WR File NR CG2-22154
WR Doc ID 699018

State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT CHANGE

DRAFT

Change Point of Withdrawal

PRIORITY DATE	WATER RIGHT NUMBER
April 8, 1974	CG2-22154

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
Clark Public Utilities **8600 NE 117th Avenue** **Vancouver, WA 98662**	

Total Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
58	GPM	93

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	
Municipal Supply Purpose	58		GPM	93		01/01-12/31

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Clark	Groundwater	N/A	28

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well 111	115621192	ABY234	2	3E	6	NESW	45.686198	-122.490472

Datum: NAD83/WGS84

Place of Use (See Attached Map)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Area served by the Clark Public Utilities. The place of use of this water right is the service area described in a Water System Plan approved by the Washington State Department of Health. RCW 90.03.386 may have the effect of revising the place of use of this water right if the criteria in section RCW 90.03.386(2) are met.

Proposed Works

Well 111 -12-inch diameter x 179.5 ft deep Completed in TGA

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	September 1, 2034

Measurement of Water Use

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

Provisions

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

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

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

Recorded water-use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Southwest Regional Office.

Department of Health Requirements
Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Southwest Drinking Water Operations, 243 Israel Road S.E., PO Box 47823, Tumwater, WA 98504-7823, (360) 236-3030.

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

Proof of Appropriation
The water right holder must 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 superseding 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, will have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

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 for Change No. CG2-22154 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.

Address and Location Information	
Street Addresses	**Mailing Addresses**
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 111 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 Olympia, Washington, this _____ day of _____ 2016.

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Michael J. Gallagher, Section Manager
Water Resources Program
Department of Ecology, Southwest Region Office

INVESTIGATOR'S REPORT
Water Right Control Number CG2-22154
Clark Public Utilities
Prepared by Jill Van Hulle, Pacific Groundwater Group

BACKGROUND

On February 2, 2016, Dan Charlson on behalf of Clark Public Utilities (CPU), filed an *Application for Change* to change the point of withdrawal of this water right certificate from Well 103 to Well 111. The water sources are situated within Water Resource Inventory Area 28, the Salmon Creek Watershed and within the Lacamas Creek sub-drainage.

Table 1: Attributes of the Existing Water Right and Proposed Change

Attributes	Existing	Proposed
Name	Robert McBain and Hockinson Water Association	Clark Public Utilities
Priority Date	April 8, 1974	No Change Requested
Instantaneous Quantity	58	No Change Requested
Annual Quantity	93	No Change Requested
Purpose of Use	Community Domestic Supply	Municipal Supply (Conformed pursuant to RCW 90.03.560)
Period of Use	Continuously	No Change Requested
Place of Use	Area served by the Hockinson Water Association	Area served by Clark Public Utilities as described in a DOH approved Water System Plan
Point of Diversion	Well 103	Well 111

Legal Requirements for Proposed Change

The following requirements must be met prior to authorizing the proposed *Application for Change*.

Public Notice

A public notice detailing this proposed change was published in the Columbian on February 25th and March 3rd, 2016, and no protests were received.

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Department of Fish and Wildlife of applications to divert, withdraw, or store water. Steve Boessow reviewed this application and supporting information and provided comments to Ecology on August 2, 2016 indicating that he did not object to the approval of this request. Mr. Boessow notes that since this is an existing right with a point of withdrawal change there would be little if any change in impacts to fish.

State Environmental Policy Act (SEPA)

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

- It is an application for more than 2,250 gpm;
- It is an application that, in combination with other water right applications for the same project, collectively exceeds the amount above;
- 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);
- It is part of a series of exempt actions that, together, trigger the need to make a threshold determination, as defined under WAC 197-11-305.

None of these situations apply to this application. Accordingly, the subject application is categorically exempt under SEPA (WAC 197-11-305 and WAC 197-11-800(4)).

Water Resources Statutes and Case Law

RCW 90.03.380(1) which states that a water right that has been put to beneficial use may be changed. The point of diversion, place of use, and purpose of use may be changed if it would not result in harm or injury to other water rights. The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp.*

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

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

This application was processed under Ecology's Cost Reimbursement Program, based on the provisions of RCW 43.21A.690 and RCW 90.03.265. Pacific Groundwater Group (PGG) prepared under contract to CPU, under the review of Ecology. PGG's evaluation of this application included a review of applicable statutes and case law, including Ecology's interpretation of the *Yelm v. Foster* case. We note however, that this request involves a modification of an existing water right and does not include a habitat-based mitigation component, and suggest that there is no conflict with the issuance of this decision.

INVESTIGATION

Evaluation of this application included, but was not limited to, research and/or review of the following:

- CH2M Hill, 2011. Clark Public Utilities Water System Plan. April, 2011.
- Evarts, R.C., 2006. Geologic map of the Lacamas Creek quadrangle, Clark County, Washington. U.S. Geological Survey, Scientific Investigations Map 2924. 22 p. plus 1 plate.
- McFarland, W.D. and Morgan, D.S., 1996. Description of the ground-water flow system in the Portland Basin, Oregon and Washington. U.S. Geological Survey Water Supply Paper 2470-A. 58 p. plus 7 plates.
- Mundorff, M.J., 1964. Geology and ground-water conditions of Clark County Washington, with a description of a major alluvial aquifer along the Columbia River. U.S. Geological Survey Water Supply Paper 1600. 268 p. plus 3 plates.
- Pacific Groundwater Group (PGG), 1996. Hydrogeologic Evaluation of Clark Public Utilities Well 95-01 (Si Ellen Estates), JM8905.27, May 17, 1996.
- Department of Ecology records of surface and groundwater rights and claims, and of well construction reports within the vicinity of the subject production wells.
- *Water Well Reports* from the Department of Ecology well log database (various dates).
- Records of water rights (and related information) in the vicinity of the subject property.
- A site visit was conducted by Jill Van Hulle of Pacific Groundwater Group.

History of Water Use

Withdrawals from CPU's Well 103 (DOH Source 32) are authorized by Groundwater Certificate G2-22154. The right allows for the withdrawal of 58 gpm, and 93 ac-ft/yr. The original source a well CPU acquired with transfer of ownership of the Hockinson water system. Well 103 is not currently an active production well, however the right is kept in good standing based on its municipal status and can be used in case of an emergency.

Well 103 is constructed with an 8-inch casing to a depth of 159 feet. Metered records are not available for this source, however CPU monitored it on a monthly basis during the time it was in use. Well 103 was generally operated on a continuous basis, and incidental comments from CPU staff indicate that the well frequently overflowed the reservoir that was situated near the site.

Tentative Determination and Good Standing

Applications for Change are governed, in part by RCW 90.03.380, which states that water rights that have been put to full beneficial use may be transferred to another place of use without loss of priority if such change can be made without detriment or injury to other existing rights.

When an *Application for Change* is filed, Ecology is required by law to perform what is called a "tentative determination." A tentative determination is a determination of the extent and validity of an existing water right established pursuant to either chapter 90.03 RCW or 90.44 RCW, with guidance provided by Ecology's policy document POL 1120, (2003 Municipal Water Law Interpretive and Policy Statement). Ecology is required to assess the validity of water rights during the change process to determine if the right is in good-standing and eligible to be changed, and to quantify the amount of water put to beneficial use. Good standing" means that Ecology can verify that water has been used within the last 5 years, that the water right has not been canceled, and that development schedule has not lapsed and assessing the historical purposes of use. Whole or partial relinquishment may occur when all or part of the authorized quantity has not been used for 5 years, respectively.

In situations where forfeiture of water is not an issue, a simplified tentative determination may be conducted. A simplified tentative determination may be conducted when a tentative determination or other actions confirming beneficial use of the water right has recently occurred, or when the existing water right is for a municipal water supply in accordance with RCW 90.03.330(3). Under these circumstances, an investigation of the complete history of the water right is not required.

At one time Well 103 was pumped on a continuous basis, and as reported by CPU produced the allocation annual quantity of 93 acre-feet per year. Further, this right serves as one of CPU's additive (or primary) water rights on which subsequent allocations are based, therefore CPU's use of other sources with non-additive allocations have served to keep this right in good standing in the full amounts.

Both Well 103 and 111 are completed in the same drainage sub-basin (Fifth Plain Creek), share a common recharge area and target the same body of public groundwater that discharges into Lacamas Creek and its tributaries.

Proposed Use

CPU proposed to transfer this water right from Well 103 to Well 111. While most of CPU's system is configured so as to allow the distribution of water anywhere within the system there are locations where individual sources are key to having adequate capacity. Well 111 will be connected to the larger regional supply infrastructure but given its location will primarily serve development that is located in this portion of the service area where CPU's capacity is limited by the size of its 6-inch supply lines, and storage capacity.

Clark Public Utilities Water Rights

CPU holds numerous water rights which are detailed in the Phase 1 Report, previously issued water rights and the utilities Water System Plan. Total permitted withdrawals amount to 54,946 ac-ft/yr

(additive), 13,712 ac-ft/yr (non-additive), with total instantaneous withdrawals of 67,256 gpm. Based on CPU's Water Use Efficiency reports, CPU produced 12,740.88 acre-feet in 2015.

The intent of this Application for Change is to shift capacity between sources and will not result in a change to the total rights held by CPU.

Other Rights Appurtenant to the Place of Use

Table 2 lists water right certificates that are located within an approximate 1 mile radius of the Well 111 site.

Table 2: Water Right Certificates within 1 mile of Well 111

Certificate No.	Name	Priority Date
S2-20327 C	ORTEIG PAUL J	6/26/1972
4115	ROTH S K	8/23/1950
5556	ROTH S A ET AL	3/18/1950
2111	SCHMID L M	4/3/1941
4101	ROTH S K	5/13/1939
996	HOLTMAN W A	3/8/1930
G2-27341 C	HANSON WALTER	5/25/1988
G2-25235 G	BOLDT GARY M	6/15/1979
G2-21087 C	WADDELL ALBERT C	5/24/1973
G2-20938 C	BLOOMQUIST VICTOR	4/13/1973
3828	DAHLIN G R	10/6/1959
3452	BRUNGARDT A	6/20/1956
3097	DUVALL R I	2/27/1958
1469	HAAGEN S V	3/10/1952
758	SIEGBERG H R	7/15/1950

The closest certificates to Well 111 are those associated with the Si-Ellen Stables. These are the Roth water rights which were issued for both surface and groundwater use.

In addition to the certificated rights, Ecology's records indicate that approximately 90 claims have been filed within that same 1 mile radius. Claims can represent valid water rights to the extent that pre-code water use can documented[1]. The majority of the claims appear to have been filed for general domestic purposes and stock watering, with some irrigation which would be uses covered under the water right exemption.

The groundwater source located nearest to Well 111 is a domestic/stock water well owned by the Grobli family. The well is represented by a long-form groundwater claim G2-052631CL filed by Alois and Ruth Grobli during the 1974 claim registration opening. The date of first use is listed as having occurred in

[1] 1917 for Surface Water and 1945 for Groundwater

1946, and while the right does not appear to represent a pre-code right it should be considered as a valid water right under the State's groundwater exemption based on beneficial use.

The Grobli well was used as an observation point during the pumping test conducted on Well 111 in 1996 and has been an active monitoring well since 2002.This well likely represents the nearest neighboring groundwater user. Potential impacts to the Grobli well are further discussed in the *Hydrogeological Evaluation* section of this ROE.

Hydrologic/Hydrogeologic Evaluation

Dan Matlock, LG, LHG, Pacific Groundwater Group prepared a technical memo is support of this request that addressed the hydrogeological setting of the Lacamas Creek watershed, and potential for impairment resulting from the transfer. (*Hydrogeologic Evaluation and Impairment Considerations – Technical Memorandum in Support of CPU Well 111 Water Right Processing*)

Well 111 is located in the west central portion of the Lacamas Creek basin in Clark County Washington. The Lacamas Creek basin encompasses approximately 67 square miles of variable relief terrain near the City of Camas. (Figure 1)

Lacamas Creek originates along the steep western sloping faces of Elkhorn and Livingston mountains at an elevation of approximate 2,230 ft and flows west and south for approximately 13.5 miles before it enters Lacamas Lake at an elevation of approximately 182 ft. Along the way it is joined by several tributaries including Matney Creek, Fifth Plain Creek, Spring Branch, and Dwyer Creek. Below Lacamas Lake the creek flows for an additional mile before entering the Washougal River near Camas.

Hydrogeologic Setting

The Lacamas Creek drainage is situated at the eastern edge of a sediment-filled structural depression called the Portland Basin. The Portland Basin is part of the larger Puget-Willamette structural trough which extends from southern British Columbia to northern Oregon and occupies the lowlands between the Cascade Mountains and the coast ranges of Washington and Oregon.

The Portland Basin consists of Oligocene-age basalt and basaltic andesite. These rocks constitute area bedrock and occur at ground surface in the eastern half of the Lacamas drainage where they rise to form the Cascade foothills. In the lowlands and terraces west of the foothills, these rocks are overlain by a thick sequence of sediments deposited by the ancestral Columbia River as the Portland Basin formed (Evarts, 2006; Swanson et al., 1993).

Trimble (1963) assigned the name Sandy River Mudstone to the oldest of these locally occurring sediments. The Sandy River Mudstone is approximately 900 feet thick near Green Mountain and consists of well-bedded, semi-consolidated deposits of Miocene- and Pliocene-age claystone, siltstone, sandstone, and other rocks. Except for localized surficial exposures in the valley bottom west of Camp Bonneville, the Sandy River Mudstone is overlain throughout the study area by 200-400+ feet of semi-consolidated to consolidated deposits of coarse-grained, cemented gravel; conglomerate; and sandstone of the Troutdale Formation. These deposits contain some of the area's most extensive and

important aquifers and are thought to range in age from late Miocene to late Pliocene (or early Pleistocene) time (Swanson et al., 1993). The Troutdale Formation interfingers locally with basalt and basaltic andesite flows that erupted in middle Pleistocene time from small volcanoes and fissures located north and east of Lacamas Lake at present day Green Mountain and Bruner Hill.

In late Pleistocene time (approximately 17,000-12,000 years ago), the western Lacamas Creek drainage was repeatedly inundated by catastrophic floods that originated from periodic failures of one or more ice dams which impounded huge glacial lakes in northern Idaho and western Montana (Bretz, 1959).

With each dam breach, massive volumes of water spread laterally and flowed in great torrents across western Montana, northern Idaho, and eastern Washington. The floodwaters eventually coalesced at the Columbia River gorge where they were laterally constrained and directed into the Portland Basin which abuts the gorge's western terminus. As floodwater entered the Portland Basin it scoured and reworked portions of the older basin fill sediments and deposited coarse gravel in longitudinal bars downstream of the gorge. In the Lacamas Creek drainage, the flood deposits reach thicknesses of 100+ feet west of Lacamas Creek proper and are composed mostly of unconsolidated gravel and sand to the south and silty sand to the north. Where they are saturated, the coarser grained flood deposits can contain prolific and locally important aquifers.

Northwest of Lacamas Lake, the flood deposits are capped by a thin layer of Holocene to Pleistocene age lake deposits, peat, and alluvium. These deposits are typically less than 15 feet thick and consist of unconsolidated grey-to-black mud, silt, and organic debris. These sediments immediately underlie most of the low-lying bottomland between Lacamas Lake and the confluence of Lacamas Creek with Fifth Plain Creek (Evarts, 2006). Above this point, the lake deposits transition to mostly coarse grained silty-sand and gravel alluvium.

Hydrostratigraphic Units

Three significant hydrostratigraphic units occur within the project vicinity:

- Unconsolidated Sedimentary Aquifer
- Troutdale Gravel Aquifer
- Sand and Gravel Aquifer

Unconsolidated Sedimentary Aquifer (USA)
The USA is an important aquifer in the Burnt Bridge basin and Vancouver Lake lowlands where it consists of coarse high permeability flood deposits of late Pleistocene age. In most of the Lacamas Creek basin, these deposits are much finer grained and have much lower permeability, consequently, this unit does not serve as an important water supply source in the project vicinity. These deposits can act to locally confine groundwater in areas where the deposits contain abundant fines

Troutdale Gravel Aquifer
The Troutdale Gravel Aquifer (TGA) occurs within the upper portions of the Troutdale Formation deposits and consist of semi-consolidated to unconsolidated sand, gravel and cobbles with variable amounts of silt and cementation.

The TGA is the source of water for Well 111 and a large percentage of other wells in the area. The aquifer typically responds as a confined system in the Lacamas basin given the occurrence of fine-grained, lower permeability USA deposits.

TGA water levels are generally lower than USA water levels indicating a downward gradient consistent with what would be expected in a recharge area. Vertical gradients near Well 111 are estimated to be as high as 0.4 ft/ft. Seepage studies indicate that there may be significant groundwater discharge to Fifth Plain Creek downstream of Well 111.

Groundwater movement within the TGA us generally from northeast to southwest and is less influence by local surface water features the groundwater flow within the USA.

The TGA is the most source of water supply within the basin. Well yields typically exceed 50 gpm is properly design wells and can locally exceed 500 gpm as is the case at Well 111.

Sand and Gravel Aquifer

The Sand and Gravel aquifer is the deepest supply aquifer in the Portland basin and occurs within the lower portions of the Troutdale Formation and within western portions of the Lacamas basin where there are more substantial accumulations of unconsolidated deposits. The SGA is separated by the TGA by a regionally extensive clay confining unit.

The SGA is an important municipal and industrial water supply source in western Clark County where it typically provides yields of 1,000 to 3,000 gpm. In the Lacamas basin the aquifer is thinner and more discontinuous and well yield are generally less than 500 gpm.

Groundwater / Surface Water Interactions

Water exchanges can occur between the USA groundwater flow system and Lacamas Creek depending on hydraulic relationship between aquifer and stream as well as local permeability conditions. When groundwater heads in the aquifer are higher than the nearby stream, there is a potential for stream to gain water from the aquifer. Conversely, where heads in the aquifer lie below the elevation of the stream, there is a potential for the stream to lose water to the aquifer. Aquifer and/or streambed permeability conditions will control the rate of flow for any head condition.

Seepage gains and losses were evaluated for the Lacamas basin as part of the USGS's Portland basin investigations (McFarland and Morgan, 1996). The seepage surveys were performed during the summer/fall of 2008 and showed an overall gain of 4.5 cfs above SR-500. The studies indicated that the largest rates of inflow occur along lower Fifth Plain Creek between Ward Road and SR-500. CPU's Well 111 lies near the upstream portions of this inflow reach. Total gains in this reach amount to about 1.35 cfs per stream mile. The large amount of inflow in this reach is consistent with the water level contour map for the USA which suggests significant convergence of groundwater. Gains and losses at most other reaches of the stream ranged between 0.1 to 0.5 cfs per stream mile.

Well 111 Construction and Testing

Well 111 was constructed and tested in 1996 by Holt Drilling. The well is 12-inches in diameter and completed in the Troutdale Gravel Aquifer (TGA) at depths of 154 to 179.5 feet. The static water level at the time of drilling was 33 feet below ground surface (bgs).

The well was tested using both a step-rate to assess well efficiency and a 24-hour constant rate test to assess aquifer properties and interference potential to neighboring wells. During the step rate test, the well was pumped at rates of between 100 gpm and 670 gpm. During the constant-rate test, the well was pumped at an average rate of 630 gpm.

The testing indicated that the well was very efficient and aquifer transmissivity was estimated to be 18,470 gpd/ft and the early time storage coefficient was estimated to be about 0.0005. Total observed drawdown in Well 111 at the end of the constant-rate was about 30 feet for a 24-hour specific capacity of 21 gpm/ft.

Water levels were also monitored during the 24-hour constant-rate test in a nearby domestic well owned by the Grobli family. The Grobli well is located 400 feet north-northeast of Well 111 and is completed in the upper portions of Troutdale Gravel Aquifer at a depth of about 90 feet. The Grobli well showed a total of about 16.5 feet of interference drawdown after 24 hours of pumping at Well 111.

Same Body of Groundwater/Well 103 Completion and Hydraulic Connection with TGA

CPU intends on transferring water rights from their Well 103 to Well 111 which is better situated to meet future growth needs. Well 103 lies approximately 3 miles northeast and upgradient of Well 111.

Both wells are completed within the Lacamas Creek basin and are located within 500 to 600 feet of Fifth Plain Creek. There is no well drillers' log for Well 103; however, CPU's records indicate that the 8-inch well was completed in bedrock (Tbr) deposits at depths of 50 to 160 feet (i.e. open-hole completion). CPU reports a static water level depth of about 9 feet below ground surface and a water level elevation of about 480 feet above sea level. This is comparable to water levels of other nearby supply wells that are completed in the adjacent TGA aquifer.

The Tbr aquifer is recharged from water which infiltrates into the bedrock deposits within the Cascade foothills east of the site. Groundwater moves laterally through the fractures and ultimately discharges into the TGA aquifer west of Well 103. Given that recharge from the bedrock deposits supports flow in the TGA and that both units are hydraulically connected to one another, they can be considered as the same body of water from the standpoint of a groundwater transfer. The transfer of rights from Well 103 to Well 111 has the additional benefit of shifting streamflow capture further downstream in the basin.

Potential for Interference Impacts to Neighboring Supply Wells

Testing at Well 111 indicated that the well was relatively productive and could likely provide up to 800 gpm for extended periods of time. However due to the large amount of interference drawdown observed in the nearby Grobli well, CPU has decided to operate at a reduced capacity, which will allow them to collect additional data to assess longer-term aquifer response.

CPU has configured Well 111 to operate at a maximum pumping rate of 280 gpm. At this rate, the projected drawdown in Well 111 would be about 23 feet after 100 days of continuous pumping. Interference drawdown at the nearby Grobli well would be on the order of 12 to 16 feet depending on the storage characteristics of the aquifer and any leakage that may come into play with longer periods of operation.

CPU has been monitoring static water levels at the Grobli well for over 15 years. Typical seasonal water level fluctuations range between 7 and 15 feet and long-term trends in this area appear to be stable. Water level readings collected prior to 2010 include some measurements that were taken while the Grobli well was operating whereas the more recent data reflect only static water level conditions. The larger seasonal range in water levels noted prior to 2010 likely reflects in part the operation of the Grobli well.

The average depth to water during the 11 year period noted above is about 44 feet which would provide almost 40 feet of available drawdown above the estimated pump level of 85 feet. The deepest water levels of record at this site is on the order of 55 feet which would still provide about 30 feet of available drawdown above the pump and a sufficient safety margin to accommodate interference from Well 111 which should be no more than 16 feet at the proposed operating rate under new rights of 280 gpm. We would recommend that CPU continue to closely monitor water levels at the Grobli well and to periodically assess and report how operation of Well 111 may be affecting the performance of the Grobli well. In the event that adverse impacts are noted, CPU will need to either reduce withdrawals from Well 111 or connect the Grobli residence to the CPU's supply system.

Other nearby TGA supply wells include the include the Roth Well that lies about 900 feet west of Well 111 and the Anderson Well that lies about 1200 feet northeast of Well 111. These wells are completed at greater depths than the Grobli well and have comparable static water levels. Since these wells lie at greater distances from Well 111 than the Grobli well, we expect that interference drawdown should be proportionally lower; therefore these wells should not be adversely impacted by operation of Well 111.

Impairment Considerations

Impairment, Qualifying Ground Water Withdrawal Facilities, and Well Interference

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection (i.e., water rights that are both senior and junior in priority to the right the applicant seeks to change). When considering whether a withdrawal of water from a well would impair another existing water right there are two important concepts.

1. Is the well is a *properly constructed qualifying ground water withdrawal facility?* A qualifying groundwater withdrawal facility is 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) the withdrawal facilities must be able to accommodate a reasonable variation in seasonal pumping water levels; and (d) the withdrawal facilities including pumping facilities must be properly sized to the ability of the aquifer to produce water.

2. Will well interference be significant enough to prevent another party from being able to fully exercise their right to water?

Well interference may occur when several wells pump from the same aquifer and their individual drawdown cones intersect, forming a composite cone. The potential for this to occur is based on well density, aquifer characteristics, and pumping demand. In aquifers with high T, composite drawdown will generally be much less than in aquifers with low T. Transmissivity is related to hydraulic conductivity (K) and the saturated thickness (b) of an aquifer by the relationship T=K*b.

CPU's request to operate Well 111 will affect the Grobli Well, however based on our assessment of the aquifer's properties and long term monitoring data, we do not believe interference drawdown will be significant enough to constitute impairment – which should be limited to domestic supply and stockwater. Further, we note that the Grobli well is only 90 feet deep whereas the entire thickness of the TGA is on the order of 300 feet.

Impairment of Minimum Instream Flow Water Rights

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

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

Under the provision of WAC 173-528 instream flows have been established for Water Resource Inventory Area 28 (WRIA 28), including the Lacamas Creek drainage. The instream flows established in this chapter are based on the recommendations of the WRIA 28 Watershed Planning Unit; consultation with the Department of Fish and Wildlife, Department of Agriculture, and Department of Community, Trade, and Economic Development; and public input received during the rule-making process.

This request is an *Application for Change* and will not increase the amount of water being withdrawn from this sub-basin, and therefore, no changes to the balance of groundwater discharging to surface water.

Public Interest Considerations

As previously noted instream flows has been established in this watershed based on the recommendations of the WRIA 28 Watershed Planning Unit. It is the goal of the planning unit to provide water for development in a manner that does not impair instream flows. The ability of public water purveyors to supply water to meet to growth within their service area by modifying their existing water rights is an important tool that is supported by the planning unit.

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:

58 gallons per minute
93 acre-feet per year
Municipal Supply

Point of Withdrawal

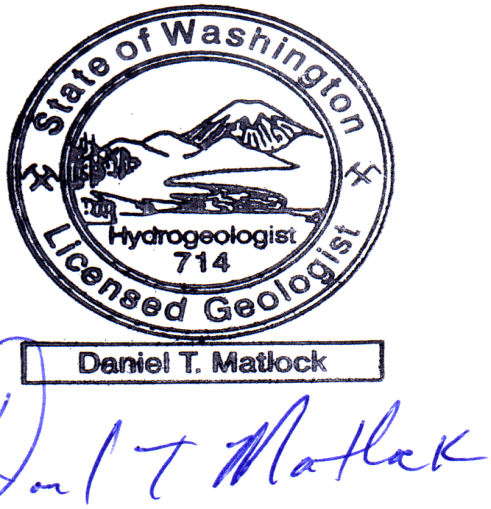
NE ¼, SW ¼, Section 6, Township 2 North, Range 3 E.W.M.

Place of Use

Area served by the Clark Public Utilities. The place of use of this water right is the service area described in a Water System Plan approved by the Washington State Department of Health. RCW 90.03.386 may have the effect of revising the place of use of this water right if the criteria in section RCW 90.03.386(2) are met.

Reported by: _____

Jill Van Hulle, Pacific Groundwater Group Date



Reported by: _____

Dan Matlock, Pacific Groundwater Group Date

Reviewed by: _____

Tammy Hall, Water Resources Program Date

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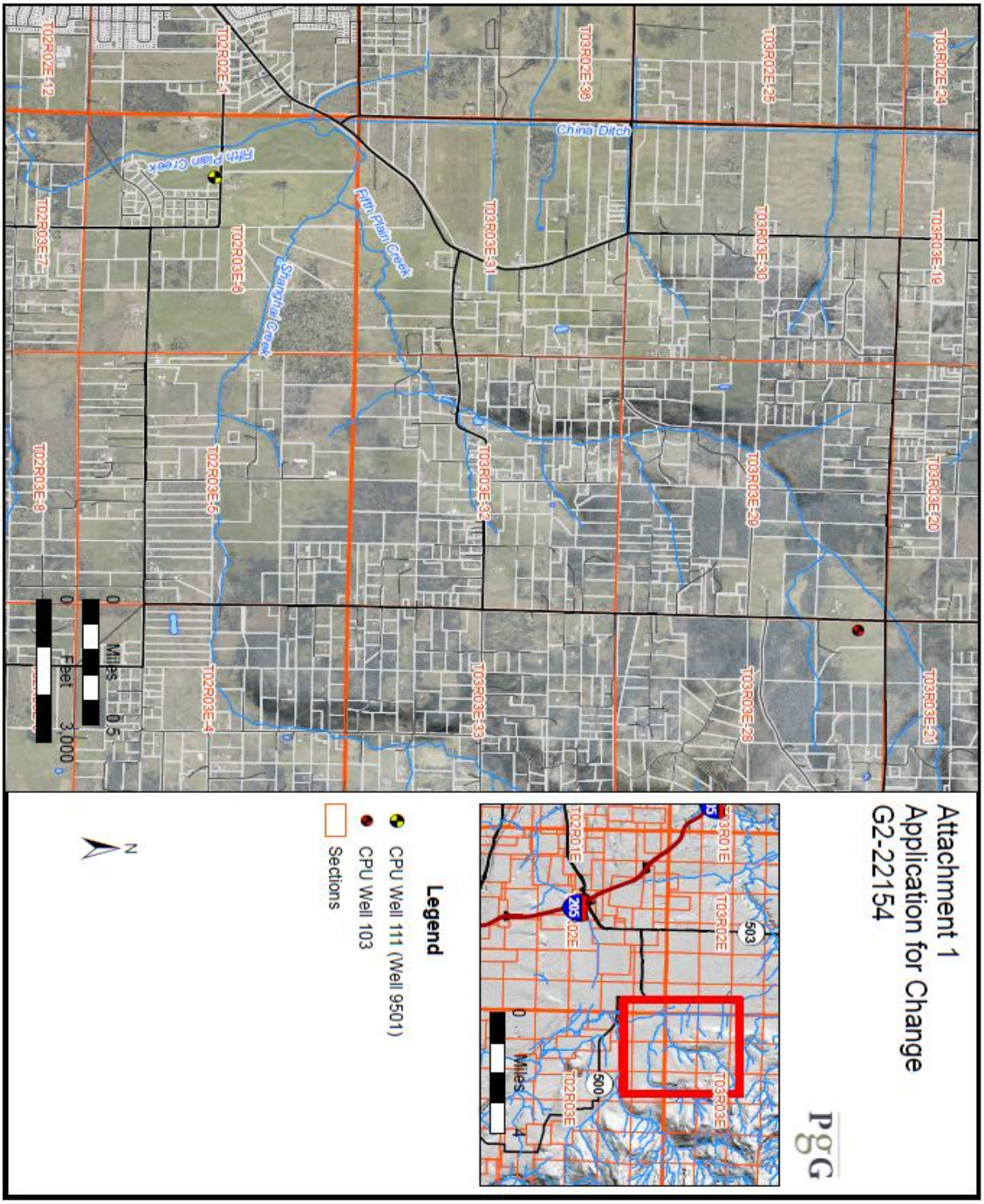
Attachment 1
Application for Change
G2-22154
PgG
Legend
CPU Well 111 (Well 9501)
CPU Well 103
Sections
N
China Ditch
Fifth Plain Creek
Shangrai Creek
T03R02E-24
T03R03E-19
T03R03E-20
T03R03E-21
T03R02E-25
T03R03E-30
T03R03E-29
T03R03E-28
T03R02E-36
T03R03E-31
T03R03E-32
T03R03E-33
T02R02E-1
T02R03E-6
T02R03E-5
T02R03E-4
T02R02E-12
T02R03E-7
T02R03E-8
Miles
0
0.5
Feet
3,000
503
500
205
T03R01E
T03R02E
T03R03E
T02R01E
T02R02E
T02R03E
4