STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 15, 1995	G2-29207		

NAME
Nancy Copeland

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3915 8th Street NW	Gig Harbor	Washington	98335

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	20	8.0

QUANTITY, TYPE OF USE, PERIOD OF USE		
0.5 Acre-feet per year	Single domestic/Stock watering	Year-round, as needed
7.5 Acre-feet per year	Irrigation	May 15 to October 15

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Approximately 550 feet North and 900 feet West of the East quarter corner of Section 31.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	31	21	2E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The South 330 feet of the East 10 acres of Lot 6A in Abandoned Military Reserve No. 24 in Section 31, T. 21 N., R. 2 E.W.M.; Except Point Fosdick-Gig Harbor County Road; and except 38th Avenue NW; and except any portion thereof lying within Moline County Road; Situated in the County of Pierce of Washington.

If you require this publication in an alternate format, please contact Water Resources at (360) 407-6300, or TTY (for the speech or hearing impaired) 711 or 800-833-6388.

DESCRIPTION OF PROPOSED WORKS

An 80-foot well.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	October 1, 2006

REPORT

BACKGROUND:

On March 15, 1995, Nancy Copeland filed an application (G2-29207) for a permit to appropriate public groundwater from a well in the amount of 20 gallons per minute (gpm) and for irrigation and stock watering. The project site is located on the Gig Harbor Peninsula in Water Resource Inventory Area 15 – The Kitsap Peninsula.

Notice of the proposed appropriation was published in *The Peninsula Gateway* on June 25, 2003 and July 2, 2003 and no protest was received by Ecology.

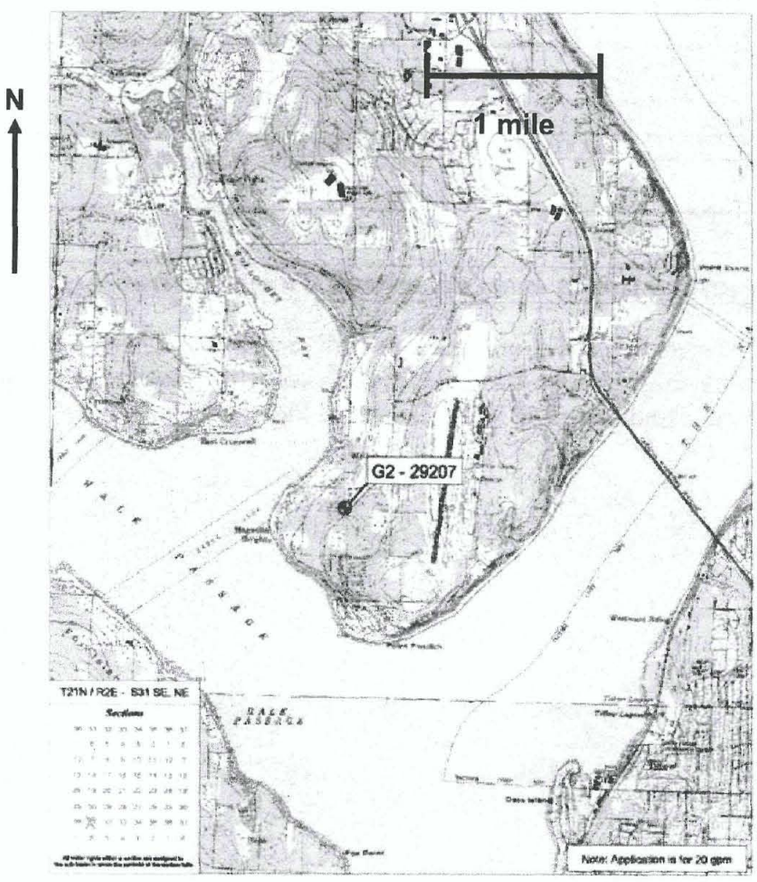
This application has been processed under the Department of Ecology (Ecology) Cost-Reimbursement Program, under agreement between Ecology and Golder Associates Inc. (Golder). Golder reviewed available documents pertaining to the City's application site conditions, historical water use, projected water demand, existing right-holders and seniority of pending applications potentially affected by the application.

INVESTIGATION:

Golder reviewed the information submitted with the application and pertinent Ecology records, including relevant geologic and hydrogeologic reports. Golder evaluated the potential effects of the proposed appropriation upon existing and senior groundwater and surface water rights. The findings of this evaluation are summarized below.

Background

The site is located on the Gig Harbor Peninsula, in the SE ¼ NE ¼ Section 31, Township 21 North, Range 2 East (Figure 1). The well belongs to Nancy Copeland.



Hydrogeologic/Hydrologic Assessment

The Department of Ecology's water right tracking database was queried to determine existing water rights within the radius of influence of the Copeland well. Well logs on file at Ecology were also examined to determine the hydrogeologic conditions in the vicinity of the water right application. Information on regional hydrogeologic data was obtained from the following resource material:

Borden, R.K. and Troost, K.G. 2001. Late Pleistocene Stratigraphy in the South-Central Puget Lowland, Pierce County, Washington. Washington Division of Geology and Earth Resources Report of Investigations 33, Washington State Department of Natural Resources.

Drost, B. W. 1982. Water Resources of the Gig Harbor Peninsula and Adjacent Areas, Washington, U.S. Geological Survey.

EMCON. 1992. Gig Harbor Peninsula Ground Water Management Plan Task 5 Hydrogeologic Evaluation Report.

Garling, M. E., Dee Molenaar, and et al. 1965. Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands, State of Washington, Department of Conservation, Washington Division of Water Resources.

Golder Associates. 2002. Phase II Level 1 Data Compilation and Preliminary Assessment Report. Redmond, Washington.

Golder Associates. 2003. Kitsap Watershed Planning (WRIA 15) Water Quality Technical Assessment. Redmond, Washington.

Golder Associates. 2004. Kitsap Watershed Planning (WRIA 15) Instream Flow Assessment Step C Final Report. Redmond, Washington.

Jones, M. A. 1996. Thickness of Unconsolidated Deposits in the Puget Sound Lowland, Washington and British Columbia, a Contribution of the Regional Aquifer-System Analysis Program. Tacoma, Washington: U.S. Geological Survey.

Kahle, S. C. 1998. Hydrogeology of Naval Submarine Base Bangor and Vicinity, Kitsap County, Washington, U.S. Geological Survey.

Noble, J. B. 1990. Proposed Revision of Nomenclature for the Pleistocene Stratigraphy of Coastal Pierce County, Washington, Washington Division of Geology and Earth Resources.

The Gig Harbor Peninsula is located in northwestern Pierce County, at the southern end of the Puget Lowland, within WRIA 15 (Kitsap Basin). The Gig Harbor Peninsula is part of the extensive glacial drift plain comprising the Puget Lowland, which was formed by at least six glaciations that occurred in the region during the last 2 million years (Kahle, 1998). The Gig Harbor Peninsula is connected to the larger Kitsap Peninsula and is surrounded on three sides by marine embayments. A complex sequence of unconsolidated and semi-consolidated sediments comprise the Gig Harbor Peninsula. The sediments include advance and recessional glacial deposits, and fluvial and lacustrine interglacial sediments. The total thickness of the sedimentary sequence on the Peninsula ranges between 1,200 and 2,000 feet (Jones, 1996). The sediments are underlain by Miocene volcanic and sedimentary bedrock (Garling et al., 1965).

Garling et al. (1965) describes a typical glacial sequence on the Gig Harbor Peninsula as consisting of the following units, listed from youngest (top) to oldest (bottom):

- Recessional outwash (a discontinuous mantle of sand and gravel overlying the till; often found on hilltops);
- Till (normally a gray to bluish-gray compact and unsorted mixture of cobbles and pebbles in a binder of sandy silt and clay); and
- Advance outwash (primarily consists of gravels and coarse sands capped by the overlying till).

Groundwater on the Gig Harbor Peninsula is primarily produced from three aquifers, referred to as the Vashon, Sea Level and Deep Aquifers. The geologic units comprising the aquifers are outlined below after EMCON (1992) and Borden and Troost (2001):

- Vashon Aquifer: Vashon recessional outwash, till, advance outwash/glaciolacustrine silt/clay (Lawton Clay)/Olympia beds/Pre-Olympia drift. Water table conditions exist in much of the Vashon Aquifer. The water level in the advance outwash generally mimics surface topography;
- Sea Level Aquifer: Salmon Springs Drift/Double Bluff Drift. The Sea Level Aquifer is characterized by a low elevation potentiometric surface (up to 135 feet above mean sea level); and
- Deep Aquifer: Permeable layers within the pre-Salmon Springs deposits. At least two productive zones have been identified as comprising the Deep Aquifer. Water level data for the Deep Aquifer is sparse, but several water level measurements indicate that the potentiometric surface is generally less than 100 feet amsl. The extent and configuration of the deep aquifer(s) is poorly understood.

All three aquifers are confined where the unit is fully saturated and overlain by a low permeable unit, however water table conditions have been observed in the Vashon Aquifer (Garling et al., 1965). Shallow, perched groundwater zones exist in several locations on the peninsula where lenses of sand and gravel occur within lower permeable material. Water levels in the perched groundwater zones are slightly higher than those in the Vashon Aquifer. Table 1 provides a summary of the hydrostratigraphy of the Gig Harbor Peninsula. EMCON (1992) developed hydrogeologic cross-sections showing the extents of the three aquifers. The cross-sections show that the Vashon Aquifer is continuous across much of the Gig Harbor Peninsula, with the exception of the deeply incised area such as Wollochet Bay and Gig Harbor. The Sea Level Aquifer is present throughout the Gig Harbor Peninsula. Borehole information for the two permeable units comprising the Deep Aquifer is very limited, and the lateral extents of the Deep Aquifer are not known (EMCON, 1992).

The peninsula is drained by multiple small streams that discharge directly to marine water. Annual precipitation on the Gig Harbor Peninsula ranges from 40 to 52 inches/year (in/yr) (Golder 2002). Precipitation on the Peninsula infiltrates into the ground, runs off to streams, or is lost to evapo-transpiration. It is estimated that between 13% (Drost 1982) and 18% (Golder 2004) of precipitation is available for groundwater recharge (after contribution to baseflow is made).

The water that infiltrates the ground flows vertically downward to recharge the three aquifers found beneath the Peninsula. Recharge to the Deep Aquifer may come from areas outside of the peninsula. Horizontal flow directions of groundwater within aquifers is generally from areas of higher head to areas of lower head. Drost (1982) cites a generally downward component to groundwater flow on the Peninsula, with groundwater generally flowing toward marine water bodies and to surface drainage channels.

Hydrologic Analysis

A well log for the Copeland Well could not be located. The claim form (G2-011885CL) associated with the Application indicates that the water was first put to beneficial use in 1967, implying that the well was drilled before this date. Since the well is only 80 feet deep, it is likely completed in the Vashon Aquifer. The estimated wellhead elevation is 150 feet amsl, while the bottom of the well is likely at 70 feet amsl. Wells logs on file with Ecology were examined to document the hydrostratigraphy of the study area. A well drilled in the same ¼ ¼ section to a depth of 62 feet bgs encountered the following hydrostratigraphic units:

DEPTH (bgs)	GEOLOGY (with unit label)
0 to 30 feet	Sand and big gravel - Vashon Till – Qvt?
30 to 62 feet	Sand and gravel with seepage, sometimes hardpacked, sometimes heaving Vashon Advance Outwash (Vashon Aquifer) – Qva
62 feet	Hardpacked gravel and clay – Qpon?

The well was drilled to a depth of 62 ft bgs in February 1983 and is owned by Dick Webster. The bailer test information provided on the Webster well indicates that the well was bailed at 40 gpm with 9 feet of drawdown after one hour. There is no water level data for the Webster Well listed on the driller's log.

Based on cross-sections created by Sweet-Edwards EMCON (1992), the thickness of the Vashon Aquifer in the vicinity of the Copeland Well is thought to be over 150 feet. The potentiometric surface map produced by Sweet-Edwards/EMCON (1992), suggests that water in the Vashon Aquifer in the vicinity of the Copeland Well is flowing southwest toward Wollochet Bay. The hydraulic gradient measured from the potentiometric surface map is between 0.04 and 0.05.

The wellhead is at approximately 140 feet amsl. The application indicates that the well is drilled to a depth of 80 feet (60 feet amsl). Since the well is above sea level, it cannot experience seawater intrusion. No pumping test or water level data is available for this well.

Neighboring Water Users

Water rights and well logs for wells completed in the Vashon Aquifer were examined in order to determine if pumping in the Copeland Well would impair other water right holders. Two wells completed in the Vashon Aquifer, both with certificated water rights are located within ¼ mile of the Copeland Well. A radius of ¼ mile was selected for a search radius based on aquifer properties.

- Water right G2-24582C is located approximately 750 feet northeast of the Copeland Well. The potentiometric surface maps created by EMCON (1992) show that the well for certificate G2-24582C is located cross-gradient from the Copeland Well and therefore is not likely to be impaired by pumping.

- Water right G2-*07796C is located approximately 1,200 feet southwest of the Copeland Well. The potentiometric surface maps created by EMCON (1992) show that the well for certificate G2-*07796C is located downgradient from the Copeland Well and therefore may be impaired by pumping.

Effects to Surface Water

Minimum instream flows were established in 1981 through Chapter *173-515-040 WAC, the Instream Resources Protection Program for the Kitsap Water Resource Inventory Area (WRIA) 15*. Any groundwater withdrawals with priority dates later than the closure dates stated in the WAC must not impair instream flows.

The nearest surface water body to the Copeland Well shown on the USGS 7.5-minute topographic map is an intermittent stream located in Sullivan Gulch, approximately 1 mile north of the Copeland Well. The potentiometric surface maps created by EMCON (1992) show that this intermittent stream is located cross-gradient from the Copeland Well. Because of its distance from the Copeland Well and the configuration of the potentiometric surface of the Vashon Aquifer in this area, it is unlikely that the Copeland Well will impact any surface water bodies. Additionally, no springs are indicated on the USGS map downgradient from the Copeland Well.

Seawater Intrusion

Since the bottom of the Copeland Well is located at approximately 70 feet amsl, there is no potential for seawater intrusion.

Water Allocation/Demand Forecasting

According to the Application, the well will be used for irrigation, stockwater and single domestic. Approximately 5 acres are expected to be irrigated (4 acres of pasture and 1 acre of orchard). The application indicates that the Ms. Copeland has 4 horses. I recommend the allocation of 0.5 acre-feet per year for single-domestic supply and related stockwater, and 1.5 acre-feet per acre/per irrigation season for the applicant's irrigation needs, for a total annual allocation of 8.0 acre-feet per year.

FINDINGS AND CONCLUSION:

- The Copeland Well is located on the southeastern portion of the Gig Harbor Peninsula, in the SE ¼ NE ¼ Section 31, Township 21 North, Range 2 East. The Copeland Well is completed in the Vashon Aquifer system.

- The Copeland well has been in continuous operation for over 30-years, without adverse effects to neighboring water users. The nearest well in the Vashon Aquifer completed downgradient with a water right is approximately 1,200 feet from the Copeland Well.

- While the well is located within WRIA 15, which is regulated by WAC 173-515-040, it is unlikely that withdrawals from the well will affect surface water bodies in the basin. The nearest (fresh) surface water body is located over a mile from the well. The estimated radius of influence of the well is ¼ mile. Potentiometric maps indicate that surface water bodies should not be impacted by pumping in the Copeland Well. No springs are indicated downgradient of the Copeland Well on the USGS topographic map.

RECOMMENDATIONS:

I recommend that this application be approved and a permit be issued to allow maximum instantaneous appropriation of 20 gallons per minute from the Copeland Well and 8.0 acre-feet/year for stock water and irrigation supply as a primary allocation. The period of use is year round as needed for domestic supply and stockwater, and May 15 to October 15 for irrigation.

PROVISIONS:

The water user is advised that quantities recommended, and the number of acres to be irrigated, may be reduced at the time of issuance of a final water right commensurate with the capacity of the installed system, and the number of acres actually irrigated.

The applicant is advised that notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent distribution system has been constructed and that quantity of water allocated by the permit to the extent water is required, has been put to full beneficial use.

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

Water use data shall be recorded annually and maintained by the property owner for a minimum of five years, and shall be promptly submitted to Ecology upon request.

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

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

The Water Resources Act of 1971, Chapter 90.54 RCW specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

REPORTED BY: Jill E Walsh Date: October 18, 2004

The statutory permit fee for this application is $27.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29207, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 18th day of October, 2004.

Thomas Loranger

Thomas Loranger
Water Resources Section Manager
Southwest Regional Office