PORT OF VANCOUVER
WATER RIGHT APPLICATION
G2-30649
PHASE I REPORT

March 24, 2015

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JM1307

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SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.

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1.0 INTRODUCTION

The Port of Vancouver (POV), founded in 1912, is deep-water port located in Vancouver, Washington along the Columbia River. The POV is a critically important developer of marine and industrial property, generating significant economic activity for the public benefit. They manage over 2,100 acres, serve more than 50 businesses that employ about 2,300 employees, and generate approximately $1.6 billion of annual economic benefit.

Within the POV's 2,100 acres, over 800 acres are currently developed with operational industrial and marine facilities, and over 600 acres are available for future development (**Figure 1**). The POV's currently-developed industrial properties are nearly completely leased. In addition, shovel-ready industrial land is available in their Centennial Industrial Park project, as well as other areas undergoing long range planning. For the POV to actively market their facilities to a wide range of potential tenants, they require a robust water right portfolio that provides flexibility to locate production wells as needed throughout their property so they can continue to meet industrial and other related needs for irrigation and mitigation programs.

This report presents Phase 1 background information for a new water right application to provide future sources of supply, including:

- an overview of the hydrogeologic setting of the POV's property
- documentation of the POV's need for additional water rights based on projected demand, supply, and existing water rights
- identification of senior water right applicants and other water users
- regulatory considerations including the WRIA 27/28 watershed planning process, instream flows specified in WAC 173-528, and the State Environmental Policy Act (SEPA)
- other environmental considerations for water-right processing

The POV's water right application is being processed by the Washington State Department of Ecology (Ecology) under a Cost Reimbursement Agreement (CRA) between the two parties. We understand that Ecology has granted the POV's request to process this application through the Streamlined CRA Processing program. Under this program the POV would be able to enter directly into a contract with Ecology to provide oversight and review of a draft Report of Examination, which will be prepared by Pacific Groundwater Group (PGG).

2.0 BACKGROUND

The intent of this application is to secure the additional water rights required by the POV to meet their long-range demands. As an industrial water provider, the POV is responsible for ensuring that both existing and future tenants have an adequate supply of water.

On January 29, 2015 the POV filed Application for Water Right G2-30649 (Attachment 1). The POV requested a new permit in the instantaneous quantity (Qi) of 20,500 gallons per minute (gpm) and the annual quantity (Qa) of 22,050 acre-feet per year (ac-ft/yr).

It is the POV's intent to develop these full amounts subject to previously issued rights that authorize the use of water on the site. Since the POV already holds water rights in the presumed amounts of 13,550 gpm and 8,024 acre-feet, PGG suggests that the new permit be issued for a combination of additive and non-additive amounts consistent with Ecology's Policy Guidance POL-1040. A discussion of previously issued water rights and recommendations for future permit allocation is included in Section 5 of this Phase I report.

2.1 PLACE OF USE

The POV owns over 2,100 acres located in southern Clark County south and west of Vancouver Lake. While the POV currently distributes water to tenants located on their property, it is possible that distribution could be extended to adjacent parcels.

In order to provide future flexibility, the place of use for this application encompasses the POV's property and includes some neighboring property. Potable water is available throughout this area from the City of Vancouver and Clark Public Utilities (CPU); it is not the POV's intent to provide a drinking water supply for residential land owners that may be situated within the designated place of use.

The POV's project site is situated within the following place of use, which is illustrated in Exhibit 2 of Attachment 1:

In Township 2 North, Range 1 West, W.M.

S ½ of Section 1, T2N, R1W
E ½ of SE of Section 2, T2N, R1W
NE of NE of Section 11, T2N, R1W
Section 12, T2N, R1W
Section 13, T2N, R1W

In Township 2 North, Range 1 East, W.M.

W ½ of SW of Section 7, T2N, R1E
SW of SW of Section 16, T2N, R1E
S ½ of Section 17, T2N, R1E
SW of NE of Section 18, T2N, R1E
W ½ of Section 18, T2N, R1E
SE of Section 18, T2N, R1E
N ½ of Section 19, T2N, R1E
Section 20, T2N, R1E
NW of NW of Section 21, T2N, R1E
S ½ of NW of Section 21, T2N, R1E
SW of Section 21, T2N, R1E
W ½ of SE of Section 21, T2N, R1E

SW of Section 27, T2N, R1E
N ½ of Section 28, T2N, R1E
N ½ of SE of Section 28, T2N, R1E
NE of NE of Section 29, T2N, R1E

2.2 POINTS OF WITHDRAWAL

Since the POV needs the flexibility to site wells on an as-needed basis, this water right application designates the following quarter sections as potential well sites, or points of withdrawal. While a total of 31 potential sites have been designated, it is unlikely that more than 15 wells will be constructed under this authorization.

Section 1 – the SW ¼ and the SE ¼, of T. 2 N., R. 1 W.W.M.
Section 2 – the SE ¼ of T. 2 N., R. 1 W.W.M.
Section 7 – the SW ¼ of T. 2 N., R. 1 W.W.M.
Section 11 – the NE ¼ of T. 2 N., R. 1 W.W.M.
Section 12 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N., R. 1 W.W.M.
Section 13 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N., R. 1 W.W.M.
Section 17 – the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.
Section 18 – the NW ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.
Section 19 – the NW ¼ and the NE ¼ of T. 2 N. R. 1 E.W.M.
Section 20 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.
Section 21 – the NW ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.
Section 27 – the SW ¼ of T. 2 N. R. 1 E.W.M.
Section 28 – the NW ¼, the NE ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

3.0 HYDROGEOLOGIC SETTING

The POV properties are located within the Vancouver Lake Lowland and the Columbia River floodplain (**Figure 1**). Associated land-surface elevations range from 10 to 30 feet above mean sea level. The regional geology and hydrogeology in the Vancouver Lake Lowland have been extensively studied and are described in the following references:

- A Description of Hydrogeologic Units in the Portland Basin, Oregon and Washington (Swanson and others, 1993)
- Geology and Ground-Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River (Mundorff, 1964)
- Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington (McFarland and Morgan, 1996)
- Technical Information in Support of Clark Public Utilities South Lake Wellfield, Water Right Application G2-30381 (PGG, 2008)
- Hydrogeologic Evaluation for Clark Public Utilities South Lake Wellfield SGA Production Wells PW-2 and PW-3 (PGG, 2009)
- Vancouver Lake Lowlands Groundwater Model Summary Report (Parametrix, S.S. Papadopulos & Associates, Pacific Groundwater Group and Keta Waters, 2008)

The hydrostratigraphy of the Vancouver Lake Lowland can be divided into the upper and lower sedimentary systems. The production zone for the POV's wells, the Pleistocene Alluvial Aquifer, is part of the upper sedimentary system. A basin wide aquitard referred to as Confining Unit 1 (CU1) divides the regionally extensive upper and lower sedimentary sequences and aquifer systems. **Figures 2** and **3** present two regional hydrogeologic cross-sections that extend through the Vancouver Lake Lowland and show key hydrostratigraphic units (cross-section alignments are shown on **Figure 1**). Detailed descriptions of the key hydrostratigraphic units are presented below.

3.1 UPPER SEDIMENTARY SUBSYSTEM

The upper sedimentary subsystem includes the following hydrogeologic units:

- Recent Alluvial Aquifer (RAA)
- Pleistocene Alluvial Aquifer (PAA)
- Troutdale Gravel Aquifer (TGA)

3.1.1 Recent Alluvial Aquifer

The Recent alluvial deposits form the RAA, which is the uppermost aquifer throughout much of the Vancouver Lake Lowland (**Figures 2** and **3**).

The Recent alluvial deposits blanket the Vancouver Lake Lowland and primarily consist of fine-grained silts and sands. The deposits are typically 80 to 100 feet thick, but may achieve thicknesses of close to 200 feet near the existing Columbia River channel. These deposits contain two sub-units—an upper sub-unit that is primarily silt, and a lower sub-unit that is primarily fine sand. Both sub-units extend over most of the Lowland but may be locally absent in some areas. The upper silt sub-unit appears to be absent in vicinity of CPU's La Frambois wellfield site (south of Vancouver Lake) as well as in the vicinity of some of the environmental sites that are south of the lake. The silt sub-unit is generally thinner than the underlying sand sub-unit, typically ranging between 20 and 40 feet in thickness. The lower sand sub-unit appears to pinch out east of Fruit Valley near the margins of the Vancouver Lake Lowland. The unit achieves a thickness of 100 to 150 feet near Hayden Island and along the west side of Vancouver Lake.

Water levels in the RAA typically occur within 10 to 20 feet of ground surface. In some areas the water table is near land surface, as indicated by wetlands. The RAA is in direct hydraulic continuity with surface water bodies such as the Columbia River, Vancouver Lake, the Flushing Channel, and Lake River (**Figure 1**). Because of its relatively low permeability and the much greater productivity of the underlying PAA, this aquifer is not used as a water supply source.

3.1.2 Pleistocene Alluvial Aquifer

The Pleistocene alluvial deposits form the PAA, which has served as an important municipal supply source in the Vancouver area and an industrial supply source in the Vancouver Lake Lowland area. The Pleistocene alluvial deposits blanket the uplands that surround the modern Columbia River floodplain, and underlie the Recent alluvial deposits (**Figures 2** and **3**). The permeability of the Pleistocene alluvial deposits is variable and depends on the processes that occurred during their deposition in the Missoula flood events. Very coarse sand, gravel, and cobble deposits were laid down in the Vancouver Lake Lowland and within flood channels that crossed the Vancouver area. The coarsest deposits occur along the current channel of the Columbia River, in the Vancouver Lake Lowland, and below the upland that extends from Orchards to Vancouver. Further north of Vancouver, fine-grained deposits consisting largely of silt and fine sand were laid down in lower energy, backwater environments.

The PAA underlies the RAA in the Vancouver Lake Lowland and is the uppermost aquifer system within the upland areas that lie to the east (**Figure 2**). In the Lowland areas, the PAA and RAA are in direct contact with each other and are confined by the presence of the overlying silt sub-unit (**Figures 2** and **3)**. Within the Vancouver Lake Lowland, the thickness of the PAA appears to vary from about 150 feet near CPU's Carol Curtis Wellfield (formerly known as the South Lake Wellfield) to 50 feet along the west side of Vancouver Lake (PGG, 2008). In the uplands near Vancouver, its thickness ranges from about 100 to 300 feet.

Transmissivity estimates for the higher energy depositional areas of the PAA range between 2,000,000 and 13,500,000 gallons per day per foot (gpd/ft) (Mundorff, 1964; PGG, 1997; PGG, 2004; Parametrix et al, 2008; and Robinson & Noble, 1982). The highest transmissivity values are based on recent testing at CPU's Carol Curtis site (TW-8), where the aquifer was stressed for a period of 3 days at an average rate of 5,100 gpm (Parametrix et al, 2008). The Carol Curtis Wellfield testing indicated a confined storage coefficient of 0.002 (dimensionless).

Transmissivity and well productivity greatly diminish north of Burnt Bridge Creek where the Pleistocene alluvial deposits become finer grained. The transmitting capacity of the PAA is only sufficient to support domestic well production in this area.

3.1.3 Troutdale Gravel Aquifer

The Troutdale formation underlies the Pleistocene alluvial deposits and has been divided into various stratigraphic and hydrostratigraphic units by previous investigators (Mundorff, 1964; Swanson and others, 1993). For this study, the coarse grained upper Troutdale is considered a separate unit from the finer grained lower units that underlie Confining Unit 1.

The upper unit, which includes the coarse-grained sediments of the Upper Troutdale formation described by Mundorff (1964), is the most extensive deposit in the Portland basin (PGG, 2008). Consisting of cobbly sand, gravel, and varying amounts of silt, this unit often contains considerable cementation, which reduces its capacity to transmit water. It is approximately 100 to over 300 feet thick within the project vicinity (**Figures 2** and **3**).

Water bearing zones within the upper gravel unit form the Troutdale Gravel Aquifer (TGA). This aquifer underlies the Pleistocene Alluvial Aquifer. In areas where the upper Troutdale has been severely weathered, a confining zone may occur between these two aquifers. The degree of hydraulic separation depends on the local permeability of this confining unit. In the Vancouver Lake Lowland vicinity, the confining unit has a moderately high permeability, and heads in both aquifers are about equal (PGG, 2001).

The permeability of the TGA is moderate and its transmissivities are typically one to two orders of magnitude lower than those of the Pleistocene Alluvial Aquifer. PGG (2001) estimated a transmissivity of 260,000 gpd/ft at the La Frambois test well site (TW-2d). In the Hazel Dell area, transmissivity values range between about 8,000 and 800,000 gpd/ft (PGG, 2000). Although the TGA may achieve thicknesses of 200 to 300 feet, the bulk of the transmitting capacity is constrained to thinner zones that are on the order of 20 to 50 feet. Because of its widespread occurrence, the TGA is an important source of water supply throughout Clark County. Well yields are typically less than 1,000 gpm, and specific capacities usually do not exceed 20 gpm/ft.

3.2 LOWER SEDIMENTARY SUBSYSTEM

The lower sedimentary subsystem has been referred to as the Sandy River Mudstone (PGG, 2008). The lower sedimentary subsystem includes the following hydrogeologic units:

- Confining Unit 1 (CU1)
- Troutdale Sandstone Aquifer (TSA)
- Confining Unit 2 (CU2)
- Sand and Gravel Aquifer (SGA)

3.2.1 Confining Unit 1

Confining Unit 1, or CU1, is a regionally extensive sequence of silt and clay deposits that forms a major aquitard ranging from 50 to nearly 300 feet thick within the Portland Basin. CU1 isolates groundwater flow in the upper sedimentary subsystem from groundwater flow in the lower sedimentary subsystem.

3.2.2 Underlying Units

On a regional scale, the lower sedimentary system includes three hydrostratigraphic units that underlie CU1, including: the Troutdale Sandstone Aquifer (TSA), Confining Unit 2 (CU2) and the Sand and Gravel Aquifer (SGA). While these three units are well differentiated in the Orchards area and near Portland’s South Shore Wellfield, north of these locations (particularly beneath the Vancouver Lake Lowland), the TSA and SGA are both largely composed of fine sand and there is less intervening silt and clay (CU2). Because of the textural similarity of the sediments underlying CU1 beneath the Vancouver Lake Lowland, these water-bearing sands are herein collectively referred to as the SGA.

3.3 RECHARGE, DISCHARGE AND GROUNDWATER FLOW PATTERNS

Natural recharge to the Vancouver Lake Lowland comes from areal recharge derived from local precipitation and from groundwater flow from upland areas north of Burnt

Bridge Creek and Lake River. PGG (2008) estimated aerial recharge rates, in part based on U.S. Geological Survey (USGS) recharge estimates for the Portland Basin studies (Snyder et al. 1994). The areal average annual recharge is estimated at approximately 6 inches per year (approximately 14-percent of average annual precipitation), with reduced recharge rates associated with paved areas. Rates of groundwater recharge from the upland north of Burnt Bridge Creek were assessed by PGG (2004) based on groundwater flow patterns, recharge, pumping, and baseflow statistics from the USGS Portland basin studies. Based on this information, PGG estimated that about 29 cubic feet per second (cfs) of recharge enters the Vancouver Lake Lowland as subflow from the adjacent uplands.

Due in part to the high transmissivity of the PAA, groundwater gradients in the upper sedimentary subsystem are relatively flat, particularly in the area west of the City of Vancouver. Water level measurements indicate that the PAA and the adjacent RAA respond rapidly to changes in Columbia River stage (PGG, 2008). These stage changes are caused by tidal influences and up-stream dam releases. Seasonal variation of Columbia River stage (in excess of 7-10 feet) results in similar changes in groundwater levels. Tidal river stage variations (on the order of 2 feet) typically result in groundwater level variations of several tenths of feet. The observed rapid response between changes in river stage and corresponding changes in groundwater levels indicates a high interconnectivity between the river and both the PAA and the RAA. The combination of a flat groundwater gradient and tidal influences make estimating groundwater flow directions difficult using conventional methods.

The relatively flat gradient in groundwater levels is further affected by pumping of groundwater in the study area. High aquifer transmissivity results in large capture zones with shallow gradients. Capture areas are difficult to differentiate based on groundwater elevations alone due to the influence of river-stage variations. However, capture zones have been roughly delineated based on a combination of modeling analyses (Parametrix et al, 2008), groundwater elevation snapshots (close to pumping centers), and mapping of groundwater contamination. Model-estimated drawdowns due to existing and projected future groundwater withdrawals are discussed in Section 9 of this report.

4.0 ENVIRONMENTAL SITE REVIEW

Portions of the Vancouver Lake Lowland have a long history of commercial and industrial land use, particularly in the vicinity of the Columbia River. A potential byproduct of these land uses can be negative impacts to the environment. Of particular relevance to the POV's water right application would be sites that pose potential sources of groundwater contamination to existing or future production wells.

POV documents and input, and Ecology databases were used to identify key environmental sites in the vicinity of the POV's property and possible future POV production wells. The primary sources for the environmental site review were:

- POV-provided information on environmental clean-up sites they currently manage
- Ecology's Environmental Information Management (EIM) online database

In the project area, the POV is currently managing groundwater cleanups or monitoring post-cleanups at the Former Fort of Vancouver Plywood site, Alcoa/Evergreen site, Automotive Services Inc. (ASI), Former Leasehold/Glacier site, and the Former Brazier Forest Industries Leasehold site. In addition, POV is managing an active pump and treat remedy of the area-wide dissolved phase Swan Manufacturing Company (SMC)/Cadet/Nustar plume to address chlorinated solvents (e.g. trichloroethene or TCE). NuStar is actively addressing contamination associated with their facility. Recent groundwater monitoring reports and data for these sites were provided by the POV (URS, 2014a; URS, 2014b; Kennedy/Jenks Consultants, 2012a; Kennedy/Jenks Consultants, 2012b; Parametrix, 2014b).

Ecology's EIM online database was used to perform a regional search to identify additional environmental sites with potential groundwater and soil impacts in the vicinity of the POV's property. The EIM is Ecology's main database for environmental monitoring data. It is used to manage data collected by Ecology, consultants, grant recipients, local governments, and volunteers. Ecology's Toxics Cleanup Program Web Reporting site was also used for additional environmental site information.

Table 1 summarizes environmental sites identified in POV-provided documents, by direct POV input, and in the EIM that are in the vicinity of the POV's project. As indicated in Table 1, many of these sites have undergone significant cleanup actions and are now in long-term confirmation monitoring.

The sites in Table 1 were subdivided into those with associated groundwater data and those with associated soil data only. For sites with groundwater data, the most recent groundwater data set was obtained from POV documents or EIM for comparison to cleanup levels established by the Model Toxics Control Act (MTCA) (WAC 173-340). Groundwater results for potential contaminants-of-concern were evaluated against MTCA Method A cleanup levels or Method B cleanup levels for parameters without established Method A values. This evaluation was performed for the purposes of the POV's application only, and does not represent a comprehensive assessment of the status of groundwater contamination at these environmental sites. For example, during this evaluation any exceedance of MTCA Method A/B cleanup levels in the most recent data sets was flagged; an evaluation of long-term data sets for individual sites and individual wells would be required to assess if the exceedances are representative of groundwater conditions or outliers.

Locations for groundwater samples that were evaluated against MTCA Method A/B cleanup levels are presented in Figure 4. The only environmental sites identified in the vicinity of the POV property with exceedances of Method A/B groundwater cleanup levels in the most recent data sets are those managed or co-managed by the POV: Alcoa/Evergreen, ASI, Fort Vancouver Plywood, Brazier Forest Industries, and the SMC/Cadet/Nustar area-wide dissolved phase plume. No additional sites with known groundwater impacts were identified.

EIM data alone are not as useful for evaluating soil data. Soil data in EIM may represent an initial investigation, and subsequent excavation or treatment of impacted soil may not necessarily be reflected in the EIM data set. Therefore, soil quality was not evaluated from the EIM data for environmental sites in the vicinity of the POV's property. However, nearby environmental sites with soil investigations are presented in Table 1 and Figure

4. Ecology's Toxics Cleanup Program Web Reporting website indicates that No Further Actions (NFAs) were issued for the Former Bill Copps Inc., and Northwest Pipeline sites; that groundwater was not encountered at the Estate of Mary E. MacKay site; and that contaminated soil at the Plaid Pantry 112 site is separated from groundwater by at least 25 feet. The information reviewed indicates these sites do not represent a significant threat to groundwater quality in the POV property area.

5.0 PROJECTED WATER DEMAND, SUPPLY, AND WATER RIGHTS

The POV serves as a regional industrial water purveyor, supplying water to a wide range of existing and proposed tenants. POV is requesting the issuance of permanent, year-round water rights that allow for additional development beyond the extent of their current water rights.

5.1 FUTURE DEMAND

Water will be used for industrial and related supply of the POV's facilities. The related uses include, but are not limited to: industrial needs, manufacturing, commercial processes, dust control, environmental quality, wildlife propagation, domestic and potable water supply, irrigation incidental to industrial uses and the management of wildlife enhancement areas, and mitigation.

The POV has evaluated the land use categories/zoning, and predicted development patterns of project, and estimated that they will use approximately 22,050 ac-ft/yr at full buildout. **Figure 1** presents the land use categories used in this evaluation and **Table 2** summarizes the POV water demand estimates.

In preparing these estimates, the POV considered their long range development plans and made assumptions regarding the types of water users that could be located on the site based on zoning. High-end water users such as chemical manufactures and micro-electronic producers account for the largest share of potential future water users. For example, water rights in the amount of 6,670 gpm and 10,115 ac-ft/yr have been allocated for SEH America's Vancouver micro-chip manufacturing operations. Other local Port facilities such as the Port of Kalama and Port of Longview hold rights in the amounts of 15,943 and 20,906 ac-ft/yr respectively, which are consistent with the POV's water demand estimates.

In filing this application, the POV intends to secure rights to a quantity of water adequate to meet their demand at full buildout of port facilities.

5.2 EXISTING WATER RIGHTS

There are three main types of water rights associated with the POV's current operations: 1) a presumed pre-code statement of water right claim; 2) rights associated with specific industries (tenants) that have developed their own infrastructure; and 3) rights resulting from a transfer from Boise Cascade. **Table 3** lists the water rights associated with the POV's property ownership.

1. Statement of Claim 151264 was filed in 1974 during the general claim registration period in which the POV asserted that two of the three wells had been installed prior to 1945. Based on the asserted date of first use, the claim may be found to be a pre-code water right.

   Since the claim has not been formally adjudicated, PGG has not assigned a tentative value to this claim. As with all statements of claims, this water use may be evaluated at a future date and an adjudicated certificate may be issued that reflects the extent of the pre-code water use.

2. Of the industry-specific water rights, the largest amount is associated with Great Western Malting's operations. Great Western Malting (GWM) is one of the world's largest producers of malt for use in the brewing and distilling industries. There are several water rights associated with their operations issued by Ecology to either GWM or POV. Since the water rights are currently designated for use at the GWM facility, the POV has decided not to consider those water rights as part of its general water right portfolio for purposes of this application.

3. The Boise Cascade rights include two Change Decisions resulting from previously filed *Applications for Change of Water Rights* that served to transfer water from Boise Cascade to the POV. These authorized changes will ultimately result in the issuance of superseding certificates <u>3647-A(B)</u> for 4,250 gpm and 2,650 ac-ft/yr, and <u>G2-22784</u> for 9,300 gpm and 5,374 ac-ft/yr (both for industrial uses on POV property).

   The POV currently has Ecology's authorization to construct and utilize up to 10 new wells within certain portions of the POV property. The change/transfer authorizations are subject to a development schedule, with *Proof of Appropriation* of the use due on September 1, 2017.

   It is the POV's intent to use the Boise Cascade rights as a partial supply for future development needs (in combination with any rights granted under this application), and to pursue an appropriate extension of the Boise Cascade rights to meet the timeline of future water supply goals.

For the purposes of determining how much additional water the POV will need to supply future demand, PGG suggests that the quantification of the POV's existing rights include the stated values of the Boise Cascade rights – 13,550 gpm and 8,024 ac-ft/yr.

The new permit should be issued in the Qi amount of 20,500 gpm, of which 6,950 gpm is *additive* and 13,550 is *non-additive*, and Qa in the amount of 22,050 ac-ft/yr, of which 14,026 ac-ft/yr is *additive* and 8,024 ac-ft/yr is *non-additive*.

Water Rights	Qi (gpm)		Qa (ac-ft/yr)	
	Additive	Non-additive	Additive	Non-additive
3647-A(B)	4,250	0	2,650	0
G2-22784	9,300	0	5,374	0
Sub-total	*13,550*	*0*	*8,024*	*0*
Application G2-30649	6,950	13,550	14,026	8,024
Total Proposed POV Rights	**20,500**		**22,050**	

PGG further recommends that the new permit include a provision stating that the new Qa allocation is intended to total 20,500 gpm, and 22,050 ac-ft/yr *less* any existing Boise Cascade rights (3647-A(B) and G2-22784). Thus, the final certificate may be issued with an *additive* component of Qa greater than the *additive* component specified in the permit should some portion of the Boise Cascade rights not be extended and/or fully developed.

5.3 EXISTING SOURCES

The POV currently uses production wells POV Wells 1, 2, and 3 (**Figure 1**) to produce water for a variety of industrial purposes. All three wells are approximately 18-inches in diameter.

Well 1 (UWID AFP 650) and Well 2 (UWID AFP 648) are primarily used to supply potable water to the Terminal 2 area for various purposes, but also serve as backup sources for the fire protection system. In general, the POV operates Wells 1 and 2 on alternating schedules, with one well being pumped for several months before the other well is returned to service.

POV Well 3 (UWID AFP 649) is primarily dedicated to fire protection purposes, although water pumped from the well during weekly fire-pump testing is diverted to the potable water system.

Additionally, the POV operates a containment well (EW-1) that is used to manage contamination from the SMC/Cadet/Nustar area-wide dissolved phase groundwater plume (Section 4). Over 4,000 ac-ft/yr is pumped from EW-1, treated, and discharged to the Columbia River. In the future, some of this water may be used for industrial purposes or other purposes specified in Section 5.1 and in the POV's application G2-30649, and the quantities of water use will be accounted for under both the existing (Boise Cascade) authorizations as well as under the new permit authorization.

6.0 SENIOR WATER RIGHT APPLICANTS

RCW 90.03.265(2) provides that in pursuing a cost-reimbursement project, Ecology must determine the source of water proposed to be diverted or withdrawn from, including the boundaries that delimit the source. A source of water may include surface water only, groundwater only, or surface and groundwater together if Ecology finds they are hydraulically connected. Ecology must determine if any other (senior) water right applications are pending from the same source. Ecology shall consider technical information submitted by the applicant in making their determinations under this subsection.

RCW 90.03.265(1)(b) provides that the requirement for an applicant to pay for processing of senior applicants does not apply in situations where it can be determined that the water allocated by approval of the application will not diminish the water available to a senior applicant from the same source of supply. As discussed below, PGG has identified no pending applications that would be adversely affected by the issuance of a permit to the POV, and recommend that this application be processed alone.

6.1 VANCOUVER LAKE LOWLAND AREA PENDING WATER RIGHT APPLICATIONS

Water right certificates, permits, and new/pending applications in the Vancouver Lake Lowland were obtained from Ecology's water right database in November 2014 and are summarized in Table 4. Review of these water right files indicates that there are only three pending applications on file for new water rights in the area:

Application	Applicant	Qi	Qa	Purpose	T/R-S Location
G2-29930	Vancouver Port	80 gpm	---	EN	2N/1E-18
S2-30173	Kadow Lloyd & Bev	0.2 cfs	---	FR	3N/1W-36
R2-30209	WDFW	n/a	157 ac-ft/yr	RE	3N/1E-31

Both surface water application S2-30173 and reservoir application R2-30209 were filed for projects located northwest of the POV's industrial area on the narrow strip of land between Vancouver Lake and the Columbia River. Application S2-30173 was filed for emergency fire protection for a small commercial marina located west of Vancouver Lake, and the source of supply is a slough on the Columbia River. Application R2-30209 was filed for a wetland restoration project that involves the retention of water within the former Shillipoo Lake basin. Neither project conflicts with the POV's proposed water use.

Groundwater application G2-29930 was filed by the POV for what was to be a short term wetland restoration project. Based on our discussion with Ecology, this application is no longer needed and any need for mitigation-related water can be accommodated under the POV's current portfolio.

7.0 REGULATORY FRAMEWORK

The POV's project site is located in WRIA 28, which is subject to the Instream Flow Protection Plan established under the provisions of WAC 173-528, and subject to recommendations of the WRIA 27/28 Watershed Planning Group (HDR and EES, 2006a, 2006b, and 2006c). The watershed plan provides a pathway for assessing new water right applications and outlines a methodology – when appropriate – for mitigating impacts to instream flows in the basin.

It is Ecology's goal that decisions on new water right applications in Clark County be consistent with the watershed planning process and recommendations of the WRIA 27/28 Planning Group.

The WRIA 27/28 Watershed Management Plan (WRIA 27/28 Plan) addresses a range of issues related to water resources in the watershed's drainages, including water supply, streamflow management, water quality, and fish habitat. The WRIA 27/28 Plan notes that development and use of water supplies can affect streamflow. At the same time, the WRIA 27/28 Plan recognizes that water supply is essential for communities, citizens and businesses, and that needs for water will increase as the region continues to grow and develop. Striking a balance between protecting flows and allowing for water supply has been a major aspect of this watershed planning process.

The WRIA 27/28 Plan recommendations were approved in 2006 by the Salmon-Washougal and Lewis planning unit in accordance with RCW 90.82.130. The planning unit is a group made up of Clark, Skamania, and Cowlitz county commissioners and a broad range of interested water users, with the understanding that Ecology will use the WRIA 27/28 Plan as the framework for making future water resource decisions in the Salmon-Washougal and Lewis River watershed planning areas.

The WRIA 27/28 Plan recommends where water for future development can best be made available and establishes guidelines for instream mitigation in other areas. It identifies large water resources that can support regional water supply development without harming fish habitat, such as the Vancouver Lake Lowland.

Ecology relies on the WRIA 27/28 Plan as a primary consideration in determining whether water supply projects are consistent with the water code's public interest criteria. The fundamental recommendations of the WRIA 27/28 Plan have been incorporated in the subsequent adoption of a formal instream flow projection rule as embodied in WAC 173-528.

8.0 SEPA

At the proposed withdrawal rate of 20,500 gpm, this project is not exempt from the SEPA process. The POV will prepare an Environmental Checklist for Ecology's review, and will comply with all applicable SEPA requirements. PGG envisions the SEPA review process will run concurrently with the review of this application, with the understanding that SEPA must be complied with prior to the issuance of a final water right decision.

9.0 CONSIDERATIONS FOR WATER RIGHT ISSUANCE

Under the provisions of RCW 90.03.290 and 90.44, a water right permit may be issued upon findings that water is available for appropriation for a beneficial use and that the appropriation thereof, as proposed in the application, will not impair existing rights or be detrimental to the public welfare. In preparing this application and supporting documentation, the POV contends that this request is consistent with the water code and that the following is true:

- Water is available,
- The water use is for a beneficial purpose,
- There will be no impairment of existing rights, and
- The water use is not detrimental to the public interest.

9.1 WATER AVAILABILITY AND BENEFICIAL USE

Water is available for appropriation. The completion aquifer for existing and future POV wells is highly transmissive, productive, and capable of supporting the additional withdrawals requested. Water is legally available in a manner consistent with the recommendations of WAC 173-528, which provides for the issuance of water right permits without the need for streamflow mitigation within the Vancouver Lake Lowland.

According to RCW 90.14.031 and other legal authorities, industrial supply and other proposed uses described in this report (see Section 5.1) are considered beneficial uses of water.

9.2 IMPAIRMENT/EFFECTS TO OTHER WATER USERS

Impairment to senior water-right holders typically occurs as interference drawdown associated with a new groundwater withdrawal. If interference drawdown is significant relative to well performance and available drawdown in an existing well, customary well yields can be reduced. Additionally, the pattern of drawdown from a new groundwater withdrawal can affect groundwater flow patterns, and thus influence management practices for containing and cleaning up existing contaminant plumes.

PGG used a calibrated groundwater model of the Vancouver Lake Lowland to estimate drawdown associated with the proposed POV water right. Model setup and predictions are addressed in the sections below, along with evaluations of impairment to senior water-right holders and effects on current contaminant cleanup activities.

9.2.1 Use of Vancouver Lake Lowland Groundwater Model

The Vancouver Lake Lowland Groundwater Model was developed for POV and CPU under a collaborative effort by Parametrix, S.S. Papadopulos & Associates, PGG and Keta Waters (Parametrix et. al., 2008). The model was developed using site-specific geologic and hydrogeologic data collected throughout the Vancouver Lake Lowland. Significant model features include:

- The model employs the three-dimensional, finite difference code “MODFLOW” developed by the U.S. Geological Survey (McDonald & Harbaugh, 1988). The model was run in both steady-state and transient modes.
- The model area includes the Vancouver Lake Lowland and the City of Vancouver core area. This area is bounded by the Columbia River to the south and by Burnt Bridge Creek and Lake River to the north. The Lowland extends approximately to the mouth of Salmon Creek to the northwest and approximately to Columbia River Mile 110 on the east.
- The model area was broken down into cells using a non-uniform, block-centered, finite difference grid. The grid is oriented with a principal axis parallel to the Columbia River to minimize the number of inactive cells in the model structure. The grid occupies a rectangular region approximately 11 miles northwest to southeast and 6 miles northeast to southwest. It includes 171 rows and 257 columns, with cell sizes ranging from 50 to 575 feet. The model consists of 16 vertical layers and extends to the base of the TGA (Section 3.1).
- The model boundaries coincide with physical (hydraulic) boundaries to the extent possible. Burnt Bridge Creek and the Columbia River form the area’s northern, western and southern boundaries, respectively. The eastern boundary was extended to the approximate eastern edge of the lower flood terrace deposits. The model employs “specified head” cells to represent the Columbia River and Vancouver Lake, “drain” cells to represent groundwater discharge to Burnt Bridge Creek, “specified flux” cells to represent groundwater subflow into the model domain, and “well” cells to represent significant existing groundwater withdrawals by CPU, GWM, City of Vancouver, and POV. Aerial recharge rates were simulated between zero (for paved areas) to 16.8 inches per year with average rates of about 6 inches per year.
- Ranges of values for hydraulic parameters (hydraulic conductivity, storage coefficient) were based on published data from pumping tests conducted within the model area, published ranges of values for representative soil types, and analysis of water level responses near production wells. Parameter values were further adjusted during model calibration.
- Model calibration was performed by varying model parameters and boundary conditions to achieve good agreement between the model results and observed water level data. In addition to minimizing the root mean square residual error (RMS) for water-level targets, calibration included reproduction of a curved contaminant flowpath from the SMC/Cadet/Nustar area-wide dissolved phase plume toward the GWM wells and the conclusion that the contaminated sites must fall within the GWM capture zone. The quantitative calibration was handled using the parameter optimization program, PEST (Doherty, 2004) and the particle tracking program Path3D (Zheng 1991; S.S. Papadopulos, 2001) to illustrate groundwater flow paths.

PGG ran the model in steady-state mode, which represents recharge rates, pumping rates, and stage elevations for surface-water features using annual average values. Four simulations were performed to represent the following pumping conditions:

- No pumping (pre-development condition)
- Current pumping rates (current condition)
- Maximum withdrawals by existing water-right holders (pumping at full water right allocations)
- Maximum withdrawals by existing water-right holders *plus* the POV water right application

Pumping rates for all four simulations are summarized on **Table 5** and pumping locations are shown on **Figure 1**. Consistent with the existing model, current and future pumping from the City of Vancouver (abbreviated COV in Table 5) water stations were generalized to four representative withdrawal locations at water station 1 (WS1), two locations at water station 3 (WS3), and one location at water station 4 (WS4). Current and future pumping were also simulated from Great Western Malting (Wells 4 and 5), CPU's generator plant, POV Well 2, and POV's containment well EW-1. Future withdrawals associated with the requested POV water right were simulated from 11 hypothetical locations consistent with the developable parcels shown on **Figure 1** (Section 2 and **Table 2**). Total future pumping under the requested POV water right was simulated at full annual water right quantity requested in the application of 22,050 ac-ft/yr. This withdrawal rate would include both additive rights to be issued under the new permit as well as non-additive rights associated with the existing Boise Cascade rights.

Contour maps of water-level drawdown in the PAA were developed to represent the difference between the "no-pumping" simulation and the other three simulations.

- **Figure 5** shows the drawdown between the pre-development and the current pumping conditions. Most of the drawdown (up to 4.5 feet) is associated with the COV water stations, with higher values to the southeast due to lower aquifer transmissivity in these areas. Drawdown is also accentuated near the COV water stations due to proximity to low aquifer transmissivity at the transition between the uplands and the Lowland.
- **Figure 6** shows the drawdown between the pre-development and the future full water right conditions (not including the POV water right application). Most of the drawdown is still associated with the COV water stations. Drawdowns are significantly increased over **Figure 5**, and a small cone of depression is noted around CPU's Carol Curtis Wellfield (pumping from the CPU wellfield is on the same order of magnitude as the COV water stations, but the PAA transmissivity is higher in this area). Projected drawdown in the vicinity of the SMC/Cadet/Nustar cleanup site is predicted to be about 0.7 feet. This regional component of drawdown is expected to have some effect on groundwater flow patterns at the SMC/Cadet/Nustar cleanup site, which has been addressed in a recent cleanup analysis by Parametrix (Section 9.2.3).
- **Figure 7** shows the drawdown between the pre-development and the future full water right conditions (including the POV water right application). Most of the

drawdown is still associated with the COV water stations. The predicted drawdown distribution looks very similar to **Figure 6**, with increased drawdown concentrated south and southwest of Vancouver Lake. **Figure 8** shows the additional drawdown predicted by including the requested POV water right. Except in the immediate vicinity of two hypothetical future pumping wells (POV-1a and POV-1b), predicted drawdown associated with the POV water right is less than 0.25 feet and about 0.15 feet at the POV containment well EW-1.

The following two sections provide interpretation of model predictions relative to the potential to impair existing water-right holders and to interfere with ongoing contaminant cleanup operations.

9.2.2 Impairment of Existing Water-Supply Wells

Existing water rights in the Vancouver Lake Lowland are discussed in Section 5.2 and summarized on **Table 4**. Significant existing water rights are associated with the operations of CPU, City of Vancouver, GWM, and the POV. Relative to water-levels predicted at full use of these existing water rights, interference drawdowns associated with the requested POV water right are predicted to be less than 0.25 feet at the associated points of withdrawal. This impact is negligible relative to the effects of Columbia River stage variation (over 7-10 feet variation on a seasonal basis), and will not impair the ability of existing water-right holders to obtain their allocated withdrawals. The extremely high transmissivity of the PAA along with its hydraulic connection to the Columbia River tends to minimize and stabilize drawdown associated with pumping withdrawals. These factors combine to allow industrial water users to develop very large quantities of groundwater from the PAA.

9.2.3 Influence on Ongoing Cleanup

As noted in Section 9.2.1, future groundwater withdrawals are predicted to change groundwater gradients in the vicinity of the active SMC/Cadet/Nustar site as purveyors develop their full water rights. CPU and the City of Vancouver will take over 30 years to fully develop their water rights. While modeling described in Section 9.2.1 considered future groundwater withdrawals over this time frame, contaminant reductions over time were not incorporated in the model. Monitoring by the POV has demonstrated that the current pump-and-treat remedy is effectively reducing groundwater contamination associated with the SMC/Cadet/Nustar site. Therefore, as groundwater withdrawals in the Lowland increase, contamination in the plume will continue to decrease toward cleanup goals.

On behalf of the POV, Parametrix recently completed an analysis of cleanup effectiveness over the next 30 years. The analysis simulated increased groundwater pumping (e.g. City of Vancouver and CPU withdrawals) and plume containment using POV Well EW-1. Parametrix's analysis is currently summarized in a draft report (Parametrix, 2014a), which has been reviewed and discussed by key stakeholders such as POV and Ecology. The draft report found that:

- Cleanup activities to date have been effective at reducing the contaminant source, and model predictions suggest that source reduction will be ongoing

- Higher concentration portions of the contaminant plume will continue to be contained over the 30-year period considered by the model; however, trace concentrations will migrate toward COV water station 3. Maximum TCE and tetrachloroethene (PCE) concentrations will be reduced to less than drinking water standards and MTCA cleanup levels when they arrive at the COV water stations.

Trace concentrations of dissolved organics are already ubiquitous in the PAA beneath the Vancouver Lake Lowland. Water purveyors expect to treat groundwater withdrawn from the PAA to extract low concentrations of dissolved chlorinated solvents. The City of Vancouver employs treatment at their water stations, and CPU will have treatment online when it begins PAA pumping at its Carol Curtis wellfield. Ecology is aware of the background presence of trace concentrations within the PAA, and focuses their regulation on containment of higher concentrations within the bodies of contaminant plumes.

The POV and NuStar are committed to cleanup of the SMC/Cadet/Nustar contaminant plume. As needed, POV will manage and adjust the groundwater pump and treat system should groundwater withdrawals to meet their future demands affect containment of the plume. While the recent Parametrix analysis limits its consideration to existing water-right holders, the relatively small change in drawdown associated with adding the requested POV water right suggests that this conclusion can be extended to full buildout for existing *and* new POV water rights.

9.3 PUBLIC INTEREST

As previously stated, Ecology relies on the recommendations of the WRIA 27/28 Plan as a primary consideration in determining whether water supply projects are consistent with the public interest criteria specified in the water code. The fundamental recommendations of the Plan have been adopted into the WAC 173-528, which is the instream flow protection rule.

One of the primary recommendations of the watershed plan is the development of sources such as the Vancouver Lake Lowland as a regional supply source. The issuance of this permit is in the public interest.

10.0 RECOMMENDATION FOR PERMIT ISSUANCE

The new permit should be issued in the amount of 20,500 gpm, of which 6,950 gpm is additive and 13,550 gpm is non-additive, and 22,050 ac-ft/yr of which 14,026 ac-ft/yr is additive and 8,024 ac-ft/yr is non-additive. The point of withdrawal should be designated as 15 wells.

PGG recommends that the new permit include a provision stating that the new allocation is intended to total 20,500 gpm and 22,050 ac-ft/yr *less* any existing Boise Cascade rights (3647-A(B) and G2-22784). As such, the final certificate may ultimately be issued with an additive component of Qi and/or Qa greater than the additive component specified in the permit should some portion of the Boise Cascade rights currently owned by the POV not be fully developed.

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Table 1. Environmental Sites with Potential Groundwater and Soil Impacts in the Vicinity of the POV's Property

Study ID	Study Name	Current Monitoring Dataset	Study Type	Study Purpose	Media (Matrix) Sampled	Sample Sources	Comments and Most Recent Water/Soil Quality Dataset Reviewed	Groundwater MTCA A/B Exceedance Most Recent Dataset Reviewed (parameter in exceedance in parentheses)
FS85381664	Port of Vancouver Building 2220 Former Swan/Cadet Manufacturing Facility, Vancouver, WA	EIM: 5/9/2008 - 6/25/2014 POV indicates data collection began in 12/1997	Contaminated site investigation (characterization, includes RI/FS and remedial design)	Investigation and clean up of contaminated groundwater at the SMC and Cadet sites and in the Fruit Valley Neighborhood.	Air/Gas Water	Groundwater Indoor Air Outdoor Air Soil Gas	2014 Q1 Groundwater Data Provided by Parametrix and Mapped in Figure 4.	Yes (contaminants of concern are chlorinated solvents, e.g. TCE)
POV_AlcoaEvergreen	Port of Vancouver - Alcoa/Evergreen	EIM: 5/28/2009 - 6/19/2014 POV indicates data collection began 11/23/2003 [3]	Post-cleanup, long-term confirmational monitoring of remediated contaminated site (periodic review, operation & maintenance)	Investigate groundwater quality	Water	Groundwater	Most recent EIM data June 2014. Evaluated against MTCA Method A/B Cleanup Levels and Exceedances based on EIM data Mapped in Figure 4. Exceedances based on POV input not mapped in Figure 4.	Yes (EIM data indicates cis-1,2-dichloroethene and vinyl chloride above cleanup levels; POV[1] indicates TCE, Free Cyanide, Fluoride, and PAHs also currently exceed cleanup levels)
POV_FVP	Port of Vancouver - Fort Vancouver Plywood	EIM: 2/26/2009 - 3/21/2014 POV indicates data collection began at Cell 1 on 3/10/1998 and at Cell 2 on 11/12/1998 [3]	Post-cleanup, long-term confirmational monitoring of remediated contaminated site (periodic review, operation & maintenance)	Investigate Groundwater Quality	Water	Groundwater	Most recent EIM data March 2014. Evaluated against MTCA Method A/B Cleanup Levels and Exceedances based on EIM data Mapped in Figure 4. Exceedances based on POV input not mapped in Figure 4.	Yes (EIM data indicates vinyl chloride above cleanup levels; POV[1] indicates diesel, VOCs, gasoline, and MTBE also currently exceed cleanup levels)
STEB0002	Burnt Bridge Creek Fecal Coliform Bacteria, Dissolved Oxygen, and Temperature Total Maximum Daily Load Technical Study	EIM: 7/14/2007 - 10/14/2009	Total Maximum Daily Load (TMDL) development	The overall goal of the TMDL project is to ensure that BBC attains compliance with water quality standards for bacteria, dissolved oxygen, and temperature.	Solid/Sediment Water	Plant Tissue Fresh/Surface Water Groundwater	Not Mapped in Figure 4 because no groundwater quality parameters of concern in EIM (DO, conductivity, Fe, Cl, water level, pH, Alk, nitrogen suite, t-phos, o-phos, coliform, temperature, only).	Not evaluated, see Comment
SWROGWDB	Southwest Regional Office Groundwater Database	EIM: 2/15/1935 - 10/5/2014	General environmental study	This project is a compilation of ground water elevation, quality, and use data collected from approximately 1200 wells by Ecology SWRO Water Resources Program staff and affiliates. This ongoing effort was initiated in the early 1970's.	Water	Groundwater	Water levels only in EIM, no water quality data. Not Mapped in Figure 4.	Not evaluated, see Comment
VCSW0281	Port of Vancouver (Automotive Services, Inc. Former Leasehold Site) Vancouver, WA	EIM: 4/1/2009 - 12/16/2010 POV indicates data collection began 6/15/2007 and most recent event was 10/17/2013 [3]	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Investigate groundwater quality	Water	Groundwater	NFA granted March 2014 with environmental covenant. Residual kerosene and diesel soils remain at site. Evaluated EIM most recent groundwater data Dec 2010 and Port provided Apr 2012 data against MTCA Method A/B Cleanup Levels and Exceedances Mapped in Figure 4. FSID: 4380.	Yes (diesel)
VCSW0377	Tetra Pak Vancouver Long Term Groundwater Monitoring	EIM: 9/27/2006 - 9/30/2013	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Investigate groundwater quality	Solid/Sediment Water	Groundwater Soil	NFA granted December 2012. Cleanup Site Details list residual soil below or remediated below cleanup levels. Soil was excavated to extent practicable and covered with asphalt cap. FSID 34822454. Residual Dioxins above MTCA B in soil. Most recent EIM data (GW) is for September 2013: SVOCs only - all ND. Site Location in Figure 4.	No, see Comment
VCSW1024	Frito Lay Vancouver Hydraulic Lift Area Petroleum Release Investigation	EIM: 5/26/2009 - 6/20/2014	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Investigate soil and potential ground-water contamination in the vicinity of the hydraulic lift.	Solid/Sediment Water	Groundwater Soil	Site COCs TPH and Cadmium. Most recent EIM data December 2012. Ran VOCs (all ND) and SVOC (all ND). Only detections Ba (45.8 & 81.4 ug/L rel 173-200 Criteria 1000 ug/L) and Cr (9.1-9.4 ug/L rel 173-200 criteria 50,000 ug/L). Site Location in Figure 4. FSID: 81587474.	No, see Comment
VCSW1025	Bark Duster PCB (Cliff Koppe Metals Inc), Vancouver, WA	EIM: 3/1/2006 - 10/30/2006	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	This study includes data from the investigation before and confirmation sampling after a self-implemented cleanup of PCB-contaminated soils at a former metal storage area.	Solid/Sediment Water	Groundwater Soil	NFA September 2009. COCs were metals, TPH, PCB, PAH. Cleanup Site Details GW below cleanup level and Soil remediated below. Evaluated most recent EIM groundwater data (March 2006) against MTCA A/B Cleanup Levels and Exceedance Mapped in Figure 4. FSID: 54933627.	No, see Comment

Table 1. Environmental Sites with Potential Groundwater and Soil Impacts in the Vicinity of the POV's Property

Study ID	Study Name	Current Monitoring Dataset	Study Type	Study Purpose	Media (Matrix) Sampled	Sample Sources	Comments and Most Recent Water/Soil Quality Dataset Reviewed	Groundwater MTCA A/B Exceedance Most Recent Dataset Reviewed (parameter in exceedance in parentheses)
VCSW1058	Former Bill Copps Inc., Vancouver, WA	EIM: 6/1/2009 - 6/25/2009	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Confirmation Soil Sampling for the Cleanup up of Petroleum Impacted Soils Surrounding Hydraulic Hoists	Solid/Sediment	Soil	NFA July 2011. FS ID: 62651667. No ECY document repository. Cleanup Site Details says soil remediated. Most recent EIM data June 2009 - detections and MTCA A soil exceedances of diesel and oil. Site Location in Figure 4.	No groundwater data
VCSW1126	Estate of Mary E MacKay, Vancouver, WA	EIM: 2/12/2004 - 4/23/2004	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Obtain NFA in regards to soil impacts idnetified at the property	Solid/Sediment	Soil	RI/FS/CAP Completed May 2014. Preferred remedy Capping+Env Covenant. Approx 300 ft2 area of soil above MTCA A/B between 9 & 10 ft bgs. No groundwater encountered at site. COCs: TPH and PCE. EIM most recent soil data Feb & Apr 2004, hits of VOCs, SVOCs, TPH, PCBs, metals (not evaluated against MTCA soil). Site Location in Figure 4.	No groundwater data
VCSW1200	Northwest Pipeline South Vancouver/Vanalco Meter Station - Mercury Remediation & Assessment, CS11728, Vancouver, WA	EIM: 8/28/2008 - 9/22/2009	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Remediation & Assessment of Mercury-Impacted Soils	Solid/Sediment	Soil	NFA granted 3/2012. Cleanup Site Details list mercury contaminated soil - remediated below. NFA letter cites COCs: As and Hg in Soil; excavated and disposed offsite. Most recent EIM data for Sept 2009 - Hg hits below MTCA A soil. Site Location in Figure 4. FSID: 21491.	No groundwater data
VCSW1314	Plaid Pantry 112, Vancouver, WA	EIM: 9/07/2011 - 8/17/2012	Voluntary Cleanup Program (VCP) or independent cleanup at a contaminated site	Cleanup from fuel system UST release	Solid/Sediment	Soil	Cleanup Started. Soil excavated and SVE system. Contaminated soil separated from groundwater by minimum 25 feet. Most recent EIM data Aug 2012 - BTEX+G, diesel, lead, and naphthalene hits. Site Location in Figure 4. FSID: 9158935.	No groundwater data
Study Not Identified in EIM	Former Brazier Forest Industries Leasehold	Unknown - Study/Data Not Identified in EIM	Independent cleanup at a contaminated site (requested to withdraw from VCP in 2006)	Monitored Natural Attenuation of Petroleum Compounds in Site Soil and Groundwater	October 2011 Event: Groundwater	October 2011 Event: Groundwater	October 2011 Data provided by Port. Detections evaluated against MTCA Method A/B and Exceedances Mapped in Figure 4.	Yes (gasoline-range organics)
Study Not Identified in EIM	Nustar	Unknown - Study/Data Not Identified in EIM	Cleanup under Agreed Order	Cleanup soil and groundwater impacted by chlorinated solvents; near-shore river sediment is also impacted. Plume is commingled with Swan/Cadet plume.	Study Not Identified in EIM	Groundwater Study Not Identified in EIM	2014 Q1 Groundwater Data Provided by Parametrix and Mapped in Figure 4.	Yes (contaminants of concern are chlorinated solvents, e.g. TCE)
Study Not Identified in EIM (information from Ecology Toxics Cleanup website for Carborundum Co. and 2012 Periodic Review Final Corborundum Company Plant and Ponds Site Facility Site ID# 1012 [2])	Former Carborundum Site	Unknown - Study/Data Not Identified in EIM	Cleanup in the 1990s under the Independent Remedial Action Program (IRAP), a precurser to the Voluntary Cleanup Program (VCP)	Cleanup former Industrial silicon carbide manufacturing facility	Groundwater Soil Demolition debris	Groundwater Soil Demolition debris	NFA Granted 3/17/1998 with Restrictive Covenant. Contaminated soil excavated and treated with thermal desorption. Engineered cap with groundwater monitoring remedy. FSID: 1012. Site location in Figure 4.	No EIM Data
Study Not Identified in EIM (information from Ecology Toxics Cleanup Site Details)	Albina Wholesale Warehouse	Unknown - Study/Data Not Identified in EIM	Voluntary Cleanup Program (VCP)	Unknown - Study/Data Not Identified in EIM	Study Not Identified in EIM (Groundwater, Soil based on Cleanup Site Details)	Study Not Identified in EIM (Groundwater, Soil based on Cleanup Site Details)	NFA Granted 5/12/1998. Status: Cleanup Complete - Active O&M/Monitoring Ongoing. COCs: petroleum products-unspecified. Groundwater concentrations below cleanup level; Soil concentrations remediated. FSID: 67687766. Site location in Figure 4.	No EIM Data, see Comment

NFA = No Further Action Required
ND = Non-detect
COCs = Chemicals of Concern
MTCA = Model Toxics Control Act, WAC 173-340
FSID = Facility Site ID in Ecology's Toxics Cleanup Reporting Database
RI/FS/CAP = Remedial Investigation/Feasibility Study/Cleanup Action Plan
[1] Graves, M. 2015a
[2] Ecology, 2012
[3] Graves, M. 2015b

Table 2. Summary of POV Water Demand Estimates

Category	Development Area/Specific User	Acreage	Water Use/ Acre (gpm)	Avg. Water Use (gpm)	Usage Factor	Water Use (ac-ft/yr)
1a	Chemical Manufacturing at CGW	100	n/a	5,000	0.9	8,067
1b	Parcel 7 Microelectronics or Equal	50	n/a	5,000	0.9	8,067
1c	Northwest Packing	15.4	n/a	850	0.9	1,372
2a	Irrigated Land	805.1	1.25	1,006	0.9	1,623
2b	Marine	757.7	1.25	947	0.9	1,528
2c	Industrial	426.4	1.75	746	0.9	1,204
2d	Potential Port Expansion Area	43.5	1.75	76	0.9	123
2e	Urban Lands	10.4	4	42	0.9	67
Totals (AF/yr)		**2208.5**				**22,050**

Table 3. Summary of Water Rights Associated with Port of Vancouver Property

Water Right Document No.	Name	Priority Date	Source Location	Well Identification
Statement of Claim				
151264	Port of Vancouver	6/26/1974	Port of Vancouver	PV Wells 1, 2, and 3
Industry-Specific: Great Western Malting Facility				
83-D [1]	Great Western Malting	1937	Great Western Malting	PW-1
32-A	Great Western Malting	11/26/1945	Great Western Malting	PW-2
G2-21495-C	Port of Vancouver	9/27/1973	Great Western Malting	PW-3
6375-A	Port of Vancouver	10/17/1967	Great Western Malting	PW-4
G2-01080-C	Port of Vancouver	2/18/1969	Great Western Malting	PW-5
Boise Cascade Water Right Transfers				
G2-22784	Port of Vancouver	7/1/1974	Gateway Ind. Project	Future Wells
3647-A(B)	Port of Vancouver	12/22/1959	POV Properties	Future Wells

[1] Water Right Certificates 83-D, 32-A, G2-21495-C, 6375-A, and G2-01080-C are associated with property currently leased by Great Western Malting. The Applicant has listed the rights in this table for the sole purpose of notifying Ecology that the rights are associated with property owned by the Applicant. The Applicant does not intend any statement in this application to be construed as a claim, admission or acknowledgment by the Applicant as to ownership of such rights.

Table 4. Summary of Water Rights Certificates, Permits, and Applications in the Vancouver Lake Lowland, Clark County WRIA 28

Water Right Document No.	Water Right Holder/Applicant	Document Type	Priority Date	Purpose of Use	Instantaneous Quantity (Qi)	Unit of Measure	Annual Quantity (Qa)	Irrigated Acres	T/R-S	QQ/Q	First Source
817	Spokane Portland & Seattle Railway Co	Certificate	8/22/1930	RW,DG	800	GPM	332		2N/1E-21	NE/NE	WELL
83	Great Western Malting Co	Certificate	1/1/1937	CI	400	GPM	323		2N/1E-28		WELL
164	WARREN C C	Certificate	1/1/1941	IR,DM	55	GPM	25.3	18	3N/1E-32		WELL
137	ALCOA	Certificate	3/1/1941	HE,DG	1,000	GPM	663		2N/1E-19	NW/NE	WELL
384	JAMISON R B	Certificate	5/1/1942	IR,DS	25	GPM	3.8	1	2N/1E-04	SE/NW	WELL
396	US Federal Highway Administration	Certificate	11/30/1942	DM	1,000	GPM	101		2N/1E-21	NE/NW	WELL
395	US Federal Highway Administration	Certificate	2/24/1943	DM	1,000	GPM	101		2N/1E-21	SE/NW	WELL
32	Great Western Malting Co	Certificate	11/26/1945	CI	1,200	GPM	645		2N/1E-28		WELL
1281	DUNCAN R L	Certificate	10/1/1951	IR	50	GPM	10	5	2N/1E-09		WELL
4684	RHOADES R ET UX	Certificate	2/20/1952	IR	0.08	CFS		8	2N/1E-09		UNNAMED STREAM
6792	NISSEN H E	Certificate	1/2/1953	IR	0.05	CFS	9	4.5	3N/1E-32		UNNAMED STREAM
2943	Carborundum Co	Certificate	3/1/1957	CI	600	GPM	960		2N/1E-21		WELL
3175	BROWN W H	Certificate	4/21/1958	IR	60	GPM	22.5	11.25	2N/1E-16	NW/NE	WELL
3880	Pacific Supply Cooperative	Certificate	6/11/1958	HE,DS	1,200	GPM	1,920		2N/1E-16		WELL
5188	HILLS L R / M M	Certificate	5/15/1964	IR,DS	10	GPM	5.6	1	2N/1E-16		WELL
5997	Vanalco Inc/ALCOA	Certificate	6/28/1967	CI	1,500	GPM	1,935		2N/1E-19	NE/NE	WELL
6375	Vancouver Port	Certificate	10/17/1967	CI	2,500	GPM	4,000		2N/1E-28		WELL
G2-00812C	BEDROSSIAN R H ET AL	Certificate	3/4/1968	IR,DM	25	GPM	23	10	3N/1E-32		WELL
6941	RUFENER E	Certificate	3/11/1968	IR	900	GPM	180	90	2N/1E-20		WELL
6612	DUGAN J E	Certificate	3/22/1968	IR	800	GPM	340	170	2N/1E-16		WELL
G2-01080C	Vancouver Port	Certificate	2/18/1969	CI	2,500	GPM	4,015		2N/1E-28		WELL
6725	WINSELL & CADWELL	Certificate	2/28/1969	IR	350	GPM	70	50	2N/1E-09		WELL
G2-00615C	HATCH REUBEN A	Certificate	7/12/1971	IR	150	GPM	8.3	5	2N/1E-09		WELL
S2-20214C	Willamette Hi Grade Concrete Co	Certificate	5/11/1972	CI	0.21	CFS	9		2N/1E-33		COLUMBIA RIVER
G2-21495C	Vancouver Port	Certificate	9/27/1973	CI	1,600	GPM	2,560		2N/1E-28		WELL
G2-21745C	Clark Cnty Dept Of Parks & Recreation	Certificate	1/15/1974	IR,DM	100	GPM	9.5	5	2N/1E-07	W2/NW	WELL
S2-25833C	Vancouver Port	Certificate	3/11/1981	RE	300	CFS			2N/1W-12	S2/SW	COLUMBIA RIVER
G2-26469C	Vancouver City	Certificate	1/28/1984	DG	1,350	GPM	2,178		2N/1E-28	NE/NW	WELL
G2-27163C	FIRESTONE MERRIL	Certificate	7/20/1987	IR	160	GPM	44	22	2N/1E-16	SW/SW	WELL
G2-27255C	FIRESTONE HAROLD L	Certificate	12/21/1987	IR	125	GPM	30	15	2N/1E-16	NE/NW	WELL

Table 4. Summary of Water Rights Certificates, Permits, and Applications in the Vancouver Lake Lowland, Clark County WRIA 28

Water Right Document No.	Water Right Holder/Applicant	Document Type	Priority Date	Purpose of Use	Instantaneous Quantity (Qi)	Unit of Measure	Annual Quantity (Qa)	Irrigated Acres	T/R-S	QQ/Q	First Source
G2-28029	Columbia Resource Co	Certificate	12/21/1991	CI	500	GPM	42		2N/1E-18	NW/SW	WELL
G2-28405	FIRESTONE HAROLD	Certificate	2/18/1992	IR	150	GPM	27	15	2N/1E-16		WELL
S2-29353	WA Department Of Fish & Wildlife	Certificate	2/2/1996	WL	11.2	CFS	2,500		3N/1W-36		COLUMBIA RIVER
G2-30381	Clark Public Utilities	Permit	8/13/1986	MU	7,000	GPM	9,900		2N/1E-09		well
G2-29350	Clark Public Utilties	Permit	2/5/1996	CI	1,750	GPM	2,800		2N/1E-18	SE/SE	Supply well at River Rd Gen Plant
G2-29821	Clark Public Utilities	Permit	12/23/1998	MU	150	GPM	412		2N/1E-04		WELL 8.2
G2-29981	Clark Public Utilties*	Permit	4/16/2001	MU	25,000	GPM	20,000		2N/1E-09		Southlake Well field
G2-29930	Vancouver Port	New App.	8/4/2000	EN	80	GPM			2N/1E-18		WELL
S2-30173	Kadow Lloyd & Bev	New App.	1/22/2004	FR	0.2	CFS			3N/1W-36		UNNAMED SOURCE
R2-30209	WDFW	New App.	8/30/2004	RE	0	CFS	157		3N/1E-31		Shillapoo Wildlife Area

This data may not be complete or accurate.Validity of water rights documented by statements of claims can only be determined in Superior Court. Ecology cannot guarantee the validity of the water rights documented by Permits and Certificates

WRATS Report Date: 11/13/2014

Table 5. Model Well Locations and Pumping Rates

Name	Model Layers	Pumping in CFD			Pumping in GPM			Pumping in Ac-Ft/yr		
		Full Water Right Allocation + POV Condition (Figure 7)	Full Water Right Allocation Condition (Figure 6)	Current Condition (Figure 5)	Full Water Right Allocation + POV Condition (Figure 7)	Full Water Right Allocation Condition (Figure 6)	Current Condition (Figure 5)	Full Water Right Allocation + POV Condition (Figure 7)	Full Water Right Allocation Condition (Figure 6)	Current Condition (Figure 5)
CPU Carol Curtis Wellfield	5-9	2,385,216	2,385,216	0	12,390	12,390	0	20,000	20,000	0
COV Water Station 1	7-9	2,658,324	2,658,324	741,196	13,809	13,809	3,850	22,290	22,290	6,215
COV_WS1	7-9	664,581	664,581	185,299	3,452	3,452	963	5,573	5,573	1,554
COV_WS1	7-9	664,581	664,581	185,299	3,452	3,452	963	5,573	5,573	1,554
COV_WS1	7-9	664,581	664,581	185,299	3,452	3,452	963	5,573	5,573	1,554
COV_WS1	7-9	664,581	664,581	185,299	3,452	3,452	963	5,573	5,573	1,554
COV Water Station 3	6-9	2,240,552	2,240,552	1,686,634	11,638	11,638	8,761	18,787	18,787	14,142
COV_WS3	6-9	403,996	403,996	233,889	2,099	2,099	1,215	3,388	3,388	1,961
COV_WS3	6-9	403,996	403,996	233,889	2,099	2,099	1,215	3,388	3,388	1,961
COV Water Station 4	7-9	1,432,560	1,432,560	1,218,856	7,441	7,441	6,331	12,012	12,012	10,220
Great Western Malting	7-9	692,956	692,956	692,956	3,600	3,600	3,600	5,810	5,810	5,810
GWM_W4	7-9	346,478	346,478	346,478	1,800	1,800	1,800	2,905	2,905	2,905
GWM_W5	7-9	346,478	346,478	346,478	1,800	1,800	1,800	2,905	2,905	2,905
CPU Generator Stations	4	259,858	259,858	259,858	1,350	1,350	1,350	2,179	2,179	2,179
POV Well 2	4-9	17,709	17,709	17,709	92	92	92	148	148	148
POV Containment Well EW-1	4-9	481,219	481,219	481,219	2,500	2,500	2,500	4,035	4,035	4,035
POV Water Right Application	4-9	2,629,359	0	0	13,658	0	0	22,047	0	0
POV-WR-1a	4-9	961,908	0	0	4,997	0	0	8,066	0	0
POV-WR-1b	4-9	961,908	0	0	4,997	0	0	8,066	0	0
POV-WR-1c	4-9	163,524	0	0	849	0	0	1,371	0	0
POV-WR-2a-1	4-9	96,804	0	0	503	0	0	812	0	0
POV-WR-2a-2	4-9	96,804	0	0	503	0	0	812	0	0
POV-WR-2b-1	4-9	60,736	0	0	315	0	0	509	0	0
POV-WR-2b-2	4-9	60,736	0	0	315	0	0	509	0	0
POV-WR-2b-3	4-9	60,736	0	0	315	0	0	509	0	0
POV-WR-2c-1	4-9	55,401	0	0	288	0	0	465	0	0
POV-WR-2c-2	4-9	55,401	0	0	288	0	0	465	0	0
POV-WR-2c-3	4-9	55,401	0	0	288	0	0	465	0	0

Notes: See Figure 1 for pumping locations. POV = Port of Vancouver. COV = City of Vancouver. CPU = Clark Public Utilities

Figure 1
Location of Current and
Future Water Supply Sources

Well Locations

- City of Vancouver
- Clark Public Utilites
- GWM
- Port of Vancouver
- Port of Vancouver EW-1
- Potential Future Port of Vancouver Location
- Port of Vancouver Parcels
- Cross Section Alignments
- Wells Used in Cross Sections

Landuse Categories

- Large Specific Users (1a, 1b, 1c)
- Irrigated Lands (2a)
- Marine (2b)
- Industrial (2c)
- Potential Port Expansion Area (2d)
- Urban (2e)

0 Feet 3,500

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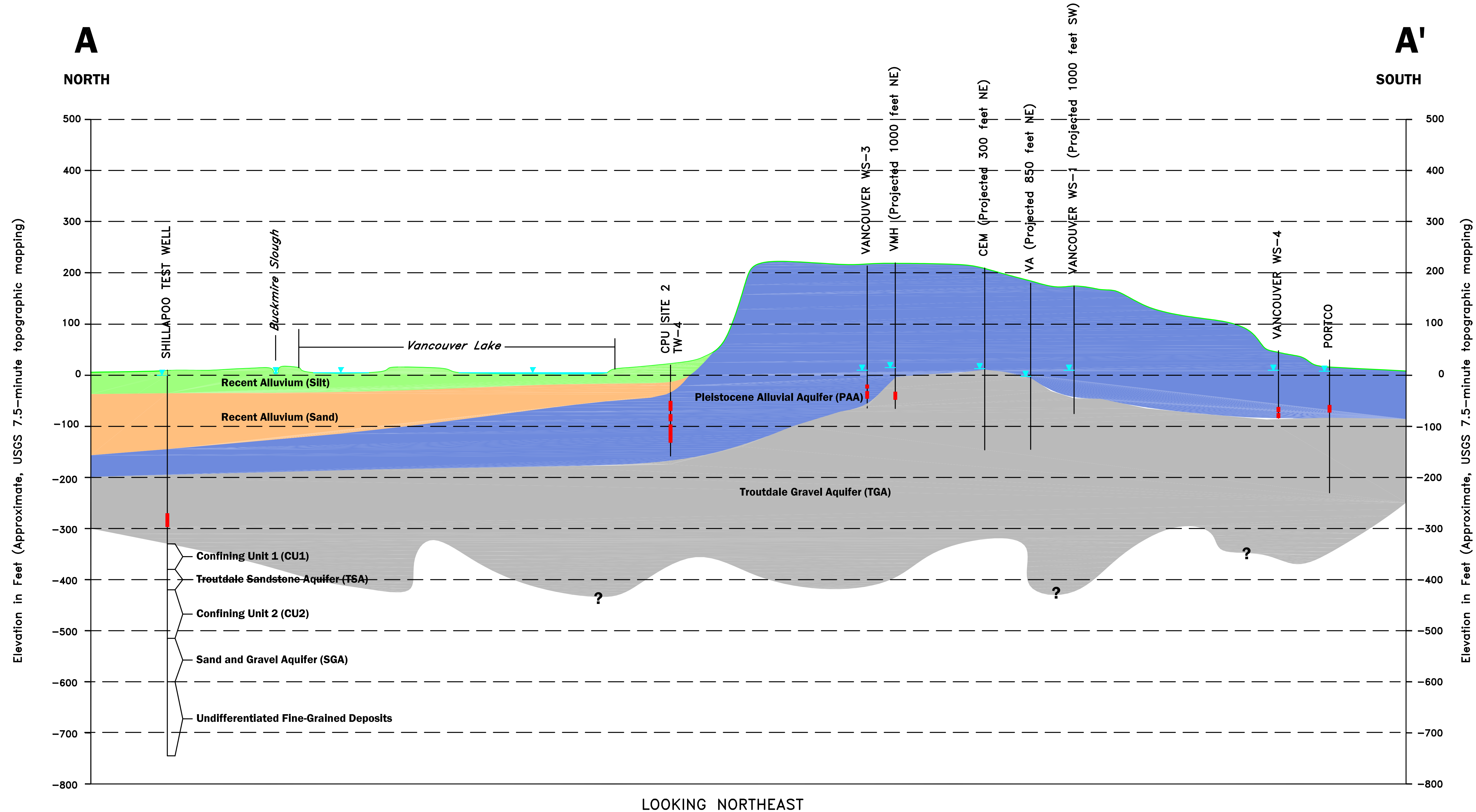


LEGEND

- Borehole/Well
- Approximate Ground Surface Elevation
- Approximate Water Level Elevation
- Well Screen Interval

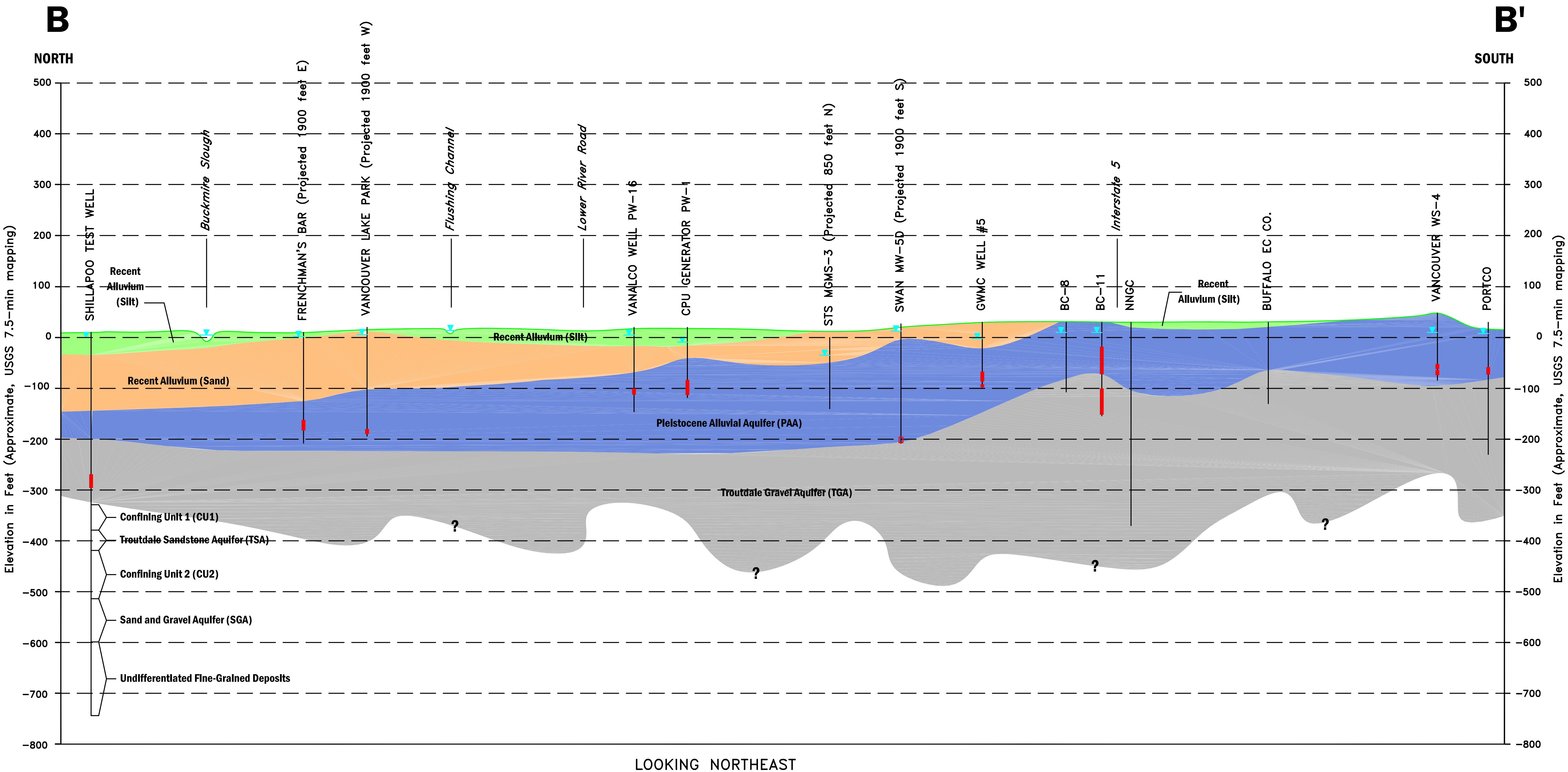
- Recent Alluvium (Silt)
- Recent Alluvium (Sand)
- Pleistocene Alluvial Aquifer (PAA)
- Troutdale Gravel Aquifer (TGA)

Vertical Scale in Feet
0 100 200
0 2,000 4,000
Horizontal Scale in Feet

FIGURE 2
Hydrogeologic Cross Section A-A'

Water Rights Procurement Project
Port of Vancouver
JM1307, SectionAA_11_24_14, 12/14

PGG



LEGEND

Borehole/Well

Approximate Ground Surface Elevation

Approximate Water Level Elevation

Well Screen Interval

Recent Alluvium (Silt)

Recent Alluvium (Sand)

Pleistocene Alluvial Aquifer (PAA)

Troutdale Gravel Aquifer (TGA)

Vertical Scale in Feet

0 100 200

0 2,000 4,000

Horizontal Scale in Feet

FIGURE 3

Hydrogeologic Cross Section B-B'

Water Rights Procurement Project

Port of Vancouver

JM1307 SectionAA'.dwg, 12/14

PgG

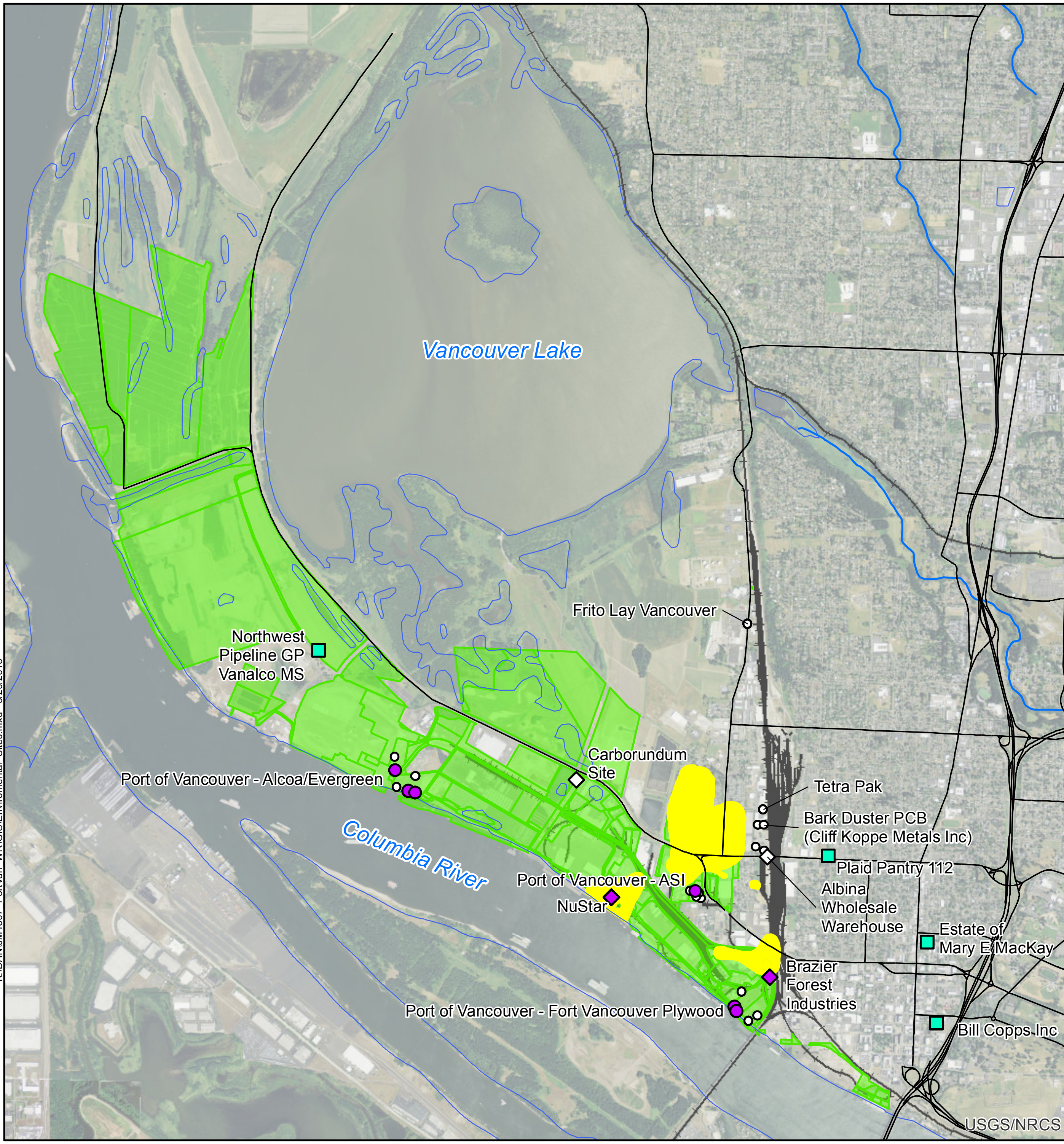


Figure 4
Environmental Sites Identified in Vicinity of POV Places of Use

PGG

Port of Vancouver Parcels

SMC/Cadet/Nustar Area-Wide Dissolved Plume (TCE > 4 ug/L, PCE >5 mg/L)

EIM Sites with Groundwater Data

- No Exceedance of MTCA A/B Cleanup Levels in most recent EIM dataset
- Exceedance of MTCA A/B Cleanup Levels in most recent EIM dataset

EIM Sites with Soil Data Only

- Concentration Relative to MTCA Not Evaluated

Additional Sites of Interest

- No EIM Data, NFA Granted
- No EIM Data, POV Records Indicate Groundwater Exceedance of MTCA A/B Cleanup Levels in Most Recent Dataset

0 Feet 4,000

N

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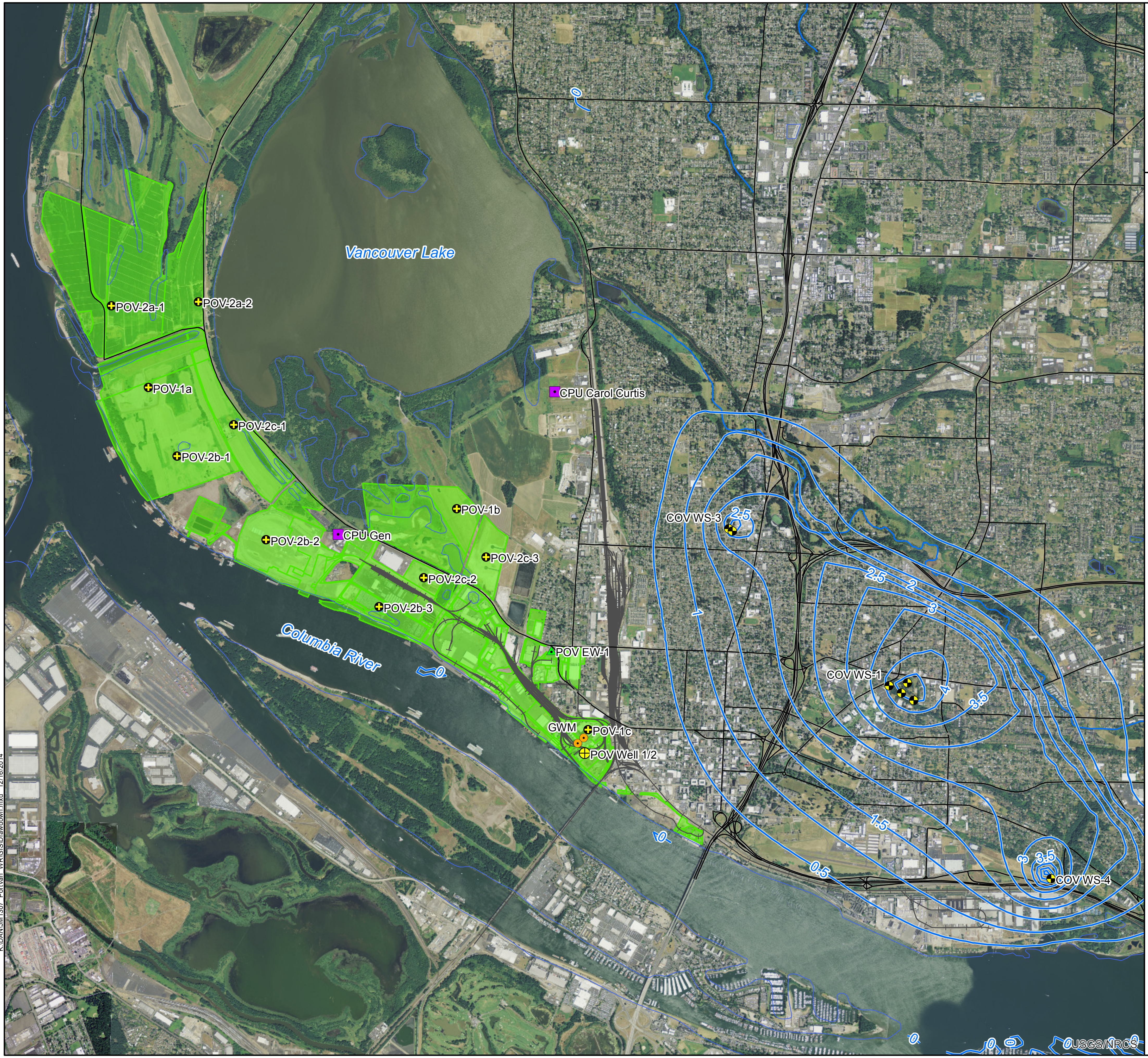
Figure 5
Drawdown for Current Condition

PgG



Drawdown Contours (feet)

Well Locations

- City of Vancouver
- Clark Public Utilites
- GWM
- Port of Vancouver
- Port of Vancouver EW-1
- Potential Future Port of Vancouver Location
- Port of Vancouver Parcels

Pumping Assumption in Model Scenario:
CPU, COV, POV, GWM: 2014 Pumping
See Table 5 For Detailed Pumping Assumptions

0 Feet 3,500

N

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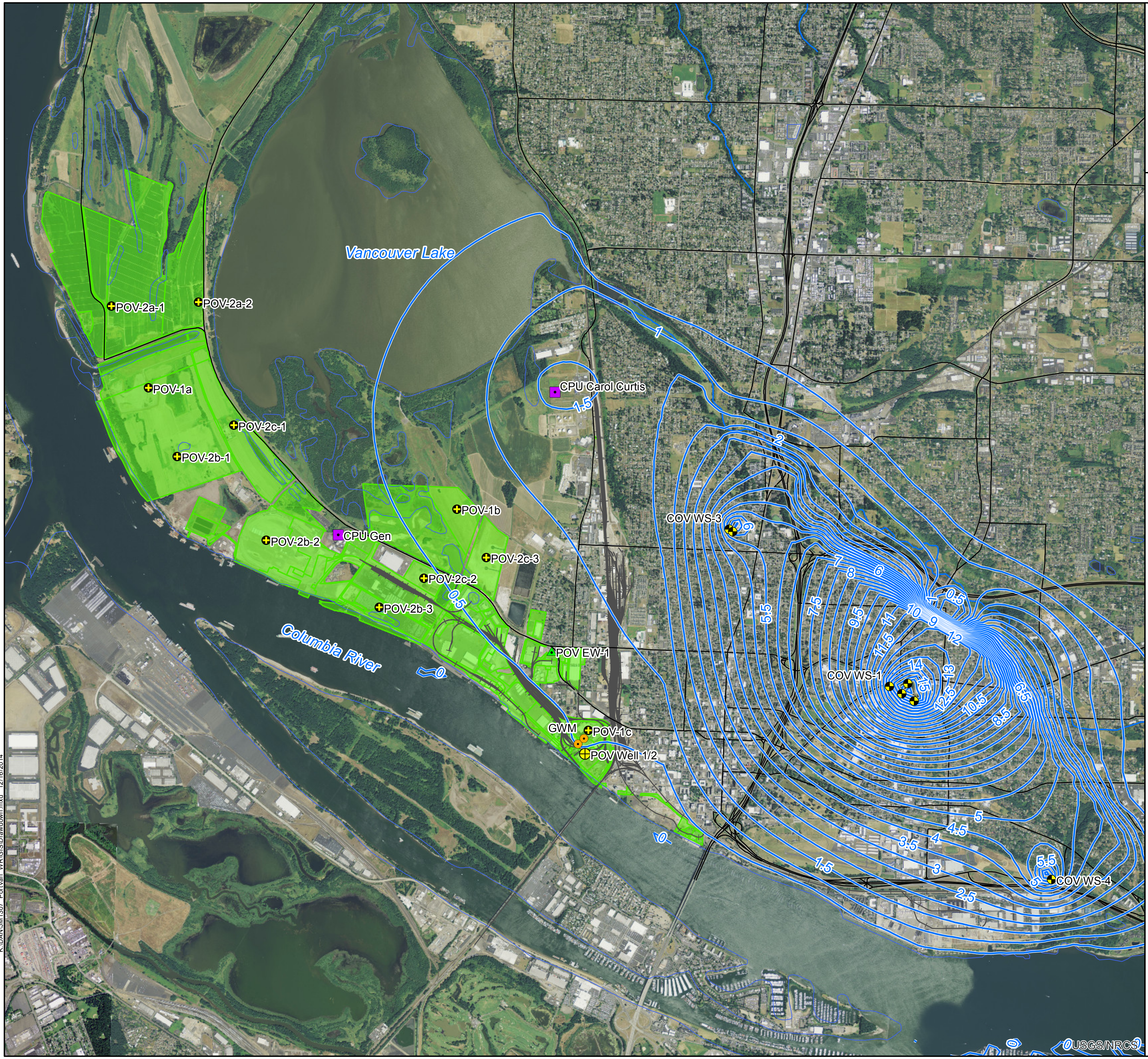


Figure 6
Drawdown Under Full Development of COV and CPU Water Rights

PGG

- Drawdown Contours (feet)

Well Locations

- City of Vancouver
- Clark Public Utilites
- GWM
- Port of Vancouver
- Port of Vancouver EW-1
- Potential Future Port of Vancouver Location
- Port of Vancouver Parcels

Pumping Assumption in Model Scenario:
CPU, COV: Full Water Right Allocation Pumping
POV, GWM: 2014 Pumping
See Table 5 For Detailed Pumping Assumptions

0 Feet 3,500

N

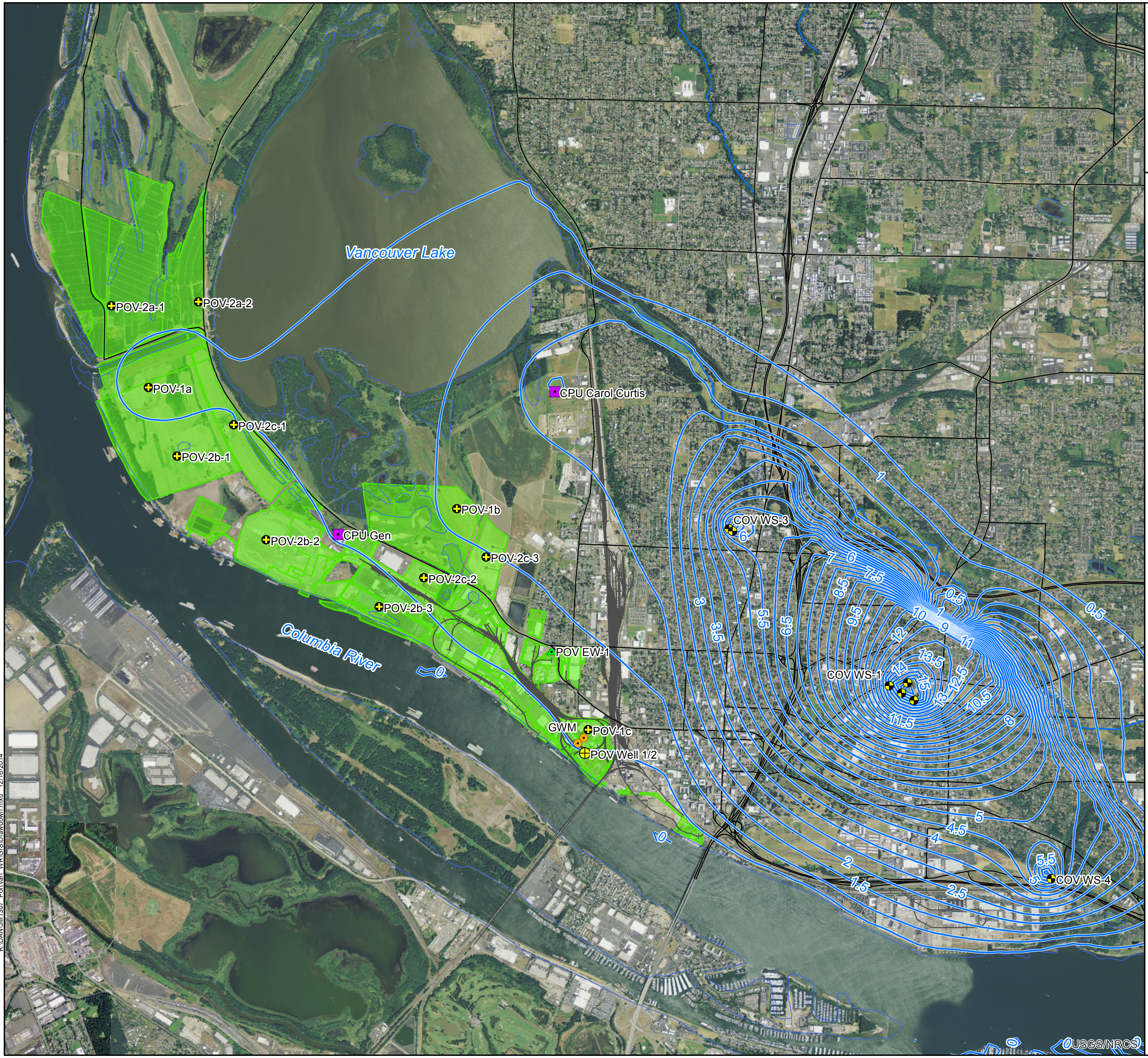


Figure 7
Drawdown Under Full Development of COV, CPU and POV Water Rights

PgG

Drawdown Contours (feet)

Well Locations

- City of Vancouver
- Clark Public Utilites
- GWM
- Port of Vancouver
- Port of Vancouver EW-1
- Potential Future Port of Vancouver Location
- Port of Vancouver Parcels

Pumping Assumption in Model Scenario:

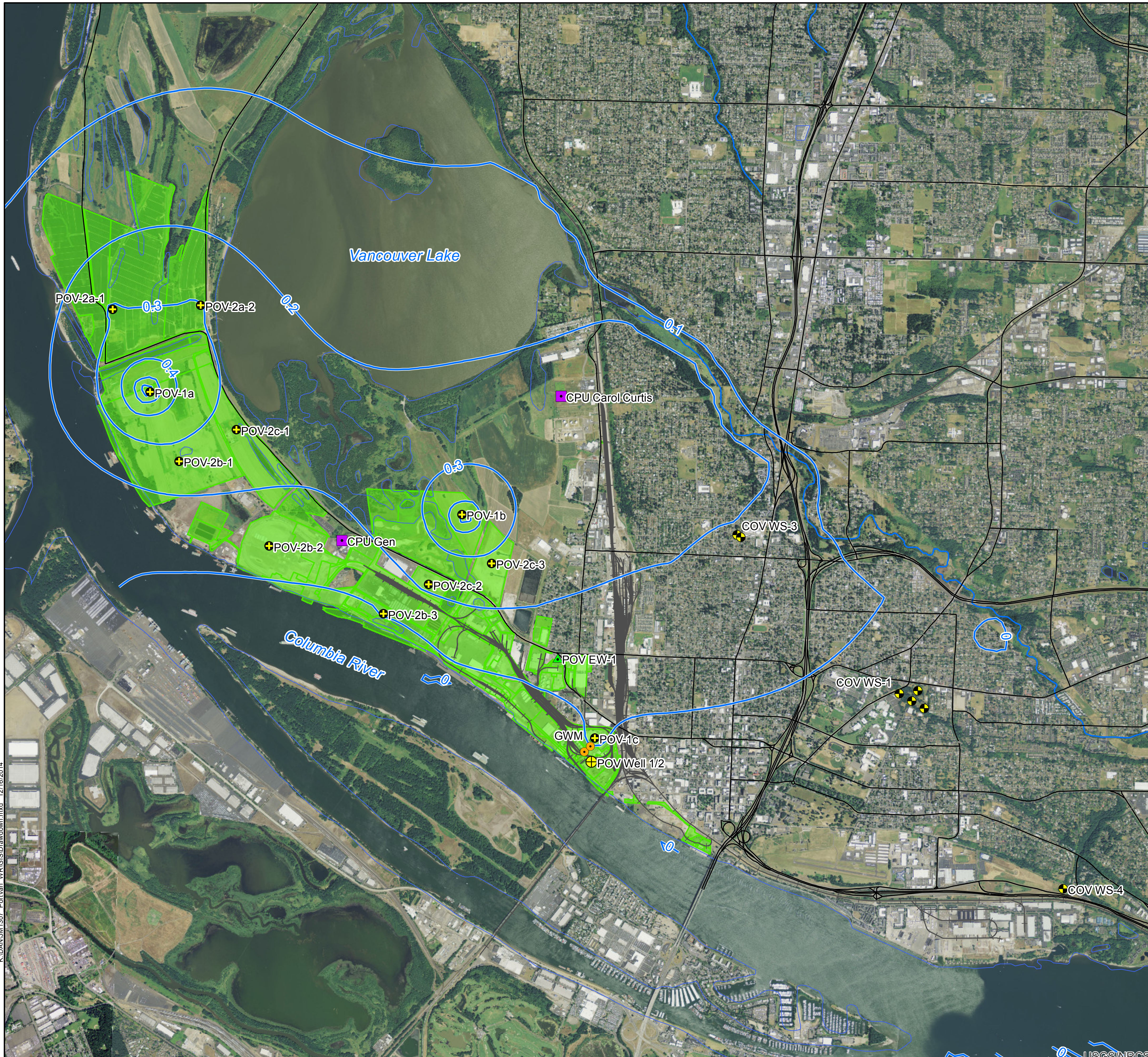
CPU, COV: Full Water Right Allocation Pumping
POV: Full Water Right Application Pumping
GWM: 2014 Pumping
See Table 5 For Detailed Pumping Assumptions

0 Feet 3,500

N

Figure 8
Net Drawdown Imposed by POV Pumping Under Full Development of Water Rights

PgG



Drawdown Contours (feet)

Well Locations

- City of Vancouver
- Clark Public Utilites
- GWM
- Port of Vancouver
- Port of Vancouver EW-1
- Potential Future Port of Vancouver Location
- Port of Vancouver Parcels

0 Feet 3,500

N

ATTACHMENT 1
POV WATER RIGHT APPLICATION G2-30649

PACIFIC groundwater GROUP

RECEIVED
JAN 29 2015
WA State Department
of Ecology (SWRO)

January 29, 2015

Tammy Hall
Department of Ecology - SWRO
PO Box 47775
Olympia, WA 98504

Re: New Application for Water Right for Port of Vancouver – CRA Request

Dear Ms. Hall,

On behalf of the Port of Vancouver (POV), please find attached an *Application for Water Right Permit* filed for the future water supply needs of the POV's facilities in Clark County, Washington. We greatly appreciated the opportunity to meet with you in early October and this application is being filed in response to the guidance we received at this meeting. Since the POV intends to pursue this permit through Cost Reimbursement we have not enclosed a filing fee. The POV requests that this application be processed through a Cost Reimbursement Agreement (CRA), preferably through a Streamlined CRA approach, and would like to proceed as soon as we finalize the Phase 1 CRA report, which is currently under development.

The POV manages over 2,100 acres of public property for marine and industrial development purposes. The POV property is home to more than 50 businesses that employ around 2,300 employees who generate about $1.6 billion of economic benefit annually. The POV serves as a critically important developer of marine and industrial property to generate additional economic activity for the public benefit. The POV's currently developed industrial properties are nearly completely leased, and POV holdings include additional shovel ready industrial land located in the Centennial Industrial Park project, as well as other areas undergoing long-range planning.

The POV's water demand forecast is still being developed; however, for the purposes of structuring the application we have filed for rights in the amounts of 20,500 gpm and 22,050 acre-feet per year, *of which approximately 13,550 gpm, and 8,024 acre-feet will be non-additive to other rights held by the POV.* We understand that these quantities will be refined through the permit review process, especially to reflect the extent of the POV's other water rights, primarily the Boise Cascade rights for which the POV will be requesting a development schedule to meet ongoing development. Our goal is to ensure that the POV has full access to the entire 20,500 gpm and 22,050 acre-feet per year they will need at full-build out. Our request is consistent with the scale of other port facilities in the State such as the Ports of Kalama and Longview, and reflects the POV's need to have a large supply available to serve more water intensive industries.

The POV's wells will target the productive PAA aquifer system, and we anticipate the eventual construction of as many as 15 wells to provide flexibility in meeting future demand. These will be in addition to the wells the POV is already authorized to construct and use under its other water right authorizations. Since it is possible that some wells will be constructed to serve specific tenants we have identified multiple potential ¼ sections; however, the POV's intent is to locate future wells in areas that are best suited for groundwater development from a water quality and an infrastructure standpoint. The POV is well aware of various groundwater cleanup actions that are taking place in the Vancouver Lake lowland and will manage future groundwater withdrawals so as to not impact these efforts. Our Phase 1 CRA Report will include more detailed information regarding the distribution of our proposed wells and how pumping can be managed to minimize any adverse impacts to existing users and cleanup efforts.

If you have questions or need more information please contact Jill Van Hulle at (360) 413-1510. We look forward to working with you on this project.

Sincerely,

Pacific Groundwater Group

Jill E Van Hulle

Jill Van Hulle
Water Resource Specialist, C.W.R.E.

CC: Patty Boyden, and Monty Edberg, Port of Vancouver
Shonee Langford, Schwabe, Williamson & Wyatt

DEPARTMENT OF ECOLOGY State of Washington

Application for a Water Right Permit

For Ecology Use
(Date Stamp)
RECEIVED
JAN 29 2015
WA State Department of Ecology (SWRO)

Follow the attached instructions. Attach additional sheets as necessary.

☒ **GROUND WATER** ☐ **SURFACE WATER**
☐ **PERMANENT** ☐ **SHORT TERM** ☐ **TEMPORARY**
☐ **DROUGHT**

***A NON-REFUNDABLE MINIMUM FEE OF $50.00 MUST ACCOMPANY THIS APPLICATION.**

Section 1. APPLICANT

☒ **I have participated in a pre-application conference with Ecology.**

Applicant/Business Name: Port of Vancouver	Phone No: (360) 992-1103	Other No:
Address: 3103 NW Lower River Road		
City: Vancouver	State: WA	Zip:98660
Email Address (if available): pboyden@portvanusa.com		
Contact Name (if different from above): Jill Van Hulle, Pacific Groundwater Group	Phone No: 360-413-1510	Other No:
Relationship to Applicant: Consultant		
Address: 2377 Eastlake Avenue East		
City: Seattle	State: WA	Zip: 98102
Email Address : Jill@pgwg.com		
Legal Land Owner or Part Owner Name of the Proposed Place of Use: **Port of Vancouver**	Phone No:	Other No:
Address:		
City:	State:	Zip:

For Ecology Use	APPLICATION NO ______ SEPA Exempt/Not Exempt Fee Paid ______ Check No ______ ECY Coding 001-001-WR1-0285-000011
Date Returned ______ By ______ Priority Date ______ By ______ WRIA ______	
Pre-application interviewer	

Section 2. STATEMENT OF INTENT

Do you own the land on which the proposed point of diversion/withdrawal is located? ☒ YES ☐ NO
If no, do you have legal authority to make this application for use of another's land? ☒ YES ☐ NO

Briefly describe the purpose of your proposed project: Develop additional water system infrastructure to supply future industrial and other related demand by the Port of Vancouver

Anticipated length of time to complete your project: 50 years from permit issuance

Water Use List all purposes for which water will be applied to a beneficial use and list quantity required for each.

Purpose(s) of Use	Rate (check one box only) ☐Cubic Feet per Second (CFS) ☒Gallons per Minute (GPM)	Acre-Feet per Year (AF/YR) (If known)	Period of Use (Continuously or Seasonal)
Industrial Supply, and related uses (See Section 8)	20,500 *13,550 non-additive to existing rights; remainder additive*	22,050 (TBD) *8,024 non-additive; remainder additive*	Year-round, as needed
TOTAL:	20,500	22,050 (TBD)	

Short Term/Temporary Water Use

Is this a request for a short term project (less than four months and non-recurring)? ☐ YES ☒ NO

Is this request for a temporary permit? ☐YES ☒ NO

If yes to either question above, indicate the dates that the water will be needed:

FROM: ____/____/____ TO: ____/____/____

Section 3. POINT OF DIVERSION OR WITHDRAWAL
(Complete A or B, and C below)

A.) If Surface Water Source	B.) If Ground Water Source
☐ Spring ☐ Creek ☐ River ☐ Lake ☐ Other:______________	☒ Well(s) ☐ Other:______________
Source Name:______________	Well diameter & depth: All wells to be completed in the PAA aquifer, diameters will vary
Tributary to:______________	Number of proposed points of withdrawal: 15
Number of proposed diversion points:________	Do you have an existing well? ☒ YES ☐ NO
Do you have an existing diversion? ☐ YES ☐ NO	If available, attach Water Well Report and pump test.
	Well Tag ID No.__________

C.) Point of Diversion/Withdrawal – Legal Description (See Attached Exhibit 1)

Parcel No.	¼	¼	Section	Township	Range	County

Lot(s)	Block(s)	Subdivision

If known, enter the distances in feet from the point of diversion or withdrawal to the nearest section corner:

_______ Feet (☐ North/☐ South) and ______feet (☐ East/☐ West)

from the (☐NW ☐SW ☐NE ☐SE ☐ ____) corner of Section_____.

Parcel No.	¼	¼	Section	Township	Range	County

Lot(s)	Block(s)	Subdivision

If known, enter the distances in feet from the point of diversion or withdrawal to the nearest section corner:

_____feet (☐ North/☐ South) and _____feet (☐ East/☐ West)

from the (☐NW ☐SW ☐NE ☐SE ☐____) corner of Section_____

Parcel No.	¼	¼	Section	Township	Range	County

Lot(s)	Block(s)	Subdivision

If known, enter the distances in feet from the point of diversion or withdrawal to the nearest section corner:

_____feet (☐ North/☐ South) and _____feet (☐ East/☐ West)

from the (☐NW ☐SW ☐NE ☐SE ☐____) corner of Section_____

Section 4. PLACE OF USE (See Exhibit 2)

Attach a copy of the legal description of the property (on which the water will be used) taken from a real estate contract, property deed or title insurance policy, or copy it carefully in the space below.

In Township 2 North, Range 1 West, W.M.

S 1/2 of Section 1, T2N, R1W
E1/2 of SE of Section 2, T2N, R1W
NE of NE of Section 11, T2N, R1W
Section 12, T2N, R1W
Section 13, T2N, R1W

In Township 2 North, Range 1 East, W.M.

W1/2 of SW of Section 7, T2N, R1E
SW of SW of Section 16, T2N, R1E
S 1/2 of Section 17, T2N, R1E
SW of NE of Section 18, T2N, R1E
W 1/2 of Section 18, T2N, R1E
SE of Section 18, T2N, R1E
N 1/2 of Section 19, T2N, R1E
Section 20, T2N, R1E
NW of NW of Section 21, T2N, R1E
S1/2 of NW of Section 21, T2N, R1E
SW of Section 21, T2N, R1E
W1/2 of SE of Section 21, T2N, R1E
SW of Section 27, T2N, R1E
N 1/2 of Section 28, T2N, R1E
N1/2 of SE of Section 28, T2N, R1E
NE of NE of Section 29, T2N, R1E

¼	¼	Section	Twp.	Range	County	Parcel No.
					Clark	

Do you own all the lands on which the proposed place of use is located? ☐ YES ☒ NO.

If no, do you have legal authority to make this application for use of another's land? ☒ YES ☐ NO
Provide owner name(s), address, and phone number:

Based on feedback from Ecology staff during the pre-application conference, the Applicant is proposing a place of use that includes certain non-owned parcels that are adjacent to the Applicant's property. Upon request, the Applicant will provide additional ownership information relating to the non-owned parcels.

Are there any other water rights or claims associated with this property or water system? ☒ YES ☐ NO

If yes, provide the water right and/or claim numbers: **See Exhibit 3**

Attach a map of your project showing the point of diversion/withdrawal and place of use. If platted property, be sure to include a complete copy of the plat map.

Section 5. WATER SYSTEM DESCRIPTION

Describe your proposed water system (include type and size of devices used to divert or withdraw water from source): The current potable water system includes three 100-foot wells (two primary and one back-up source). All three wells are located in the eastern portion of Port property; the potable water system includes two reservoirs with 200,000 gallons of capacity. Additional wells will be constructed as needed with distribution infrastructure to be designed based on future supply goals.

Section 6. DOMESTIC WATER SUPPLY SYSTEM INFORMATION

(Complete A or B, and C below)

A.) Domestic Water Systems only	**B.) Municipal Water Systems only** *(defined under RCW 90.03.015)*
Projected number of connections to be served: ____________________	Present population to be served water: ____________________
Type of connections: ____________________ *(e.g., home, recreational cabin)*	Estimate future population to be served: ____________________ (20 year projection)

C.) Water System Planning

Do you have a Water System Plan approved by the Washington State Department of Health, Drinking Water Division? ☒ YES ☐ NO

If yes, date plan was approved _____/_____/_____ Water System Number: 688501

Name of water system: Port of Vancouver

Are you within the service area of an existing water system? ☒ YES ☐ NO

If yes, explain why you are unable to connect to the system: The City of Vancouver supplies potable water to tenants of POV

Section 7. IRRIGATION/STOCKWATER/OTHER FARM USES

Irrigation N/A

The proposed uses will include non-farm irrigation incidental to industrial and other related uses (see description in Section 8)

Total number of acres requested to be irrigated under this application = ___________ ACRES
NOTE: Outline the area to be irrigated on your attached map.

Stockwater N/A

List number and kind of stock: ______________________________

Is the proposed project for a dairy farm? ☐ YES ☒ NO

Other Proposed Farm Uses

Describe all proposed uses: ______________________________

Family Farm Water Act (RCW 90.66):

Calculate the acreage in which you have a controlling interest, including only:

- Acreage irrigated under water rights acquired after December 8, 1977,
- Acreage proposed to be irrigated under this application, and
- Acreage proposed to be irrigated under other pending application(s).

Is the combined acreage under existing rights greater than 6000 acres? ☐ YES ☒ NO

Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☒ NO

If yes, enter Permit No: ______________________

Section 8. OTHER WATER USES

Hydropower

Indicate total feet of head ____________ and proposed capacity in kilowatts:____

Describe works: ______________________________

Indicate all uses to which power is to be applied: ______________________________

FERC License No: ______________________________

Mining/Industrial Use Describe use, method of supplying and utilizing water:
Water will be used for industrial and related supply of the Port of Vancouver's facilities, related uses include but are not limited to water for industrial needs, manufacturing, commercial processes, domestic and potable demand, dust control, environmental quality, wildlife propagation, irrigation incidental to industrial and other uses, and mitigation

Other Use

Section 9. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES ☒ NO

Are you proposing to store more than 10 acre-feet of water? ☐ YES ☒ NO

Will the water depth be 10 feet or more? ☐ YES ☐ NO

If you answered yes to any of the above questions, please describe:______________________________

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point and some portion of the storage will be above grade, you must also complete an Application for Permit to Construct a Reservoir and a Dam Construction Permit and Application.

Section 10. DRIVING DIRECTIONS

Provide detailed driving directions to the project site: From Olympia proceed south on I-5 to Exit 1D (4th Plain Blvd), and turn right onto W. Fourth Plain Blvd to WA-50, the Port of Vancouver's administrative office is located at 3103 NW Lower River Road

Site Address: 3103 NW Lower River Road

Section 11. REQUIRED SIGNATURES

I certify that the information provided in this application is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though the employees of the Department of Ecology may have assisted me in the preparation of the above application, all responsibility for the accuracy of the information rests with me, the applicant.

Patricia L. Boyden Print Name (Applicant or authorized representative)	Signature	1-28-15 Date
Same Print Name (Legal Owner or Part Owner Place of Use)	Signature	1-28-15 Date
Print Name (Legal Owner or Part Owner Place of Use)	Signature	Date

Please check the region in which the project is located:

***Submit your application to:**		
DEPARTMENT OF ECOLOGY CASHIERING SECTION PO BOX 47611 OLYMPIA, WA 98504-7611	☐ Central Regional Office 15 W Yakima Avenue, Suite 200 Yakima, WA 98902 (509) 575-2490	☐ Eastern Regional Office 4601 N. Monroe Spokane, WA 99205-1295 (509) 329-3400
	☐ Northwest Regional Office 3190 – 160th Avenue SE Bellevue, WA 98008-5452 (425) 649-7000	☒ Southwest Regional Office PO Box 47775 Olympia, WA 98504-7775 (360) 407-6300

If you need this document in an alternate format, please call the Water Resources Program at 360-407-6872. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

If you have questions about your application, contact the Water Resources program at the regional office in which your project is located.

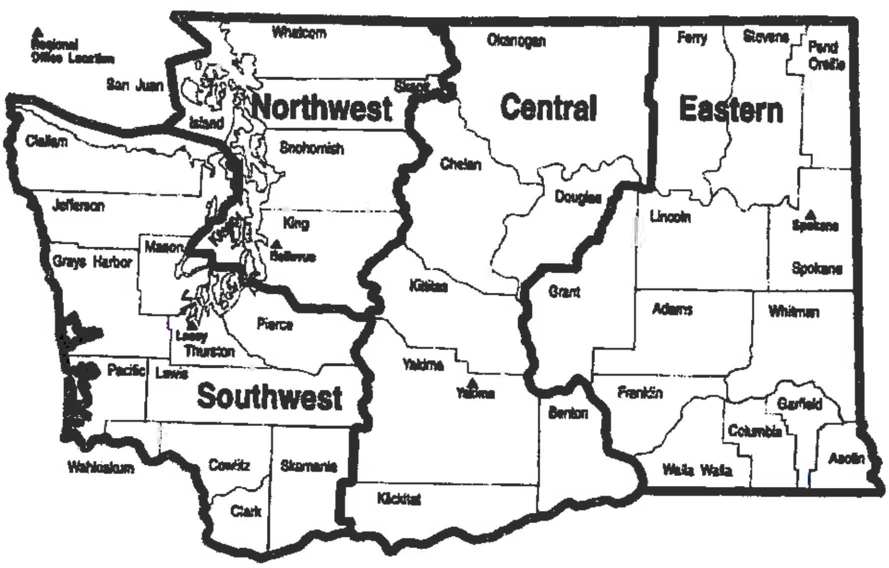


Exhibit 1
Potential Well Sites by ¼ Sections

Section 1 – the SW ¼ and the SE ¼, of T. 2 N., R. 1 W.W.M.

Section 2 – the SE ¼ of T. 2 N., R. 1 W.W.M.

Section 7 – the SW ¼ of T. 2 N., R. 1 W.W.M.

Section 11 – the NE ¼ of T. 2 N., R. 1 W.W.M.

Section 12 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N., R. 1 W.W.M.

Section 13 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N., R. 1 W.W.M.

Section 17 – the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

Section 18 – the NW ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

Section 19 – the NW ¼ and the NE ¼ of T. 2 N. R. 1 E.W.M.

Section 20 – the NW ¼, the NE ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

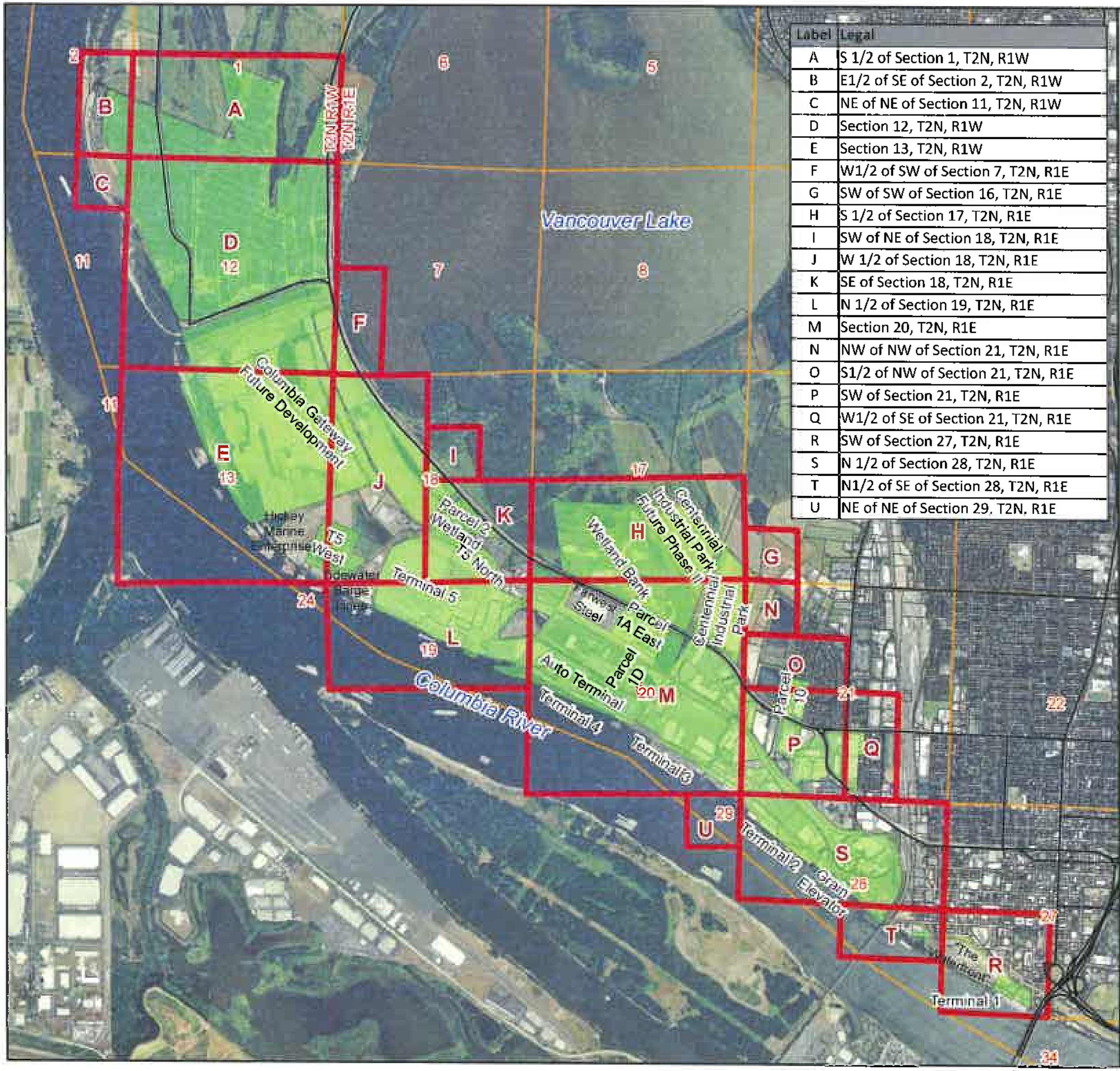
Section 21 – the NW ¼, the SW ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

Section 27 – the SW ¼ of T. 2 N. R. 1 E.W.M.

Section 28 – the NW ¼, the NE ¼ and the SE ¼ of T. 2 N. R. 1 E.W.M.

Exhibit 2
Port of Vancouver Place of Use

PgG



Label	Legal
A	S 1/2 of Section 1, T2N, R1W
B	E1/2 of SE of Section 2, T2N, R1W
C	NE of NE of Section 11, T2N, R1W
D	Section 12, T2N, R1W
E	Section 13, T2N, R1W
F	W1/2 of SW of Section 7, T2N, R1E
G	SW of SW of Section 16, T2N, R1E
H	S 1/2 of Section 17, T2N, R1E
I	SW of NE of Section 18, T2N, R1E
J	W 1/2 of Section 18, T2N, R1E
K	SE of Section 18, T2N, R1E
L	N 1/2 of Section 19, T2N, R1E
M	Section 20, T2N, R1E
N	NW of NW of Section 21, T2N, R1E
O	S1/2 of NW of Section 21, T2N, R1E
P	SW of Section 21, T2N, R1E
Q	W1/2 of SE of Section 21, T2N, R1E
R	SW of Section 27, T2N, R1E
S	N 1/2 of Section 28, T2N, R1E
T	N1/2 of SE of Section 28, T2N, R1E
U	NE of NE of Section 29, T2N, R1E

Port POU

Sections (from County)

Port of Vancouver Parcels

N

0 Feet 3,000

Exhibit 3

Water Rights Associated with Port of Vancouver Property

Water Right Document	Priority Date	Name	Source Location	Well Identification
83-D[1]	1937	Great Western Malting	GWM	PW-1
32-A	11/26/1945	Great Western Malting	GWM	PW-2
G2-21495	9/27/1973	Port of Vancouver	GWM	PW-3
6375-A	10/17/1967	Port of Vancouver	GWM	PW-4
G2-01080-C	2/18/1969	Port of Vancouver	GWM	PW-5
G2-22784	7/1/1974	Port of Vancouver	Gateway Ind. Project	Future wells
3647-AB	12/22/1959	Port of Vancouver	POV properties	Future wells

[1] Water Right Certificates 83-D, 32-A, G2-21495, 6375-A, and G2-01080-C are associated with property currently leased by Great Western Malting. The Applicant has listed the rights in this table for the sole purpose of notifying Ecology that the rights are associated with property owned by the Applicant. The Applicant does not intend any statement in this application to be construed as a claim, admission or acknowledgment by the Applicant as to ownership of such rights.

P 206.329.0141 | **F** 206.329.6968

2377 Eastlake Avenue East | Seattle, WA 98102

P 206.842.3202 | **F** 206.842.5041

8150 West Port Madison NE | Bainbridge, WA 98110

P 360.570.8244 | **F** 360.570.0064

1627 Linwood Avenue SW | Tumwater, WA 98512

www.pgwg.com

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