CASCADE WATER ALLIANCE

Transmission and Supply Plan

July 2012

HDR

In association with

CDM

Cascade Water Alliance
Transmission and Supply Plan

July 2012

Cascade Water Alliance Members

City of Bellevue

Covington Water District

City of Issaquah

City of Kirkland

City of Redmond

Sammamish Plateau Water & Sewer District

Skyway Water & Sewer District

City of Tukwila

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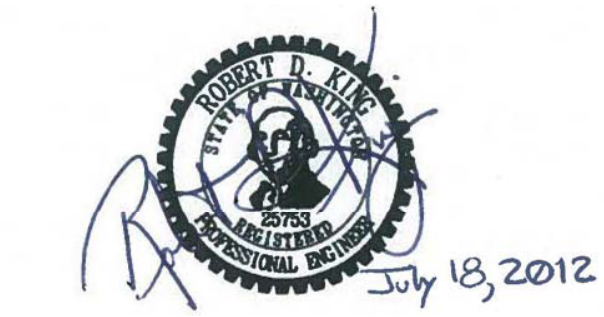
Certificate of Engineer

Cascade Water Alliance
Transmission and Supply Plan

This Transmission and Supply Plan for the Cascade Water Alliance has been prepared under the direction of the following Registered Professional Engineer.



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Resolution Adopting Transmission and Supply Plan

The Board of Directors of Cascade Water Alliance adopted the 2012 Transmission and Supply Plan and the Shortage Management Plan contained in Appendix C, by Resolution No. 2012-15 on July 25, 2012.

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Acknowledgements

Cascade Board

Jon Ault, Skyway Water and Sewer District
Don Davidson, City of Bellevue
Jim Haggerton, City of Tukwila
David Knight, Covington Water District
John Marchione, City of Redmond
Penny Sweet, City of Kirkland
Fred Butler, City of Issaquah
Lloyd Warren, Sammamish Plateau Water and Sewer District

Thanks are also due to Grant Degginger (Bellevue) and John Traeger (Issaquah) for participation on the TSP during their terms as Board Members.

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Acronyms

ADD	Average Day Demand
AOA	Asset Operating Agreement
ASR	Aquifer Storage and Recovery
BIP	Bellevue – Issaquah Pipeline
BKR	Bellevue-Kirkland-Redmond Pipeline
Cascade	Cascade Water Alliance
CERUs	Cascade Equivalent Residential Units
CIP	Capital Improvement Plan
CPA	Conservation Potential Assessment
CWSP	Coordinated Water System Plan
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
ERU	Equivalent Residential Unit
GMA	Growth Management Act
gpd	Gallons per day
LTP	Lake Tapps Pipeline
mgd	Million gallons per day
MIT	Muckleshoot Indian Tribe
MWD	Maximum Week Demand
O&M	Operations and Maintenance
OASIS	Lakehaven Utility District ASR Project
PSE	Puget Sound Energy
PSRC	Puget Sound Regional Council
PTI	Puyallup Tribe of Indians
RCFCs	Regional Capital Facilities Charges
RFP	Request for Proposals
RWSS	Regional Water Supply System
SEPA	State Environmental Policy Act
SMP	Shortage Management Plan
SPU	Seattle Public Utilities
SRRWA	Snohomish River Regional Water Authority
TCP	Tacoma – Cascade Pipeline
TPU	Tacoma Public Utilities
TSP	Transmission and Supply Plan
TSSP	Tacoma Second Supply Project
USACE	United States Army Corps of Engineers
WAC	Washington Administrative Code

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Executive Summary

Cascade Water Alliance is a municipal corporation comprised of eight Member cities and special districts in King County, Washington. Cascade's primary role is to contract, plan and develop regional water supplies on behalf of its Members.

This Transmission and Supply Plan (TSP) fulfills Cascade's responsibility to submit a water system plan to the Washington State Department of Health. In addition, it supplements information on regional supply presented in each Member's individual water system plan.

Part I: Current Water Supplies, Facilities and Operations

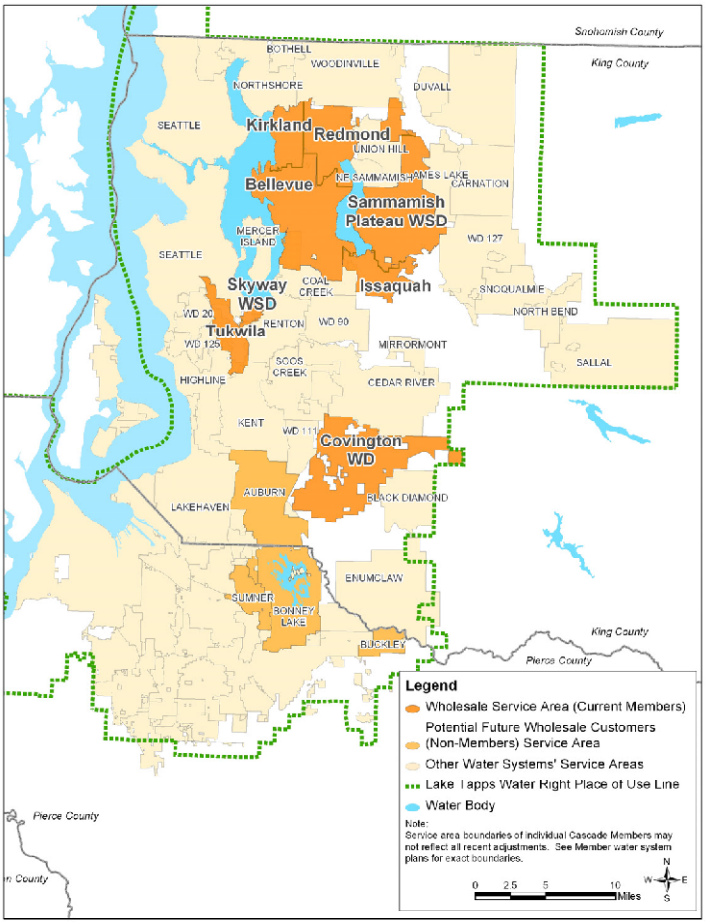
Cascade contracts with Seattle Public Utilities (SPU) for delivery of water to seven of the eight Cascade Members[1]. The SPU supply contract provides for a "declining block" of supply that will be reduced in five-year increments beginning in 2024. Under the Block Contract, SPU is responsible for maintaining and operating source, treatment, transmission and storage facilities needed to deliver the contracted supply, as well as regulatory compliance for those facilities.

At this time Cascade's existing capital facilities for delivery of municipal water supplies consist solely of the Bellevue-Issaquah Pipeline (BIP). No capital improvements have been identified for the pipeline, nor does Cascade have other capital projects coming up in relation to its current supplies (for future supplies, see Part II, below).

Individual Members of Cascade own, operate and maintain their own water distribution systems. This includes, as applicable, water treatment for their independent water sources; maintenance of water quality within their reservoirs and distribution piping systems; and local monitoring of water quality conditions (some monitoring is shared with SPU or other water systems). Five of the eight Cascade Members have their own independent supplies.

Cascade's regional water service area coincides with the individual service areas of the Members, as shown in Figure ES.1. In addition, Cascade may deliver contracted supplies to other water purveyors in King and Pierce Counties for use in their water service areas, as described in this Plan.

[1] Covington Water District meets all of its own needs from its own wells and from the Regional Water Supply System involving Tacoma, the District and two other partners.



ES.1: Cascade Service Area

Cascade anticipates that the current mix of SPU and independent supplies will meet all Member needs through 2023. Beginning in 2024 when the SPU block begins to decline, additional supplies will be needed.

Cascade also administers regional water conservation services on behalf of its Members. The 2008-2014 Conservation Program has a goal of achieving water savings of 1 million gallons per day (mgd) in terms of annual average consumption and 1.45 mgd during the peak season. By the end of 2010 the annual average goal had already been attained. From 2014 through at least 2020 Cascade anticipates continued conservation activities, with water savings continuing to increase at a rate similar to that achieved since 2008. This assumption has been built into the water demand forecast used in the TSP.

Part II: Long-Term Water Supplies and Infrastructure

Forecast of Water Needs

In recent years the downturn in housing and economic activity has affected demands for water throughout the Puget Sound region, and this effect is expected to persist for the next several years. This is a change from past planning efforts when rapid growth was occurring. Coupled with the conservation program, this means that demand for water in Cascade's service area is forecast to remain close to 40 mgd through approximately 2020. After 2020 demands are forecast to rise to begin rising again. Cascade is responsible only for a portion of this demand; as Member independent supplies meet part of the water supply need.

Water Supply Portfolio

For this TSP Cascade evaluated a wide range of water supply options to meet long-term needs. These included additional or expanded contracted supplies from existing sources within the Central Puget Sound region; new surface water supplies, new ground water supplies, reclaimed water and enhanced water conservation. From an initial list of 27 possible sources, a preferred supply "portfolio" was selected. The preferred supply portfolio includes the following sources:

- Continued production from Member supplies serving their respective service areas.

- Beginning in 2024, delivery of additional Green River supply from Covington Water District's share in the Regional Water Supply System (RWSS)[2] over and above water used within the District's own service area.
- Beginning in 2030 (or as needed), water from Cascade's White River - Lake Tapps Reservoir Project (Lake Tapps Project).

This sequence of supplies is shown in Figures ES.2 and ES.3. Conditions shown in Figure ES.2 are for "maximum week" which typically occurs in July or August of each year. Conditions shown in Figure ES.3 represent average conditions over the entire year. A range of projected demands is shown in the charts, for comparison with available supplies. Under the preferred portfolio, available supplies are expected to exceed Cascade's water demand throughout the 50-year planning period.

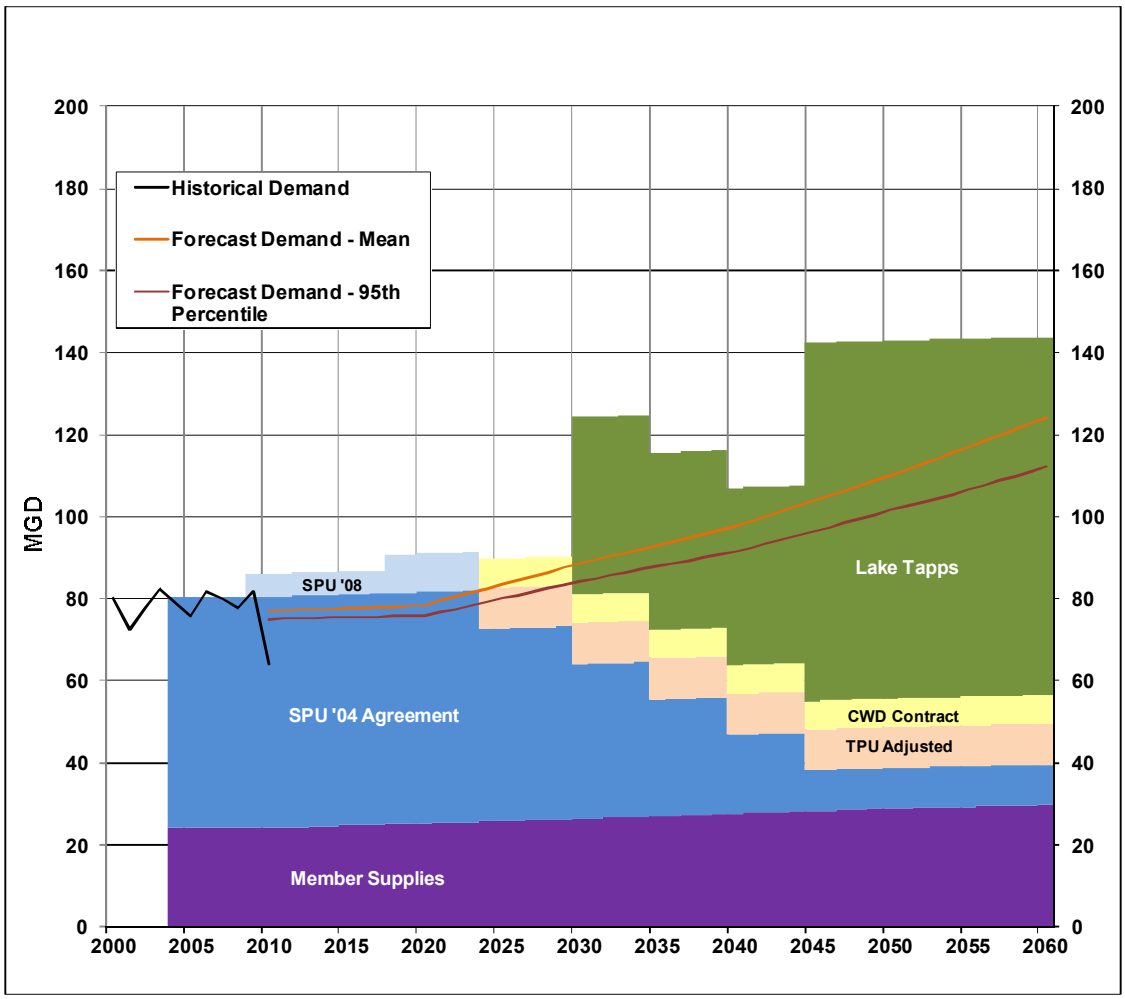


Figure ES.2: Cascade Supply Portfolio (Maximum Week)

[2] The RWSS was formerly known as the Tacoma Second Supply Project, or TSSP.

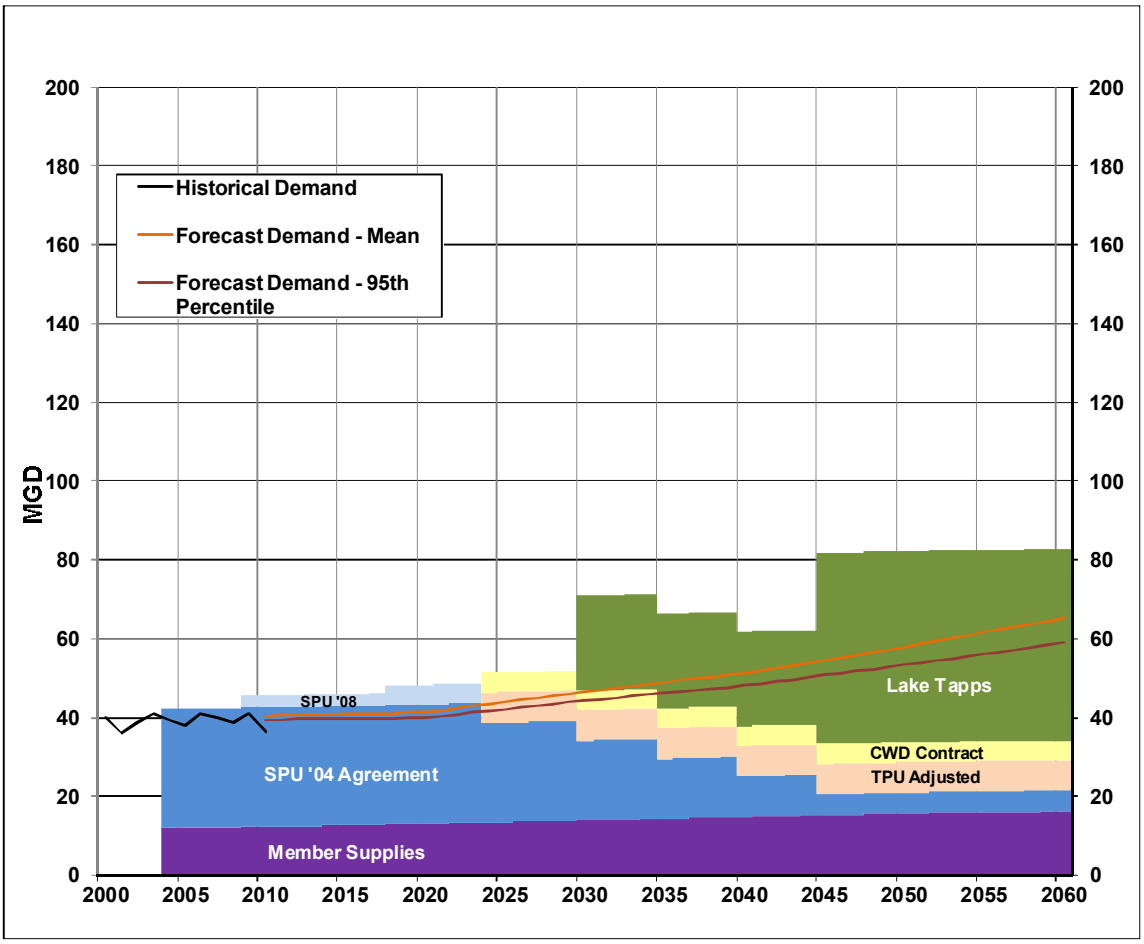


Figure ES.3: Cascade Supply Portfolio (Average Day)

Cascade's supply planning principles call for maintaining a high degree of flexibility to match available supplies with water needs as economically as possible. Investments in new water supplies will be made in stages based on actual growth in Cascade Member water demands over the coming decades. Therefore the exact quantities and timing of each new supply may change. In addition, Cascade anticipates renewed discussions with SPU and TPU from time to time regarding possible expansion of contracted supplies in the future. This could enable Cascade to delay construction of the Tacoma-Cascade Pipeline and/or the Lake Tapps Project. At a minimum Cascade will review and optimize the supply portfolio each time the TSP is updated at six-year intervals.

Lake Tapps Project

Lake Tapps is an off-channel reservoir in Pierce County that was created in 1911 to produce hydropower. In 2009 Cascade completed purchase of the lake and associated water rights and infrastructure from Puget Sound Energy with the intent of converting it to a municipal water supply project. In 2010 final water rights needed for this conversion were issued by the State of Washington. The water rights also provide for managing recreational water levels within the lake and for protection of flows in the White River.

Cascade plans to develop the necessary water treatment and delivery infrastructure in phases over time. The portfolio chart in Figure ES.2 reflects these assumptions. It shows Phase 1 of the Lake Tapps Project completed at year 2030 and Phase 2 at 2045. Phasing will respond to the timing of Cascade needs as well as any increases in other supplies over time. While Lake Tapps provides a critical resource for the long term, Cascade will seek opportunities to delay construction of both phases in order to spread the costs of infrastructure development over a longer period of time.

Infrastructure Needs and Costs

Cascade has developed a long-term Capital Improvement Plan (CIP) for development of the supply portfolio. Major projects include construction of the Tacoma-Cascade Pipeline by 2024 and construction of the Lake Tapps Project in two phases at 2030 and 2045. In addition, Cascade anticipates completion of a contract with Covington Water District to use a portion of the District's surplus supply from the RWSS. Improvements to the regional distribution system to serve Cascade Members located east of Lake Washington will also be needed eventually. These projects and their estimated costs are summarized in Table ES-1.

Table ES.1: Capital Costs of Supply Portfolio

Major Sources and Project Components	Capital Cost ($M) (2011 dollars)
RCFC Credit Buy-Back (2012)	10
Tacoma-Cascade Pipeline and Associated Costs (in service 2024)	89
Contracted Supply from Covington Water District (up front fee in 2012; in service 2024)	16
Lake Tapps Impoundment Improvements (2012-2023)	24
Lake Tapps Project, Phase 1 (in service 2030)	586
Lake Tapps Project, Phase 2 (in service 2045)	108
Regional Distribution in Cascade Service Area (in service 2040's)	119
Total 50-Year CIP ($M)	**952**

Anticipated sources of funding for infrastructure construction include revenue bonds and capital reserves, including income from Cascade's Regional Capital Facilities Charges (RCFCs) collected from Members over time. Cascade will also seek lower-cost sources of funding, such as grants and loans from State and federal sources. As discussed above, Cascade will continually seek opportunities to balance the costs of developing water supply infrastructure with ongoing growth in water needs; and will periodically review opportunities for the most economical mix of supply sources prior to building new infrastructure.

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Part I:
Current Water Supplies, Facilities and Operations

Cascade Water Alliance
Transmission and Supply Plan

1. Cascade Mission, Membership, and Structure

Cascade Water Alliance (Cascade) is unique among Washington State water suppliers in that it serves exclusively as a wholesale supplier to its Member utilities. This section provides background information on Cascade and describes its membership, service area, governance, and organizational structure.

1.1. History and Purpose

Cascade was formed in April 1999, according to the terms of an Interlocal Contract (as amended in September 1999, November 2002, December 2004 and October 2011); and under the Interlocal Contract, Cascade was created as a public body and an instrumentality of its Members. Cascade exercises essential governmental functions on its Members' behalf.

From 1999 through July 12, 2012, Cascade acted pursuant to the Interlocal Contract, as authorized by the Interlocal Cooperation Act (Chapter 39.34 RCW), functioning as a watershed management partnership (as authorized by RCW 39.34.200). Cascade was incorporated as a public nonprofit corporation in the manner set forth in the Nonprofit Miscellaneous and Mutual Corporations Act (Chapter 24.06 RCW). The Interlocal Contract provided that Cascade may be converted into a separate municipal corporation if and as permitted by law. Upon such conversion, all Cascade rights and obligations and all Member rights and obligations would transfer to that new municipal corporation.

In 2011, the Washington Legislature enacted the Joint Municipal Utilities Services Act (Chapter 39.106 RCW), which provides for the conversion of an existing intergovernmental entity formed under the Interlocal Cooperation Act into a joint municipal utility services authority.

The Cascade Board of Directors adopted an Amended and Restated Interlocal Contract (see Appendix A) to be known as the "Cascade Water Alliance Joint Municipal Utility Services Agreement" (the "Cascade Services Agreement") on March 28, 2012, by 65% Dual Majority Vote. As required by the Interlocal Contract, the Cascade Services Agreement was ratified by 65% Dual Majority of the Members' legislative authorities within 120 days of the Board action. Cascade's Chief Executive Officer filed the Cascade Services Agreement with the Washington State Secretary of State consistent with RCW 39.106.030 on July 12, 2012, completing the necessary steps to convert Cascade to a Joint Municipal Utility Services Authority. Cascade's Members intend that, as a Joint Municipal Utility Services Authority, it will constitute a municipal corporation and will no longer function as a watershed management partnership.

Cascade's purposes are listed in the Cascade Services Agreement and generally include contracting with other regional water suppliers on behalf of its Members; developing and operating water supply facilities; providing regional water conservation services; and planning for the water needs of its Members (including long-range and short-term plans for emergencies or water shortages).

Water deliveries from Cascade began on January 1, 2004. Cascade delivers water to its Members entirely on a "wholesale" basis. Each Member is responsible for distributing water to

its own residents, businesses, and other "retail" customers. Members own and operate their own local distribution systems for these purposes. Some Members also have their own independent water supplies and meet all or a portion of their needs separately from the wholesale supply provided by Cascade.

1.2. Membership and Service Area

Cascade currently has eight Members, all of whom participated in the original creation of the organization. The eight Members are shown in Table 1.1.

Table 1.1: Cascade Members

City of Bellevue	City of Redmond
Covington Water District	Sammamish Plateau Water and Sewer District
City of Issaquah	Skyway Water and Sewer District
City of Kirkland	City of Tukwila

Cascade's current service area for delivery of wholesale water supplies is contiguous with the water service areas of the eight Members, and is located entirely within the boundaries of King County, Washington. The service area may change from time to time, as Member water systems adjust their service area boundaries or if new Members join Cascade. The current service area is shown in Figure 1.1. Portions of the service area are separated from one another, since not all Members are located adjacent to each other.

Five of the eight Members are cities. Besides those five cities, several other incorporated cities and towns are located within the Cascade service area, including Black Diamond, Covington[1], Hunts Point, Maple Valley, Medina, Sammamish, and Yarrow Point. Outside of the incorporated areas, lands served by Cascade Members are located in King County. Land within the service area includes a variety of urban and suburban land uses, from high-rise business districts, industrial parks, and shopping malls to quiet residential neighborhoods and semi-rural areas.

Based on data from the Puget Sound Regional Council, the combined population of the Cascade service area was estimated to be approximately 370,000 people in 2010. A breakdown of estimated households and employment is shown in Table 1.2. The table also displays Cascade Equivalent Residential Units (CERUs), which represent the quantity of water used in each Member service area in terms of the quantity of water use by a typical household.

[1] The City of Covington is a municipal government and should not be confused with the Covington Water District. These two entities are separate and distinct from one another. However, the City of Covington is located within the service area of the Covington Water District.

Table 1.2: Housing Units, Employment and CERUs in 2010

Member	Housing Units[1]	Employment[1]	CERUs[1]
Bellevue	58,312	184,916	66,142
Redmond	23,917	55,592	30,634
Sammamish Plateau	18,178	6,671	21,289
Kirkland	17,384	33,958	17,847
Covington	19,488	5,712	17,276
Issaquah	5,336	18,780	11,012
Tukwila	3,450	42,774	8,577
Skyway	3,237	1,032	3,800
Total	**149,302**	**349,434**	**176,575**

CERUs = Cascade Equivalent Residential Units

Sources: Housing and employment data from analysis of PSRC data in CDM, "8 Member Demand Forecast 12-9-2010.xlsx"

CERU data from FCSG "Historical Comparison of Member Shares.xlsx" May 2011.

[1] Data may differ from information in individual Member plans, due to differences in sources and methodology.

As discussed in Section 5.6.4, in the future Cascade may provide water on a wholesale basis to one or more of the "Four Cities" (Auburn, Bonney Lake, Buckley and Sumner). This water will come from supplies Cascade has contracted from Tacoma Public Utilities. While the Four Cities are not currently Members of Cascade, deliveries to any of them would add their respective water service areas to Cascade's overall wholesale service area at the time water deliveries begin.

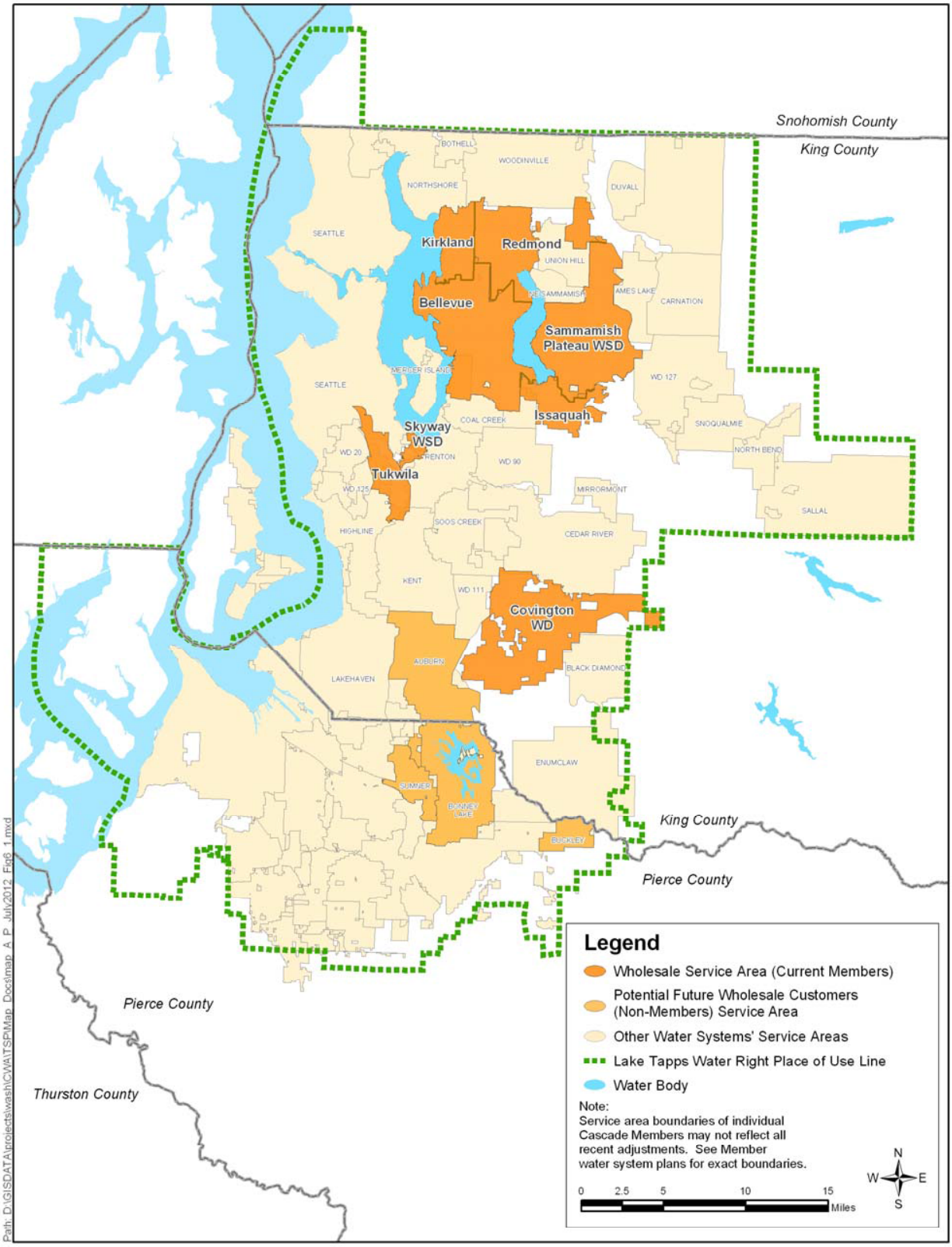

Figure 1.1: Service Area Map

1.3. Water Supply Policies

Cascade policies regarding service to its Members are defined in the Cascade Services Agreement. Article 5 of the agreement includes the following policies:

- Cascade must provide a full supply commitment to each founding Member. (All eight of the current Members are founding Members.) This means Cascade must fully meet each Member's water needs, except for the portion met by the Member's independent supply, and subject to certain limitations (see below). No one Member has priority over any other Member in its right to the full supply commitment from Cascade.
- Full supply commitment is subject to water shortages, Cascade's ability to implement this TSP, and each Member's audited independent supply. If Cascade cannot fully meet its Members' needs during a shortage, the shortage shall be shared by all Members in accordance with Cascade's Shortage Management Plan (see TSP Section 2.9).
- Cascade must provide for expansion and extension of its supply system to meet the needs of additional water customers of Members, subject to consistency with applicable growth management plans and comprehensive plans, this Transmission and Supply Plan, orderly asset development, reasonable cost, and financing capacity.
- Cascade is not obligated to provide water for Member service area expansions, unless Cascade agrees to do so.
- Cascade is obligated to provide water within the entire service area of its Members, whether or not the service area lies within the Member's jurisdictional boundaries or within the current urban growth boundary. However, Cascade is not obligated to provide increased water supply if a Member's planning process or plans do not comply with the Washington State Growth Management Act.
- If loss of a Member's independent supply causes a water shortage, the other Members are not required to share in the resulting shortage initially. The Member experiencing a shortage may request additional supply and pay additional charges accordingly. Cascade will then have 15 years to supply the water needed to meet the increased commitment. At the end of the 15-year period, the shortage is subject to sharing among all of the Members. In the interim, if supply is available, Cascade may provide interruptible supply to the Member experiencing the shortage.
- For Members that join Cascade in the future, Cascade is required to provide a full supply commitment if the new Member joins with sufficient supply to meet its needs for at least 15 years. Cascade will be obligated to meet needs that exceed the new Member's independent supply after the 15-year period. For new Members that do not have sufficient supply to meet their needs for 15 years, Cascade may provide partial supply, interruptible or full supply, depending on availability of full supply at Cascade's defined reliability standards.
- The Cascade Board may authorize source exchange agreements with Members or non-members to replace all or a part of a public water system's existing water supply to improve stream flow or fish habitat, without serving growth or increasing that system's water supply.

Issues arise from time to time that are not addressed directly in the Cascade Services Agreement. One of these involves independent, small water systems located within the service area boundaries of Cascade's Members. From time to time, small water systems may request

water supplies from a Member, or may request a Member take over service to their customers. If this will require additional supply from Cascade, then the Member must seek Cascade's agreement prior to taking on the new service obligation.

1.4. Water Quality Requirements

Section 7.4 of the Cascade Services Agreement addresses water quality. It indicates that Cascade is responsible for meeting or exceeding all federal and state water quality requirements, at the point of delivery to each Member. Each Member is responsible for maintaining water quality within its local distribution system. Members are also responsible for any costs of making water from Cascade compatible with its internal system, including any independent supplies.

1.5. Governance and Organizational Structure

Cascade is governed by a Board of Directors consisting of one representative appointed by each Member. Members can also appoint alternates to the Board of Directors. Each Director and alternate must be an elected official of the Member organization, such as a City Council or Board member of the individual city or special district.

The Board has authority over all actions taken by Cascade. The Cascade Services Agreement defines voting procedures and also indicates certain actions that require ratification by the elected bodies of each Cascade Member.

Cascade's operations are overseen and informed by committees and a Chief Executive Officer appointed by the Board. The Cascade Services Agreement provides for an Executive Committee, consisting of a Chair, Vice Chair, Secretary, Treasurer, and the Chairpersons of Standing Committees. Standing Committees are established to oversee particular topics as determined by the Board. The Executive Committee includes only Board members; while Standing Committees can also include other personnel.

Currently, Cascade's Standing Committees include the following:

- Resource Management Committee
- Finance Committee
- Public Information Committee

Cascade staff positions are shown in the organizational chart in Figure 1.2. Staff members are employees of Cascade and are neither elected officials nor employees of the respective Cascade Members. Staff members carry out functions of the organization; coordinate with Cascade Member staffs; and oversee services provided by consultants, contractors, and other external service providers.

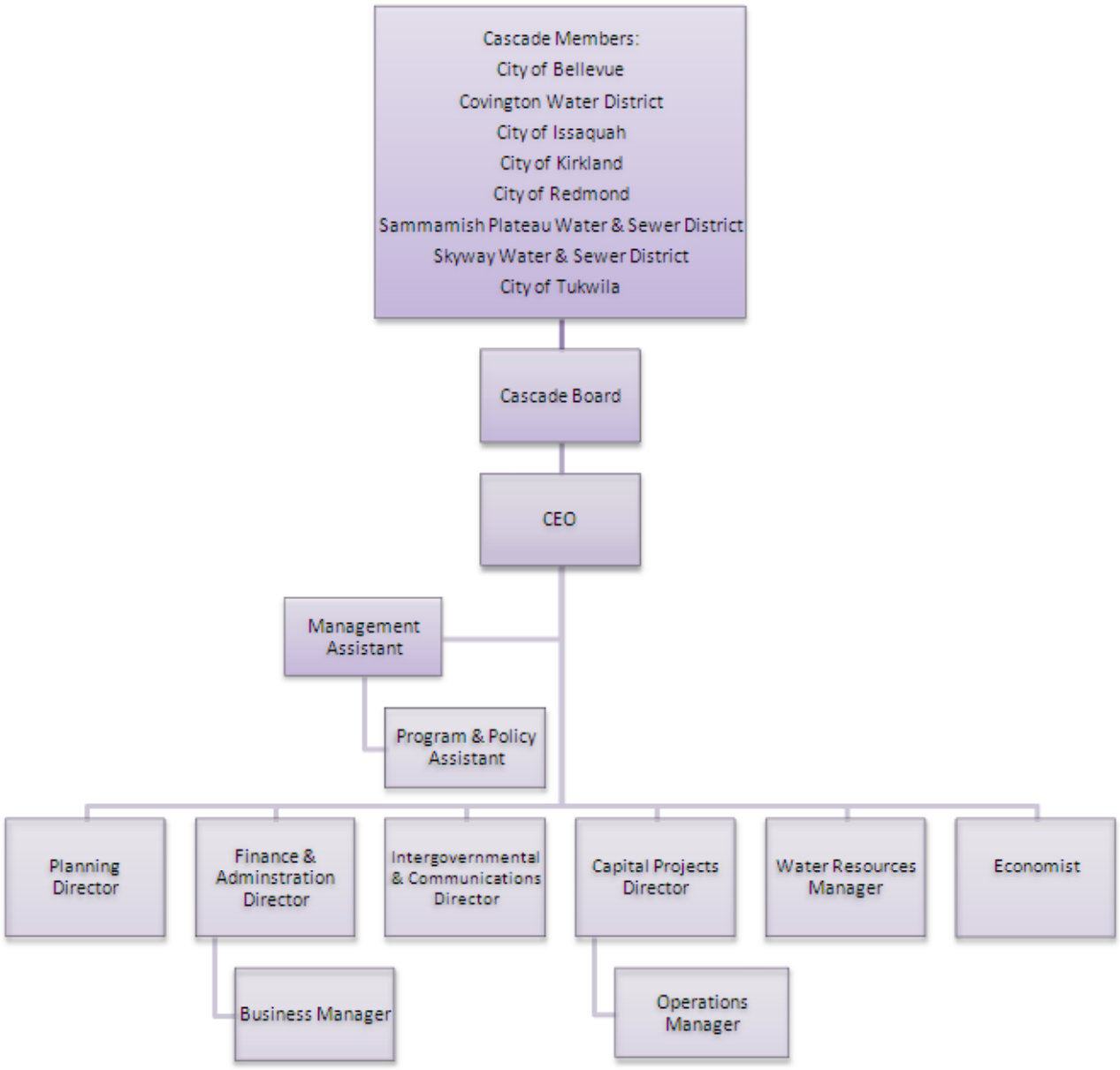

Figure 1.2: Organizational Chart

Since Cascade purchases its water from SPU and local distribution is handled by Cascade Members, Cascade's current functions do not include direct operation of municipal water supply facilities. Therefore, Cascade is not required to maintain operator certification for any of its employees under DOH regulations. However, Cascade's Operations Manager Joe Mickelsen does maintain certification as a Water Distribution Manager 4.

1.6. Regulatory Compliance by Cascade Members

Each Member of Cascade is responsible for complying with state, local and federal regulations regarding public water supply within its individual service area. Members delegate a portion of these responsibilities to Cascade, including water sources, treatment of water supplies, and

regional storage and transmission facilities. Some of these responsibilities, in turn, are implemented through Cascade's contract for regional supply from SPU (see Section 2.1).

Cascade Members operate and maintain their own individual water distribution systems. This includes, as applicable, water treatment for their independent water sources, maintenance of water quality within their reservoirs and distribution systems, and local monitoring of water quality conditions (some monitoring is shared with regional water suppliers).

1.7. Relationship to Member Water System Plans

Each Cascade Member is responsible under State law to prepare a water system plan every six years. However, regional planning for water supply sources is delegated to Cascade, documented in this Transmission and Supply Plan, and summarized in the individual Member water system plans submitted to the State Department of Health.

Based on the requirements described in Chapter 246-290-100 Washington Administrative Code (WAC), this TSP provides the following specific elements relevant to water system plans prepared by Cascade Members:

- Description of current and future regional water supplies that are either delivered currently or planned for future delivery to Cascade Members
- Documentation of the water-use efficiency program administered by Cascade on behalf of its Members
- Source of supply analysis
- Documentation of Cascade's water rights
- Water shortage response plan as it relates to regional water supplied by Cascade
- Discussion of opportunities for use of reclaimed water from regional sources such as King County
- Discussion of capital improvements related to Cascade water supplies and facilities

Members may supplement the items listed above with further information in their individual water system plans.

Each Cascade Member is individually responsible for system-specific information in its water system plan, including but not limited to the following:

- Description of its water system
- Basic planning data for the Member service area
- Consistency with local land use plans and policies
- Local water service area policies
- System-specific demand forecast
- Documentation of water rights for independent supplies owned by Members
- Analysis of local source capacity (e.g., Member-owned wells)
- Analysis of local storage and distribution system needs
- Documentation of operations and maintenance practices for Member facilities
- Development of a system-specific capital improvement plan and financial plan.

2. Current Water Supplies and Operations

This chapter summarizes Cascade's current water supplies and operational arrangements. Water supplies for future uses are covered separately, in Chapter 5.

2.1. Contracted Supply

Cascade contracts with SPU for delivery of water to seven of the eight Cascade Members[1]. The current contract ("Block Contract") became effective on January 1, 2004 and was amended in 2008 (Appendix B). The contract contains a "declining block" of supply that will be reduced in stages, beginning in 2024. It also includes a "supplemental block" that was added in 2008 and is available to Cascade from 2009 through 2023. Supply quantities are shown in Table 2.1.

Under the Block Contract, SPU is responsible for maintaining and operating source, treatment, transmission, and storage facilities needed to deliver the contracted supply, as well as regulatory compliance for those facilities. Water is delivered to individual Cascade Members at approximately 35 delivery points along SPU's various transmission pipelines, including portions of SPU's Tolt and Cedar transmission systems. Delivery points are identified in Exhibit II of the Block Contract (see Appendix B). SPU is required to provide water that meets state and federal drinking water quality standards at the delivery points.

Each of the delivery points has a wholesale meter that measures deliveries to individual Members. Both SPU and Cascade track total deliveries to Cascade Members on a monthly basis. Some of the water received by individual Members is "wheeled" through the Member distribution system to another Member. For example, some of the water delivered to Kirkland is wheeled to Redmond; and some of the water delivered to Bellevue is wheeled to Redmond and Issaquah.

[1] Covington Water District (CWD) meets all of its own needs from its own wells and the Tacoma Regional Water Supply System. There are no plans to deliver SPU supplies to the CWD within the 50-year planning period covered by the TSP.

Table 2.1: Supply Quantities in SPU Declining Block Contract (mgd)

Time Period	Original Block (2004)		Supplemental Block (2008)		Total	
	Average Day	Maximum Week	Average Day	Maximum Week	Average Day	Maximum Week
2004-2008	30.3	56.4	0	0	30.3	56.4
2009-2017	30.3	56.4	3.0	5.6	33.3	62.0
2008-2023	30.3	56.4	5.0	9.3	35.3	65.7
2024-2029	25.3	47.1	0	0	25.3	47.1
2030-2034	20.3	37.8	0	0	20.3	37.8
2035-2039	15.3	28.5	0	0	15.3	28.5
2040-2044	10.3	19.2	0	0	10.3	19.2
2045-2053	5.3	9.9	0	0	5.3	9.9
After 2053*	5.3	9.9	0	0	5.3	9.9

*After 2053, Cascade has the right to continue purchasing the amount shown, to serve Cascade Members that cannot be economically served by any other means.

The SPU supplies are drawn from the Cedar and Tolt River watersheds. Further information on SPU management of stream flow, fisheries resources, and aquatic habitat in the watersheds can be found in SPU's 2007 Water System Plan, Section 2.2.1, available on the Internet at: http://www.seattle.gov/util/About_SPU/Water_System/Plans/2007WaterSystemPlan/index.asp

An excerpt from Section 2.2.1 of SPU's water system plan is reprinted below:

> In operating its surface water supply sources, SPU is obligated to meet instream flow requirements on the Cedar and South Fork Tolt Rivers to protect fisheries resources and aquatic habitat. On the Cedar River, instream flow management is governed by the Cedar River Instream Flow Agreement (IFA), a component of the Cedar River Watershed Habitat Conservation Plan (HCP). The IFA specifies a guaranteed flow regime as measured at the USGS stream gage below the Landsburg Dam. This regime includes normal and critical minimum flow levels as well as additional supplemental flows or blocks of water at certain times of year that are linked to real-time hydrologic conditions and biological need. The agreement also specifies limitations for changing flow rates (i.e., "down-ramping") within certain flow ranges, and specifies minimum releases from Chester Morse Lake into a short bypass reach of the river between Masonry Dam and the Seattle City Light Cedar Falls hydroelectric facility. During many times of the year, stream flows exceed the levels required to meet the guaranteed flow regime and municipal diversions. The HCP provides funding for studies to help guide the management of this additional water in collaboration with the interagency Cedar River Instream Flow Commission, which oversees the implementation of the Cedar River instream flow management program.
>
> For the South Fork Tolt River, instream flow requirements are specified in the 1988 South Fork Tolt River Hydroelectric Project Settlement Agreement that was negotiated and committed to as part of the Federal Energy Regulatory Commission (FERC) licensing process for the Seattle City Light South Fork Tolt hydroelectric facility. This agreement specifies normal and critical minimum instream flow levels at the USGS stream gauge on the South Fork Tolt River near Carnation. Limitations on

downramping flow rates are also included in the agreement. The interagency Tolt Fisheries Advisory Committee oversees the implementation of the instream flow management program and associated mitigation projects.

SPU's performance in meeting this service level is tracked in semiannual and annual compliance reports. To date, SPU has almost always met its instream flow obligations; only a few minor noncompliance incidents have occurred, and actions have been taken to prevent reoccurrences.

2.2. Supply Interties

The SPU delivery points also represent "interties" in the context of Washington State requirements for water system plans. Table 2.2 lists these supply interties.

Some individual Members also have interties among themselves that are used to move a portion of the SPU supply from one Member service area to another. These are referred to as Member-to-Member interconnections. Cascade Members also have emergency interties with adjacent water systems to provide water in the event of emergency water shortages. These local interties are identified in the individual Members' water system plans.

2.3. Cascade Infrastructure

To perform its responsibilities for regional water deliveries, Cascade purchased the Bellevue-Issaquah Pipeline (BIP) from Bellevue and Issaquah in 2004 and 2006. Currently, the BIP is the only piece of infrastructure Cascade owns that is used to deliver municipal water supply. Its location is shown on Figure 2.1.

The ductile iron BIP conveys water from SPU's Tolt Eastside Supply Line and Eastside Reservoir to the City of Issaquah and the Sammamish Plateau Water and Sewer District. It is 24 inches in diameter, approximately 7.2 miles long, and extends from near the easterly city limits of Bellevue, along the south side of Interstate 90, and then continues through the City of Issaquah to its terminus at the Sammamish Plateau Water and Sewer District turnout. The portion of the BIP located within Bellevue was constructed in the 1960s. The remainder of the BIP was constructed in 2000 and became operational in 2006.

Transmission lines may experience leakage, particularly in older segments. Detailed information on leakage from the BIP is not available. There is no indication of substantial leakage. In the absence of specific data, Cascade estimates that leakage from the BIP is less than five percent of the flows through this pipeline.

Cascade also owns the White River - Lake Tapps Reservoir Project (Lake Tapps Project) in Pierce County. This resource is available for future production of municipal water supply and is discussed in Chapter 6.

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Table 2.2: Interties between Cascade Members and SPU

Meter Location / (SPU Identification)	Station Number	Cascade Member(s) Serviced By Meter [1]	Pipeline Segment Number	Size of Meter (in.)	Min. Hydraulic Gradient at Station Upstream of Meter (Feet NAVD-88 Datum)	Maximum Instantaneous Flow Rate Permitted by SPU (gpm)	
						Current Limit [2]	Proposed Limit [3]
Bellevue							
132nd Ave. SE & SE 26th Street	59	Bellevue	8	8	425	1300	1300
128th Ave. SE & Newport Way	56	Bellevue	8	8	435	850	800
Mercer Is. Pipeline & 108th Ave. SE	66	Bellevue	9	8	420	700	800
140th Ave. NE & 40th Street	65	Bellevue / Redmond	2	10	500	3500	3800
132nd Ave. NE & NE 14th St.(Bel Red Rd. & 132nd NE)	62	Bellevue	2	12	470	4500	4200
132nd Ave. NE & NE 24th Street (NE 24 NR 134th NE)	63	Bellevue	2	10	455	4500	3900
152nd Ave. NE & NE 8th Street	61	Bellevue / Redmond	2	24	460	3500	3000
145th Pl. SE & SE 28th Street	58	Bellevue	3	12	470	3000	2700
14509 SE Newport Way	60	Bellevue / Issaquah / Sammamish Plateau	3	10	525	4600	2300
14509 SE Newport Way	182	Bellevue	3	10	525	2900	5810
128th Ave SE & SE 56th ST	47	Bellevue	8	8	440	Backup to Sta. 55 [5]	
128th Ave SE & Newport Way (1)	55	Bellevue	8	6	435	800	300
120th Ave SE & SE 35th ST (3510 120th Ave. SE)	46	Bellevue	9	6	425	Backup to Sta. 124 [5]	
I-90 & Lake Washington Boulevard	50	Bellevue	9	6	425	Backup	
124th Ave SE & SE 38 PL (12417 SE 38th Pl)	124	Bellevue	9	8	425	1500	1400
128th Ave SE & SE 70th ST (4401 128th Ave. SE)	52	Bellevue	8	12	445	1020	1700
Kirkland							
132nd Ave. NE & NE 113th Street (11377 132nd Ave. NE)	74	Kirkland / Redmond	1	10	555	4500	3540
132nd Ave NE & NE 85th St (TESSL NE 85 & 132 NE)	75	Kirkland / Redmond	1	16	535	4080	4890
140th Ave. NE & NE 70th Street (6914 140th Ave. NE)	72	Kirkland / Redmond	2	12	520	1240	1430
Redmond							
160th Ave NE & NE 104th Street	165	Redmond	28	10	515	1,000 (combined with following planned new location)	2100
NE 172nd Street & Tolt Pipeline No. 2	185	Redmond	28	6	515		
Trlgy Pkwy NE & NE 125 St (12230 236th Ave. NE)	164	Redmond	26	10	610	2,000 (combined with following planned additional meter)	2900
Trilogy Parkway NE & NE 125 Street	186	Redmond	26	10	610		

Meter Location / (SPU Identification)	Station Number	Cascade Member(s) Serviced By Meter [1]	Pipeline Segment Number	Size of Meter (in.)	Min. Hydraulic Gradient at Station Upstream of Meter (Feet NAVD-88 Datum)	Maximum Instantaneous Flow Rate Permitted by SPU (gpm)	
						Current Limit [2]	Proposed Limit [3]
Tukwila							
39th Ave S & S 112 Street (3950 S. 112th St.)	11	Tukwila	15	10	460	Backup service	
S Center Pkwy & Tukwila Pkwy (CPRL 4 and 57th Ave. S.)	13	Tukwila	13	10	460	2200	800
W Valley Hwy & S 162nd St (000 S. 160yh 165 E, W. Valley Hiwy)	14	Tukwila	13	8	460	Backup emergency service	
Christensen Rd. & Baker Rd (16001 Christensen Rd)	15	Tukwila	13	8	460	480	440
3rd Ave S & S 160th Street	16	Tukwila	13	6	460	20	20
E Marginal Way & S 112th Street (3242 S. 112th St.)	168	Tukwila	15	12	445	810	800
51st Ave S & S Leo Street (1135 51st Ave. S.)	169	Tukwila	12	8	455	60	70
W. Marginal Place & s 102nd St. (10190 W Marginal Pl.)	170	Tukwila	5	12	300	80	300
47th Ave S & S Victor Street	173	Tukwila	12	6	425	Backup service	
Skyway							
84th Ave. S & S 134th Street (8400 S 134th St.)	1	Skyway	10	6	455	210	170
Beacon Ave S & S 124th Street (12400 Beacon Ave. S.)	5	Skyway	10	8	455	720	600
Cornell Ave S & S 112th Street	172	Skyway	4	6	375	Backup service	

Notes:

1. Currently, Issaquah and Sammamish Plateau do not receive water through meter #60 in Bellevue. It is anticipated and assumed for this TSP that both of these Members will be serviced by this meter in the near future.
2. Flow up to which the minimum hydraulic gradient is guaranteed.
3. Proposed changes through Management Agreements.

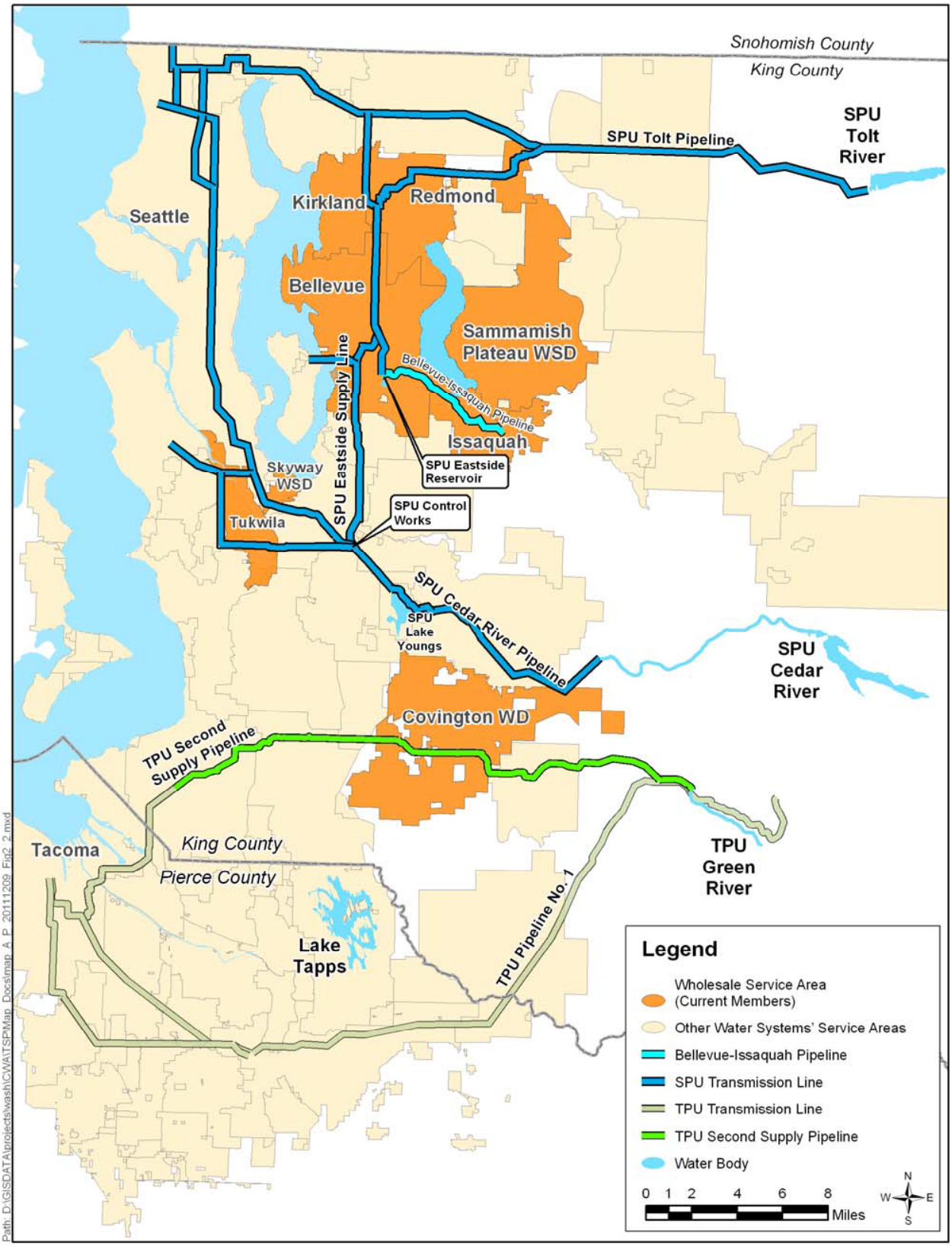

Figure 2.1: Regional Transmission Pipelines

2.4. Cascade Member Supplies

Five Members of Cascade have their own independent water supplies, and one of them, Covington Water District, meets all of its current needs with independent supply. These supplies are used only within the service area of the Member owning each supply (except as noted in Members' individual water system plans).

Members with independent supply are listed below:

- Covington Water District (wells and a share of Tacoma's Regional Water Supply Project)
- City of Issaquah (wells)
- City of Redmond (wells)
- Skyway Water and Sewer District (wells)
- Sammamish Plateau Water and Sewer District (wells)

Each of the independently-supplied Members has water rights or supply contracts, or both, separate from Cascade. These are documented in each Member's individual Water System Plan submitted to the Washington State Department of Health.

Bellevue and Tukwila have surface water rights which are used exclusively for irrigation in limited areas. Those sources are not discussed further in this TSP. Tukwila also receives reclaimed water from King County for irrigation at Fort Dent Park, street sweeping, and other uses. A delivery system has also been installed to the Foster Golf Links site for future use.

For purposes of planning long-range supplies for Cascade as a whole, Cascade accounts for the water supplies of the independently-supplied Members. Since Members face constraints on pumping in some places and at some times, the amount considered by Cascade is not always the same as the quantity authorized in Member water rights. Independent supply quantities used by Cascade in developing the 2010 TSP are listed in Table 2.3. These quantities come from Cascade audits of Member independent supplies in 2008. Except for Covington Water District, supply quantities shown in Table 2.3 are used in the supply portfolio analysis discussed in Chapter 5. More up-to-date information is used for Covington Water District.

Table 2.3: Member Independent Supply Capacity (mgd)

	Covington	Issaquah	Redmond	Skyway	Samm. Plateau	Total
Year Round Capacity - 2008	3.67	1.35	2.20	0.24	4.50	**12.0**
Max Week Capacity - 2008	8.60	3.33	3.51	0.57	8.89	**24.9**
Year Round Capacity - Ultimate	7.13	1.74	2.60	0.30	4.89	**16.7**
Max Week Capacity - Ultimate	18.30	3.33	3.51	0.57	8.89	**34.6**

Source: Adapted from Water Audits of Member Independent Supply, 2008. Maximum week generally estimated as 90 percent of maximum day quantity. Covington quantities account for expected usage of its combined sources.

2.5. Water System Analysis

Washington State Department of Health requires that a water system plan describe how the system was analyzed to identify infrastructure deficiencies. Since Cascade's supply is contracted from SPU and Cascade Members plan for and operate their own local distribution systems, Cascade does not independently perform system analysis. Information on SPU's water supply system, treatment facilities, and transmission lines can be found in SPU's 2007 Water System Plan. Analysis of each Cascade Member's local distribution system can be found in the Member water system plans.

2.6. Water Demand and Production

Water demand in the Cascade service area has been relatively stable since 2000, ranging from approximately 36 to 41 million gallons per day (mgd) despite growth in the service area. Table 2.4 shows total average-day demands, including both water purchased by Cascade and water produced as independent supply by Cascade Members.

Table 2.4: Total Cascade Demand, 2000-2010 (mgd)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Average Day Demand	40.1	36.2	38.8	41.2	39.5	38.0	40.1	39.9	38.9	40.9	36.5

Sources: Cascade records of water purchased from SPU 2004-2010; SPU records of deliveries to Cascade Members 2000-2003, and data provided annually by Cascade Members on their independent supply production.

Table 2.5 shows water purchased from SPU since Cascade began operating in 2003. Water purchased from SPU is less than the total water used, because five of the eight Cascade Members produce water from their own water sources.

Water use in the Puget Sound region varies sharply between the rainy winter months and the dry summer months. Table 2.6 and Figure 2.2 display the 2009 monthly variation in water produced, from both Member independent supplies and the Cascade regional supply contracted from SPU.

Table 2.5: Wholesale Deliveries from SPU, 2003-2010 (mgd)

	2003	2004	2005	2006	2007	2008	2009	2010	Average
January	19.4	20.3	19.6	20.1	20.7	21.0	20.7	21.3	**20.4**
February	18.3	19.7	19.9	20.2	20.5	19.7	22.9	20.2	**20.2**
March	19.2	19.3	20.4	20.6	20.5	21.3	22.4	22.2	**20.7**
April	20.2	21.1	20.6	20.9	21.4	21.5	20.9	20.7	**20.9**
May	21.7	26.2	22.5	25.4	24. 6	23.9	24.5	21.4	**23.8**
June	32.5	29.3	26.1	27.9	31.3	26.1	34.8	22.4	**28.8**
July	40.9	48.0	31.0	41.0	39.0	39.8	48.0	32.2	**40.0**
August	40.0	48.1	42.5	47.3	39.3	41.7	45.6	40.8	**43.2**
September	31.5	32.4	34.7	41.8	33.6	31.2	32.8	27.8	**33.2**
October	22.4	23.3	24.4	27.0	24.8	27.7	26.7	23.3	**25.0**
November	18.7	20.8	21.4	20.0	20.7	18.7	18.9	21.0	**19.9**
December	17.5	19.8	21.2	20.9	21.6	19.7	21.0	18.4	**20.2**
Annual Average	**25.6**	**27.5**	**25.5**	**27.8**	**26.8**	**26.6**	**28.7**	**24.3**	**26.9**

Table 2.6: Monthly Production in 2009 (mgd)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Members	9.6	9.7	9.2	9.8	11.6	16.8	21.8	18.9	12.8	10.2	10.7	10.8
Cascade	20.7	22.9	22.4	20.9	24.5	34.8	48.0	45.6	32.8	26.7	18.9	21.0
Total	**30.3**	**32.6**	**31.6**	**30.7**	**36.1**	**51.6**	**69.8**	**64.5**	**45.5**	**36.9**	**29.6**	**31.8**

Source: HDR peaking analysis, December, 2010.
Member supply is totaled from the five Members that have independent supply.

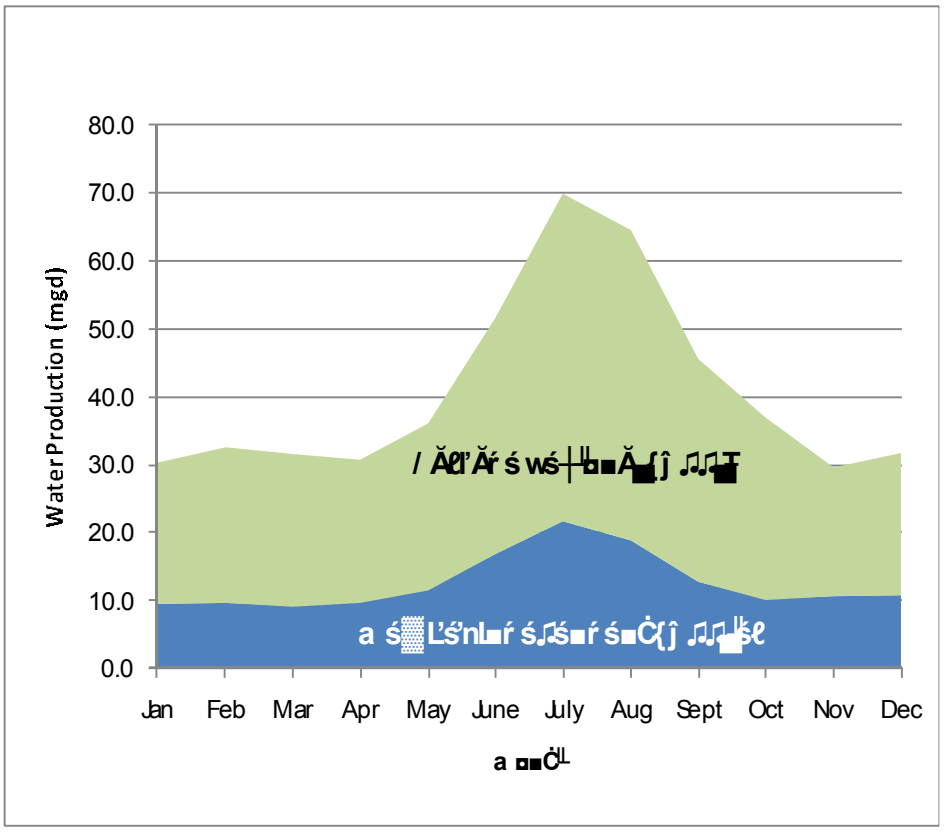

Figure 2.2: Monthly Production in 2009

Table 2.7 displays water supply peaking characteristics, based on production data from Cascade Members combined with water delivery data from SPU. Because Cascade operates at a regional scale, the peak week serves as the basis for evaluating supply adequacy. SPU meters are normally read once each month, but a weekly schedule of meter reads was employed in the summers of 2009 and 2010 to gather more detailed peaking data. Results for monthly and weekly peaking are shown in the table. The ratio of peak week to average day production was 2.01 in 2009 and 1.76 in 2010. In 2009 peak demands were affected by record high temperatures in the final week of July. In 2010 cool weather persisted throughout the summer months and water suppliers throughout the Puget Sound region experienced low demands during the peak season. In addition, both years were affected by the economic downturn.

Table 2.7: Peaking Profile 2009-2010

Year	Annual Average Demand in MGD	Peak Month Demand in MGD	Peak Month Ratio[a]	Peak Week Demand in MGD	Peak Week Ratio[a]
2009	40.7	69.8	1.71	81.9	2.01
2010	36.5	59.6	1.63	64.17	1.76

[a] Ratios represent demand during the peak period divided by annual average demand (expressed in mgd).
Source: HDR spreadsheet: "Peaking – Combined SPU&Members (v01).xlsx" Based on water production data acquired from Cascade Members and water delivery data from SPU.

Cascade uses the "Cascade Equivalent Residential Unit" (CERU) as a unit for tracking Member needs, growth, and financial obligations. The current value of a CERU is 250 gallons per day. This represents the usage of a typical single-family residence throughout the Cascade service area.

2.7. Water Quality Regulatory Compliance

As described in Sections 2.1 and 2.4, water supplies currently used by Cascade Members include a combination of independent supplies owned and operated by Members and regional supply contracted by Cascade from SPU.

For Member independent supplies, all water treatment, water quality monitoring, and associated reporting under State and federal drinking water regulations are the responsibility of the respective Members who own and operate the supply. In addition, all eight Members have responsibility for maintaining and reporting water quality within their local distribution systems.

Under the Cascade Services Agreement, Cascade is responsible to its Members for delivering water meeting State and federal standards at the point of delivery from Cascade to the Member. Currently, most of the points of delivery are taps along SPU transmission pipelines. Article V of Cascade's contract with SPU stipulates that SPU shall "…supply water to Cascade that meets or exceeds federal and state drinking water quality standards, as those standards may change from time to time" (see Appendix B). Cascade communicates regularly with SPU and Cascade Members regarding water quality conditions and monitoring. SPU performs all treatment, monitoring, and regulatory reporting of water quality conditions with regard to the regional supply.

There are some points of delivery where regional supply is "wheeled" within one Member's distribution system and then delivered to another Member's distribution system at a member-to-member interconnection. The Cascade Services Agreement also assigns Cascade responsibility for water quality at these interconnections. As a practical matter, the Members on the delivery and receiving ends of these wheeled supplies work closely with each other to ensure operational requirements are met on a daily basis, and this includes water quality considerations. Water quality monitoring and reporting is handled through the normal distribution system monitoring carried out by each Member. Cascade communicates with its Members regularly and is available to assist in resolving any water quality issues that may arise.

At this time, Cascade does not collect or test any water samples from the regional supply system or local distribution systems. Since SPU and Cascade Members handle reporting to regulatory agencies, Cascade does not prepare or submit separate reports. More information on water quality monitoring and reporting can be found in the respective water system plans of each Cascade Member as well as from SPU.

Cascade's regional supply from SPU originates from the Tolt and Cedar River sources owned and operated by SPU. SPU is responsible for watershed controls to protect water quality at the source, consistent with State and federal regulations. Watershed controls are described in Chapter 3 of SPU's 2007 Water System Plan.

Cascade does not have end-use customers (e.g., households or businesses) that would be the focus of cross-connection controls. Therefore, Cascade does not have a cross-connection control program. Cross-connection control by Cascade Members is described in their individual water system plans.

Similarly, Cascade Members track customer complaints as described in their water system plans. Cascade does not independently track complaints from end-use customers regarding water quality problems, pressures at the tap, or other local distribution system issues.

2.8. Reliability of Existing Supplies

Cascade's supply contracted from SPU originates from three separate sources: the Cedar River, the Tolt River, and the Highline Wells. The availability of all three sources contributes to system-wide reliability. Analysis summarized in SPU's 2007 Water System Plan indicates the firm yield of the SPU regional supply is 171 mgd, using a 98 percent reliability standard. This means the system is capable of producing this supply for municipal use in 98 out of 100 years. In the last four years (2007-2010), demand for the SPU regional system has ranged from 118 to 130 mgd, including Cascade and other wholesale customers. SPU projections of future growth in demand indicate that total system needs would not exceed the firm yield until at least 2060.

SPU's Water System Plan includes the following policy statement on supply reliability:

> Plan to meet full water demands of "people and fish" under all but the most extreme or unusual conditions, when demands can only be partially met.
>
> 1. Take into account reductions in demand resulting from demand management when forecasting water demands for people.
> 2. In forecasting water demands for fish, include water that is needed to meet regulatory requirements and provisions of legal agreements, and to maintain healthy ecosystems based on best available science that prove beneficial in a triple bottom line analysis.
> 3. Use a 98 percent engineering planning standard for determining long-term yield from water supplies, which differs from the approach used for evaluating available supplies on a year-to-year basis.
> 4. Include operational requirements associated with flood management, as well as increments in supply related to conjunctive use of SPU supply sources, when determining long-term yield.
> 5. As understanding of regional climate change and variability advances, continue to factor it into long-range demand and supply analysis.
> 6. Maintain a contingency plan that guides utility and customer actions during low water conditions in a way that strives to minimize impacts to people and fish.
> 7. Maintain backup supplies as a tool for managing supply in years with unusually low water conditions.

Water supplies from SPU could be disrupted in the event of an emergency that interferes with treatment or damages transmission infrastructure. SPU has developed a vulnerability assessment as well as contingency plans for rapid response to infrastructure damage from an emergency event. In addition, SPU and Cascade and its Members have developed water shortage contingency plans to deal with either drought conditions that may occur from time to time or emergency conditions that could disrupt supply.

Five of Cascade's Members also can use their local, independent supplies in the event of a supply shortage to supply at least a portion of their needs. One of these, Covington Water

District, fully meets its needs with its independent supplies, which includes several wells plus water from the Tacoma Regional Water Supply. In addition, each Cascade Member has emergency interties with other water systems that can provide water during a localized emergency.

2.9. Shortage Management Plan

Cascade's Shortage Management Plan (SMP) outlines how Cascade will respond to a shortage affecting its regional water supply. Cascade's primary role in the event of a water shortage is to coordinate responses among the Cascade Members that receive water from the regional supply and SPU as the source of the regional supply. Therefore, the SMP focuses on communication and coordination actions. The SMP is summarized here and a complete copy is included in Appendix C.

2.9.1. Stages of Curtailment

The SMP identifies four stages of water curtailment, reflecting increasingly severe shortage conditions that match the stages from SPU's Water Shortage Contingency Plan (WSCP). These are the Advisory Stage, Voluntary Stage, Mandatory Stage, and Emergency Curtailment Stage. For each stage of curtailment, Cascade's SMP identifies objectives, triggers, public messages, communication actions, and operating actions that are specific to Cascade. The SMP also identifies a range of actions that Cascade Members and their retail water customers can take to reduce water usage.

The SMP may be activated in response to actions by SPU or independently by Cascade. If SPU activates its WSCP, Cascade will take the following actions:

- If SPU initiates its **Advisory Stage**, Cascade will assess the situation to determine whether to activate its plan and recommend the same to its Members.
- If SPU activates its **Voluntary or Mandatory Stages**, Cascade (and its Members) should again assess the situation and consider whether to: a) activate their SMPs (if not already activated), and b) rely more heavily on non-SPU sources of supply, in the Member service areas where this is applicable.
- If SPU activates its **Emergency Curtailment Stage**, Cascade anticipates that Section 12.1 (Emergency Events) of the Seattle Block Contract would also be triggered (if it had not already been triggered at a previous stage). In the event of significant curtailment, Cascade and its Members would need to activate their SMPs to manage the situation effectively.

It is anticipated that SPU will communicate with its own retail customers, wholesale customers, large retail customers, regional stakeholders, state/federal resource agencies, and regional media. Cascade Members should communicate with retail customers, wholesale customers, local stakeholders, and local media. Cascade will help to coordinate and facilitate communications between the regional level and the local level.

2.9.2. Applicability to Cascade Members

Under the Cascade Services Agreement, Cascade Members "must respond to water shortages in a collective, shared fashion". The agreement allows the Cascade Board to impose penalty charges or a disproportionate reduction in supply on any Cascade Member who does not comply with the SMP during a shortage. However, the agreement also indicates that Members are not required to impose Cascade's SMP in areas not served by Cascade's regional supply and that Members with independent supply may decline to participate in Cascade's shortage management program without penalty if they cease taking Cascade water during the period of the emergency or shortage. Based on these provisions, shortage management applies to Cascade Members as follows:

- **Members receiving all of their water supply from Cascade:** Required to comply with Cascade's SMP.
- **Members receiving partial supply from Cascade:** Required to comply in portions of their service areas that receive regional supply; *or* to discontinue use of Cascade supply during the water shortage.
- **Members not receiving Cascade supply.** Not required to comply with Cascade's SMP. (Currently, Covington Water District does not receive water from Cascade, so would not be required to comply.)

Many Cascade Members have their own water shortage contingency plans. The SMP recommends that Members receiving water from Cascade review their plans for consistency with the SMP to support coordination during a water shortage.

2.9.3. Related Agreements

The SMP reflects relevant provisions of Cascade's Block Contract with SPU, and the 2009 *Agreement Regarding Lake Tapps* with the Lake Tapps Community. At such time as Cascade begins receiving regional water supply from Tacoma, the need to incorporate shortage response actions in coordination with Tacoma Public Utilities (TPU) will be reviewed.

2.10. Related Plans and Agreements

This section summarizes plans and agreements that affect Cascade's current supplies and operations. Select documents are attached as appendices to the TSP. The content of the respective plans and agreements is also discussed throughout this TSP, where relevant.

2.10.1. Agreements

Several agreements that affect Cascade's current supplies and operations are listed in Table 2.8. These are summarized as follows:

- The Cascade Services Agreement serves as the foundational agreement that created Cascade and guides its activities. A copy of this agreement is included in Appendix A.
- The 50-Year Declining Block Water Supply Agreement with Seattle provides for purchase of water on a wholesale basis, as described in Section 2.1. It includes the terms and conditions associated with this water supply.

- Member Water Supply Audits were developed to establish the quantity of local supplies that those Members having their own water supplies will produce. The Members that have local supplies are listed in Table 2.3. Each audit establishes a commitment by the Member to produce a certain quantity of water for its own needs.
- Cascade has agreements with two of its Members concerning operations and maintenance of the Bellevue-Issaquah Pipeline.
    - A 2006 agreement with the City of Bellevue provides that Bellevue shall operate and maintain a portion of the pipeline extending from the Eastside Reservoir to the intersection of 163rd Avenue and Newport Way in Bellevue.
    - A 2010 agreement with the Sammamish Plateau Water and Sewer District provides that the District will operate and maintain the BIP from 163d Avenue and Newport Way in Bellevue to a location at 1st Avenue Northeast in Issaquah, as well as an extension to the District's corrosion control facility and Well 9.

As more specifically described in a MOU among Cascade, Bellevue and the District, and in an associated Annual Task List, Bellevue and the District are responsible for:

- Operating and maintaining the BIP;
- Emergency response;
- Implementing the water quality monitoring program;
- Identifying any drinking water compliance deficiencies or issues within or affecting the BIP (e.g., water quality) and responding appropriately; and
- Record-keeping and reporting as required.

Cascade also has a water supply agreement with Tacoma Public Utilities (TPU). Since that is a future supply, it is discussed in Part II of the TSP (see section 5.6.3). Similarly, Cascade has an agreement to sell water to a group of four cities near Lake Tapps, which is described in Section 5.6.4.

Table 2.8: Agreements Affecting Current Supplies and Operations

Document	Date	Location
Cascade Water Alliance Joint Municipal Utility Services Agreement[a]	March 2012	Appendix A
50-Year Declining Block Water Supply Agreement Between the City of Seattle and the Cascade Water Alliance	December 2008	Appendix B
Member Water Audits (Covington, Issaquah, Redmond, Sammamish Plateau, Skyway)	May 2008	Cascade Files
Agreement for Operations and Maintenance of Cascade Water Alliance Pipeline (Cascade/Bellevue)	May 2006	Cascade Files
Agreement for Operations and Maintenance of Cascade Water Alliance Transmission Facilities to Issaquah and Sammamish Plateau Water and Sewer District Connections (Cascade/Sammamish Plateau WSD)	March 2010	Cascade Files

[a] The JMUSA replaced the December 2004 Cascade Water Alliance Interlocal Contract.

2.10.2. Regional Wholesale Supplier Water Plans

SPU's 2007 Water System Plan outlines its programs to provide safe and reliable drinking water throughout its retail and wholesale service area. The plan identifies Cascade as a wholesale customer, and describes the 50-Year Declining Block Water Supply Agreement. The plan includes sections on SPU's water resources, water quality and treatment program, and the transmission system that delivers water to Cascade and other wholesale customers.

(Note: The Tacoma Public Utilities (TPU) water system plan is not discussed in this section, because Cascade does not currently receive water from Tacoma.)

2.10.3. Cascade Member Water System Plans

Each of Cascade's Members is a public water system that prepares its own water system plan to comply with Washington State requirements. The most recent water system plans submitted to the Department of Health by each Member is listed in Table 2.9. Each of these plans describes the Member's supplies and operations, including its relationship to Cascade. Seven of the eight Cascade Members currently receive water from Cascade. The eighth Member, Covington Water District, has its own sources of supply and does not currently receive water from Cascade.

Table 2.9: Water Plans Affecting Current Supplies and Operations

Document	Date	Location
City of Bellevue Water Comprehensive Plan	2006	Cascade and Member Files
Covington Water District Water System Plan Update	2007	
City of Issaquah Water System Plan Update	2002	
City of Kirkland Water Comprehensive Plan 2007 Update	2007	
City of Redmond 2011 Water System Plan	2011	
Sammamish Plateau Water and Sewer District 2010 Water Comprehensive Plan Update	2011	
Skyway Water and Sewer District Comprehensive Plan, Water and Sewer Systems	2004	
City of Tukwila 2005 Water System Plan Update	2005	

2.10.4. Coordinated Water System Plans

Coordinated water system plans (CWSPs) are designed to enable water systems that serve different communities within a county to resolve service area boundary issues, provide for smooth transition of service as development occurs, and coordinate planning for new sources of supply. CWSPs are not required but can be initiated under a state procedure. CWSPs affecting the Cascade service area include the East King County, South King County, and Skyway CWSPs.

The East King County CWSP was prepared in 1989 and updated in 1996. It identified water supply needs in the eastern part of the county and developed a list of supply options to potentially meet those needs. It addressed expected growth and development, design

standards, service areas, satellite system management, and additional topics. Cascade Members in the area addressed by this plan include Bellevue, Issaquah, Kirkland, Redmond, and Sammamish Plateau. Each of these Members has established policies and design criteria that meet or exceed the requirements of this CWSP.

The South King County Coordinated Water System Plan was also prepared in 1989. The area it covers includes the Covington Water District. It addressed proliferation of small systems, water supply limitations, overlaps and conflicts in service areas, and land use and development policies. The Covington Water District has developed programs, policies, and design criteria that meet or exceed the requirements of this CWSP.

The Skyway Coordinated Water System Plan was prepared in 1988 and updated in 1999. It defines water service area boundaries in an area where Seattle, Tukwila, Renton Water District 125, and Skyway provide water to the public. It contains provisions for transferring service from one water system to another, reestablishing boundary lines, and resolving service area disputes. Service area changes are made from time to time but do not require an update or amendment of the plan.

2.10.5. Regional Water Supply Outlook

A group of water suppliers and local governments in King, Pierce, and Snohomish Counties known as the "Water Supply Forum" collaborated in 2001 and again in 2009 to develop the Regional Water Supply Outlook for the central Puget Sound area. The Outlook helps water utility managers and other decision makers to understand the needs and issues associated with providing water supplies to meet current and future needs throughout the region.

The Outlook planning area comprises all of King, Pierce, and Snohomish Counties. For this region, the Outlook provides a regional-scale forecast of municipal water needs by decade from 2010 through 2060 and extrapolates that need to 2110. It also documents existing water supplies within the region, along with future water supply options that may be available for development as needed. Where future needs exceed available supplies, the shortfalls are documented.

Cascade's water demand forecast for the TSP (see Chapter 4) was developed using the same source of demographic growth information as the 2009 Outlook and results are generally consistent with water needs documented in the Outlook. The uncertainty analysis and assessment of climate change impacts prepared by Cascade were also informed by the methods and data used in the Outlook. In addition, review of potential supply sources for Cascade relied, in part, on information that was developed for the Outlook. Finally, criteria used in evaluating potential supply sources for Cascade are consistent with those recommended by the Forum in the 2009 Outlook.

2.10.6. County and City Land Use Plans

County and city land use plans determine the extent and nature of development that can occur on lands within King County and its many cities. Land use plans also provide a means to implement provisions of Washington State's Growth Management Act (GMA). Each of the five cities that is a member of Cascade has a land use plan (comprehensive plan) as shown in Table 2.10. King County's land use plan regulates development in areas that are outside the various cities, including unincorporated lands within the water service areas of both cities and

special districts. Three special districts, Skyway, Sammamish Plateau and Covington Water District, are Cascade Members. Some Cascade Members also serve smaller cities within their service areas that have their own land use plans.

Table 2.10: Land Use Plans Affecting Cascade's Service Area

Document	Date	Location
King County Comprehensive Plan	October 2010	King County Web Site/Files
Member Comprehensive Plans (for the five Members that are cities)	Dates vary by jurisdiction	Member Web Sites/Files
Other cities' comprehensive plans. Several small cities are located within the area served by a Cascade Member as listed in Section 1.2.	Dates vary by jurisdiction	City Web Sites/Files

The various land use plans have policies that guide how each Cascade Member responds to development activity in its own service area. For more information, see the Members' individual water system plans.

2.11. Capital Improvement Program for Existing Water System

Cascade's existing capital facilities used to deliver municipal water supplies consist solely of the BIP. No deficiencies or capital investments have been identified for this existing pipeline.

Acquisition of the Eastside Reservoir from SPU has been identified as a potential capital expense. This has been discussed with SPU, but no formal agreement has been reached nor has the timing of this potential acquisition been determined.

Apart from these facilities and payments for contracted water supply, investments in capital facilities with respect to Cascade's existing municipal supplies are not needed during the six-year period of this Transmission and Supply Plan.

Part II of this TSP addresses future needs and supplies. Therefore Cascade's investment in new, long-range infrastructure is described separately in Chapter 5 of this TSP.

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3. Water Conservation Program

Cascade and its Members have a long standing commitment to stewardship of water resources and have carried out water conservation activities for many years. As an extension of its Members, Cascade manages regional-scale conservation activities on their behalf. This section summarizes Cascade's conservation program goals and activities.

3.1. 2008-2013 Program

Cascade's current conservation activities are carried out under its 2008-2013 Conservation Program (Conservation Program). The program was developed using information from Cascade's *2005 Conservation Potential Assessment* (CPA) which evaluated a wide range of potential conservation actions in terms of water savings and cost-effectiveness. Cascade staff work in partnership with staff from each of the eight Cascade Members to implement the program.

In adopting the Conservation Program, Cascade's Board defined eight policies as follows:

- Implement the requirements of the Cascade Interlocal Contract (now replaced by the Cascade Services Agreement).
- Provide the minimum number of conservation measures required for each of its Members to comply with Washington State's 2003 Municipal Water Law.
- Continue to promote efficient use of water.
- Give emphasis to reducing peak season demand.
- Provide conservation services to each Member in proportion to the amount of funding provided to the Conservation Program from each Member.
- Consider the cost-effectiveness of any water conservation measure as a primary criterion for adopting that measure.
- Provide an assortment of conservation measures sufficient to meet the need of its Members based on their unique demographics and demand characteristics.
- Allow flexibility in the implementation of specific conservation measures in each Member's service area.

3.2. Conservation Program Goal

The Cascade Board adopted the following water conservation goal in 2007 consistent with the Washington State Department of Health (DOH) Water Use Efficiency Rule:

> Cascade will dedicate resources necessary to achieve a cumulative combined Member savings of 1 million gallons per day on an annual basis and 1.45 million gallons per day during the peak season by 2014.

Each of Cascade's eight Members has adopted its own water conservation goal, in conjunction with the organization-wide goal listed above.

After 2014 Cascade anticipates continued achievement of water savings that will extend savings from the goal defined above (see Section 3.5). This assumption has been built into the water demand forecast described in Chapter 4.

Cascade recently updated analysis of a range of water conservation actions, and the Cascade Board plans to revisit policies, goals and objectives of the conservation program in 2012. If conditions warrant, the Board may elect to revise the goal in 2012, either upwards or downwards. Any revisions will comply with the State's Water Use Efficiency Rule (Chapter 296-290-830 WAC).

3.3. Conservation Program Actions

From 2008 through 2010, Cascade has carried out a wide range of conservation activities for its Members under the Conservation Program. These actions are summarized in Table 3.1. Each Member chooses whether and how to supplement these activities locally.

Significant accomplishments during this three-year time period included the following:

- **Toilet replacements:** Cascade provides rebates to homeowners throughout the eight Member service areas for installation of efficient toilets to replace older toilets that use more water. Cascade has transitioned from replacing older models with code-compliant toilets initially to distributing High-Efficiency Toilets that offer even more water savings. Cascade works with approximately 75 retailers and plumbers to promote the program. Customer surveys indicate very high satisfaction levels (96 percent and above).
- **Toilet Leak Detection.** Cascade distributes mailers annually to nearly 100,000 residences. The mailers provide dye strips and instructions to assist customers to find and repair toilet leaks.
- **WashWise.** Cascade has provided thousands of rebates to encourage customers to purchase high-efficiency clothes washers at the time their machines are replaced. Most retailers now primarily sell these machines.
- **Commercial Projects**. Cascade looks for opportunities to work with specific customers to improve efficiency of process applications requiring large volumes of water. For example, these have included installation of water-recycling equipment at a car wash in Issaquah and an improved cooling tower at Boeing's Tukwila facility.

Table 3.1: Conservation Measures Implemented during 2008-2010

Measures	Units Installed or Distributed	Estimated Water Savings (gpd)
Single Family Residences		
Clothes Washer Rebates	9,181	144,883
Toilet Replacements	7,716	189,494
Toilet Leak Identification	296,746	291,315
Irrigation Audits and Equipment	475	4,329
Other Measures	1,933	1,933
Multifamily Residences		
Showerhead Replacements	2,149	19,803
Bathroom Aerator Replacements	11,198	69,638
Toilet Replacements	1,272	28,396
Irrigation Audits and Equipment	14	89
Commercial Sites		
Clothes Washer Upgrades	12	1,848
Toilet Replacements	1,031	20,152
Urinal Replacements	178	20,737
Bathroom Aerators	4,410	189,630
Kitchen Spray Head Replacements	1,042	142,754
Commercial Dishwashers	13	2,600
Boilerless Steam Cookers	3	1,179
Irrigation Audits and Equipment	73	21,199
Other Commercial Projects	2	5,697
Other		
Miscellaneous Measures	N/A	67,777
Average Annual Water Savings (gpd – rounded)		**1,223,000**
Peak Season Water savings (gpd)		**1,274,000**[1]

gpd = gallons per day

[1] Peak season savings are calculated by multiplying the average irrigation savings by a factor of three and substituting those values for the average annual values. This reflects the seasonal pattern of these savings.

- **Outdoor irrigation audits, evaluations and equipment.** Cascade has worked with a wide variety of customers to assess irrigation efficiency, provided rain sensors to prevent automatic irrigation systems from watering during wet periods, and worked to improve irrigation systems to reduce water use.

- **Outreach Activities.** Cascade promotes conservation to customers and residents at community events, trade shows, stores, and schools within the eight Member service areas. This includes approximately 20 events per year. In 2010, Cascade also produced two videos aimed at assisting homeowners to manage their irrigation systems.

- **Industry Awards.** Cascade's conservation program has been recognized for excellence within the water industry. In 2010, Cascade received the U.S. Environmental Protection Agency's WaterSense Promotional Partner of the Year Award. Cascade has also received awards from the American Water Works Association, Pacific Northwest Section, on its video and mailer communications.

Cascade plans to continue implementing the water conservation program into the future. Program offerings will change from year to year to reflect new opportunities and areas of emphasis. For purposes of this TSP, Cascade anticipates that the program through 2020 will be similar in content and funding to the 2008-2013 program. However, Cascade plans to conduct a review of its water conservation program policies and activities in 2012. This may result in a modification to the program.

3.4. Budget and Staffing

Budgets for the Conservation Program ranged from $600,000 to $1.2 million during the first four years of implementation. The 2012 budget is $1.2 million. Cascade operates the program with 1.5 staff (FTEs), who work closely with Cascade Members' water system staffs to deliver programs throughout Member service areas that match customer and service area characteristics.

3.5. Water Savings

Cascade routinely tracks water savings from the conservation program by tabulating the number of water-saving devices and other actions and estimating savings per unit. Cascade has also carried out a detailed Conservation Potential Assessment using a spreadsheet model to evaluate water savings, costs, and cost-effectiveness for the current program and potential program variations.

Cascade estimates that water saved due to the water conservation program during 2005-2007 was 50,000 gpd in 2005; 100,000 gpd in 2006; and 120,000 gpd in 2007. The new 2008-2013 conservation program took effect after that. As shown in Table 3.1, activities during the first three years of 2008-2013 generated water savings of 1.22 mgd on an average basis and 1.27 mgd on a peak season basis.

Assumptions regarding future program savings were made to support Cascade's forecast of future water demand (see Chapter 4). Water savings assumptions were incorporated directly in the demand forecast. Baseline assumptions for water conservation use the 2008-13 program as a starting point. It is assumed that a similar investment will be made in each decade, but that water savings will accumulate more slowly in future decades as new savings become more difficult to achieve. These assumptions and projected water savings are shown in Table 3.2.

Table 3.2: Projected Reductions in Demand from Water Conservation

Time Period	Assumptions	Average Day Reduction from 2007 to End of Period (mgd)	Peak Season Reduction from 2007 to End of Period (mgd)
2011 - 2020	Savings to 2013 per prior adopted Cascade goal Additional savings 2014 to 2020 accumulate as in 2008 to 2013[1]	2.2	3.1
2021-2030	Annual growth in savings at 80% of the 2008-2013 rate	3.5	5.1
2031-2040	Annual growth in savings at 70% of the 2008-2013 rate	4.7	6.8
2041-2050	Annual growth in savings at 50% of the 2008-2013 rate	5.6	8.0
2051-2060	Annual growth in savings at 30% of the 2008-2013 rate	6.1	8.7

[1] Under the 2008-2013 Program, the annual increase in water savings is 168,300 gpd for the average day year-round, and 241,604 gpd for the average day during the peak season. All savings listed in the table accumulate beginning with the first year of the 2008-2013 Conservation Program.

3.6. Compliance with State Requirements

State rules at Chapter 246-290 Washington Administrative Code (WAC) require certain actions by municipal water systems with regard to water use efficiency. Each Member of Cascade is required to comply with these rules. Cascade's Conservation Program is designed to assist its Members meet the requirements as well as to achieve broader purposes of water supply and management.

Table 3.3 summarizes Cascade actions with respect to the specific provisions of the water use efficiency rules.

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Table 3.3: Compliance with Water Use Efficiency Rule Requirements

Category	WAC[1] Section	Compliance Date	Requirement	Cascade Compliance
1. Meters	246-290-496	Fully metered by January 22, 2017. Submit metering plan by July 1, 2008.	1. Meter all **sources.**	**Not applicable.** Currently, Cascade does not own or operate its own sources of municipal water supply. Sources owned by SPU and Cascade Members are metered, however, and delivery points from SPU to Members are also metered.
			2. Meter all **service connections.**	**Not applicable.** Cascade does not own or operate service connections to residences, businesses or other retail customers. Service connections of Cascade's eight Members are metered.
2. Data Collection	246-290-100	WSPs submitted after January 22, 2008.	1. Provide monthly and annual **production/purchase** numbers for each source.	**Yes**, data on Cascade's purchases of water from SPU are provided in Section 2.6.
			2. Provide annual **consumption** by customer class.	**Yes**, since Cascade's deliveries to its Members represents customer class consumption. These data are the same as production data.
			3. Provide "**seasonal variations**" consumption by customer class.	**Yes**, provided in Section 2.6. There is only one customer class.
			4. Provide annual quantity **supplied to other public water systems.**	**Yes**, provided in Section 2.6. Since all of Cascade's Members are public water systems, this is the same as production and consumption.
			5. Evaluate **reclaimed water** opportunities.	**Yes**, provided in Appendix D.
			6. Consider water use efficiency **rate structure.**	**Yes**. Cascade wholesale rates are based in part on demand shares, encouraging efficient use of water by Members. Retail rate setting is the responsibility of each Cascade Member.
3. Distribution System Leakage	246-290-820	First report completed by July 1, 2008. First compliance determination made by July 1, 2010.	1. **Calculate** annual volume and percent using formula defined in the Rule.	**Not applicable**. Cascade does not own or operate a water distribution system. Cascade Members address these requirements separately in their respective water system plans.
			2. **Report** annually: annual leakage volume, annual leakage percent, and, for systems not fully metered, meter installation progress and leak minimization activities.	
			3. Develop water loss control **action plan** (if leakage is over 10% for 3 year average).	
4. Goals	246-290-830	Goals established by January 22, 2008.	1. **Establish** measurable (in terms of water production or usage) conservation goals and re-establish every 6 yrs. Provide schedule for achieving goals.	**Yes,** measurable goals were established through a public process. See Section 3.2.
			2. Use a **public process** to establish the goals.	
			3. **Report** annually on progress.	**Not applicable.** Cascade's Members fulfill this responsibility directly.

1. WAC = Washington Administrative Code

Category	WAC[1] Section	Compliance Date	Requirement	Cascade Compliance
5. Efficiency Program	246-290-810	WSPs submitted after January 22, 2008.	1. **Describe existing** conservation program.	**Yes,** provided in Section 3.3.
			2. **Estimate water saved** over last 6 years due to conservation program.	**Yes,** provided in Section 3.5.
			3. Describe conservation **goals**.	**Yes,** provided in Section 3.2.
			4. Implement or evaluate **1-12 measures**, depending on number of connections.	**Not applicable.** Cascade does not own or operate connections to retail customers. Instead, it provides conservation services to its eight Members, who are individually responsible for meeting this requirement. The number of measures Cascade provides to its Members exceeds the requirement for each Member.
			5. Describe conservation **programs for next 6 years** including schedule, budget, and funding mechanism.	**Yes,** provided in Sections 3.3, 3.4, and 3.5.
			6. Describe how customers will be **educated** on efficiency practices.	
			7. Estimate **projected water savings** from selected measures.	
			8. Describe how efficiency program will be **evaluated** for effectiveness.	
			9. Estimate **leakage from transmission lines** (if not included in distribution system leakage).	**Yes,** provided in Section 2.3.
6. Demand Forecast	246-290-100	WSPs submitted after January 22, 2008.	1. Provide demand forecast reflecting **no additional conservation**.	**Yes,** see Section 4.4.
			2. Provide demand forecast reflecting **savings from efficiency program**.	
			3. Provide demand forecast reflecting **all "cost effective" evaluated measures,** if not implementing the minimum number of measures.	**Not applicable.** As noted above, Cascade does not have a minimum number of measures since it does not serve retail connections. Cascade does deliver more than the required number of measures to support compliance by each of its Members.
7.Performance Reports	246-290-840	First report completed by July 1, 2008.	1. **Develop** annual report including: goals and progress towards meeting them, total annual production, annual leakage volume and percent, and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	**Not applicable.** Each Member of Cascade fulfills the reporting requirement individually.
			2. **Submit annually** by July 1 to DOH and customers and make available to the public.	

1. WAC = Washington Administrative Code

Part II:
Long-Term Water Supplies and Infrastructure

Cascade Water Alliance
Transmission and Supply Plan

4. Long-term Water Needs

This chapter summarizes Cascade's forecast of water needs from 2010 to 2060. This information is used as a basis for decisions on how Cascade should manage and develop available supplies over the next 50 years, as discussed in Chapter 5.

4.1. Development of Demand Forecast

The water needs forecast presented in this chapter was developed in two stages. An initial forecast was prepared for Cascade by CDM and HDR in mid-2009. A key driver of the forecast was the future growth in households and employment as projected by the Puget Sound Regional Council (PSRC) in 2006. This was the most recent set of projections available from PSRC at the time Cascade's demand forecast was prepared.

The recession that began in 2008 had a dramatic impact on growth trends in the Puget Sound Region, including the Cascade water service area. The annual growth in new service connections (water customers) for Cascade Members fell by approximately 50 percent between 2007 and 2010. In addition, the major regional suppliers in the Puget Sound Region reported that growth in water demand flattened out during the decade from 2000 to 2010. Available information on the national, state, and regional economies suggests that recovery from the recession may be slow and growth in water use may be affected for some time to come.

In response to these trends, adjustments were made to the demand forecast in the fall of 2010. The sections that follow describe how Cascade's 2009 forecast was developed, and how the forecast was adjusted downward in 2010 to reflect reduced expectations for growth in the demand for water.

This chapter summarizes the methods and results. The results presented include only the final, 2010 demand forecast. Additional information, including the earlier forecast results, is included in Appendix E.

4.2. 2009 Forecast of Long-term Water Needs

4.2.1. 2009 Baseline Forecasting Model

An econometric (statistical) modeling approach was used to forecast water needs. An econometric approach statistically correlates water demands with factors that influence those demands. It relies on regression analysis to describe how water use is influenced by a number of explanatory variables.

Cascade's water demand forecasting model was estimated based on water billing and production data, demographic and socioeconomic data, weather data, and information on water conservation. These elements were assembled in a comprehensive data base for the eight Cascade Members, organized into a monthly time series from January 1994 to December 2008. Specific data used in the forecasting model included the following:

- Water production
- Water billings
- Temperature
- Precipitation
- Number of households in service area
- Ratio of multifamily households to total households
- Household income
- Number of employees in service area
- Ratio of manufacturing employment to total employment
- Marginal price of water
- Passive conservation (code)
- Active conservation (programs)

Two models were developed:

1. **Residential water demand** (single-family and multifamily combined). The dependent variable in this model is the log of monthly residential water use, expressed in gallons per household per day.
2. **Non-residential water demand** (all non-residential uses combined). The dependent variable in this model is the log of monthly non-residential water use, expressed in gallons per employee per day.

For further details on the data used, econometric methods, and resulting models, see the Technical Memorandum: *Water Demand Forecast, Task 600* (CDM December 2009), included in Appendix E.

For forecasting purposes, CDM used projections of future households and employment issued in 2006 by the Puget Sound Regional Council (PSRC). The PSRC forecast covered the time period from 2000 to 2040. Cascade's planning period extends beyond 2040, so CDM extended the forecast by assuming linear growth trends to 2060.

The baseline forecast includes assumptions on future levels of active conservation. Extrapolating from Cascade's current conservation program (2008-2013 Program) and assuming diminishing returns over time, the levels of conservation shown in Table 4.1 were built into the baseline forecast:

Table 4.1: Conservation Program Savings in 2009 Baseline Forecast

Year	Average Day Water Savings (MGD)	Year	Average Day Water Savings (MGD)
2010	0.5	2040	4.7
2015	1.3	2045	5.1
2020	2.2	2050	5.6
2025	2.9	2055	5.8
2030	3.5	2060	6.1
2035	4.1		

4.2.2. 2009 Uncertainty Analysis

After the baseline models of future water need were developed, an uncertainty analysis was performed to generate a range of possible water needs in future years. A software package designed for modeling risk and uncertainty using "Monte Carlo" simulations was used. Ranges of possible future values were developed for six of the variables that were used in the econometric models:

- Number of households in service area
- Number of employees in service area
- Temperature
- Precipitation
- Marginal price of water
- Household income.

In addition, a sensitivity analysis was performed to assess how water needs would change under two additional conditions: a) climate change and b) regional contingency for water needs in addition to those of the current Cascade Members.

Bringing these elements together, CDM provided three distinct forecasts in 2009, each showing a range for uncertainty:

1. Baseline forecast
2. Forecast with climate change
3. Forecast with climate change and regional contingency

The uncertainty analysis generated three separate demand curves for each forecast: a 95 percent exceedance level, the mean forecast, and a 5 percent exceedance level. The 95 percent exceedance level represents a low-end curve with very high certainty that water needs will be at least this high. The mean forecast represents the expected value under normal weather conditions. The 5 percent exceedance level provides a high-end demand curve, with only a five percent chance that demand will exceed that value under normal weather conditions. See Appendix E for these curves from the 2009 forecast.

As discussed previously, the forecasts also include assumptions regarding future water savings from Cascade's water conservation program (Cascade and Member conservation).

The water needs forecast was reviewed with Cascade's Resource Management Committee in the fall of 2009. Two policy decisions were made at that time:

1. Cascade should use the demand forecast with climate change as its basis for long-range water supply planning; and
2. The uncertainty range from the 95 percent exceedance level (low forecast) to the mean should be used for long-range supply planning. This choice was made because of concerns that PSRC demographic forecasts tend to be higher than actual population growth. By selecting the lower "half" of the uncertainty range, Cascade believed this tendency could be offset.

The water needs forecasts used in the TSP follow these policy decisions by Cascade.

4.2.3. Climate Change Effects

In 2006, King County formed the Climate Change Technical Committee, comprised of participants from King County, Seattle Public Utilities, Cascade Water Alliance, and other organizations. A technical report was generated that summarized a process used to select a representative sample from a dozen global circulation models and carbon emission scenarios. This sample of climate change was also used for the 2008 Regional Municipal Water Supply Outlook. The three represented climate change scenarios are listed below:

a. GISS_ B1: "warm" regional climate change scenario with nearly the smallest increase in temperature and nearly the largest decrease in precipitation

b. ECHAM5_A2: "warmer" regional climate change scenario with mid-range increases in both temperature and precipitation

c. IPSL_A2: "warmest" regional climate change scenario with large increase in temperature and nearly the largest increase in precipitation

For the uncertainty analysis described in Section 4.2.2, these three scenarios were used in a Monte-Carlo simulation procedure to produce a range of estimates of possible future temperatures and precipitation levels.

The econometric model described in section 4.2.1 includes temperature and precipitation variables. By applying the future estimates of climate-change effects on temperature and precipitation to the model, it was possible to estimate how water demands may change due to climate change. The result was that climate change was estimated to add approximately 3 mgd to water needs in the Cascade service area by year 2060. This represents an increase of approximately 5 percent. This increase is embedded in the demand forecast results discussed in Section 4.4.

For further information on how climate change effects were forecasted, see the *Technical Memorandum: Water Demand Forecast, Task 600* (CDM December 2009) in Appendix E.

4.3. 2010 Forecast Adjustment

As described in Section 4.1, adjustments were made to the water needs forecast in 2010 to account for reduced growth in the Cascade service area that began during the 2008-2009 recession and flattening trends in water usage within the Puget Sound region. The adjusted forecast used the same econometric models as the 2009 Baseline Forecast. However, reduced projections of growth in households and employment were used.

An updated forecast of households and employment was not available from PSRC. In lieu of an updated regional forecast, Cascade's financial consultant FCSG summarized recent growth in Cascade Equivalent Residential Units (CERUs) from 2005 to 2009, and forecasted CERU values for 2010-2016 based on Member projections of new water service connections. The CERU data are summarized in Table 4.2.

Table 4.2: Recent and Forecast Growth in CERUs

Member Utilities	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bellevue	63,107	64,353	64,622	65,169	65,519	66,142	66,281	66,461	66,662	66,873	67,114	67,388
Covington	14,036	14,904	16,243	16,578	17,141	17,276	17,325	17,396	17,516	17,959	18,475	19,060
Issaquah	9,117	10,105	10,119	10,514	10,961	11,012	11,137	11,219	11,289	11,337	11,393	11,456
Kirkland	17,000	17,299	17,558	17,712	17,773	17,847	17,936	18,157	18,182	18,208	18,234	18,260
Redmond	27,614	28,677	29,324	29,749	30,251	30,634	31,027	31,283	31,797	32,345	32,986	33,725
Sammamish Plateau	20,155	20,674	20,848	20,954	21,153	21,289	21,520	21,826	22,176	22,547	22,981	23,481
Skyway	3,761	3,773	3,782	3,790	3,800	3,800	3,805	3,812	3,820	3,828	3,838	3,849
Tukwila	8,459	8,473	8,503	8,538	8,567	8,577	8,593	8,615	8,639	8,665	8,694	8,727
Total	163,247	168,258	170,997	173,002	175,163	176,575	177,625	178,769	180,081	181,762	183,715	185,946
% Growth		3.1%	1.6%	1.2%	1.2%	0.8%	0.6%	0.6%	0.7%	0.9%	1.1%	1.2%

Note: data may differ from information in individual Member plans, due to differences in sources and methodology.

CDM used the growth rates from Table 4.2 to construct an adjusted forecast of households and employment through 2020. Growth rates from 2007 to 2016 used the results from Table 4.2. Growth rates from 2017 to 2020 gradually returned to the original forecast growth rates from PSRC. From 2020 to 2060, the original growth rates from the 2009 Cascade forecast were used (PSRC forecasts plus extrapolation to 2060).

In essence, this process reduced the forecast of households and employment for the period from 2010 to 2020, reflecting an extended effect of the 2008-2010 recession. For the period after 2020 the forecast of households and employment assumes growth rates will be similar to those used in Cascade's original 2009 baseline forecast. The demographic inputs, as adjusted, are shown in Table 4.3.

Table 4.3: Housing and Employment Projections, 2010 Adjusted Forecast

Date	Housing	Employment
2007	144,481	338,152
2010	149,302	349,434
2020	168,864	386,514
2030	193,918	440,216
2040	219,930	482,117
2050	250,299	537,684
2060	285,859	590,169

Additional future water savings expected from Cascade's conservation program were applied to the adjusted forecast using the same water savings levels as in the 2009 baseline forecast.

The uncertainty analysis was not performed again in preparing the 2010 adjusted forecast. However, results of the original uncertainty analysis from 2009 were applied, on a proportional basis. This included both the predicted effect of climate change and the range of projected demands from the Monte Carlo analysis. These adjustments were made on a proportional basis based on the uncertainty results from the 2009 analysis. As discussed in Section 4.2, the range of forecasts selected for use in the TSP extends from the low forecast (95 percent exceedance) to the mean forecast.

4.4. Results of 2010 Adjusted Forecast

Table 4.4 and Figure 4.1 show the 2010 Adjusted Forecast. Both Average Day Demand (ADD) and Maximum Week Demand (MWD) are shown. ADD is the average daily water use, averaged over an entire calendar year. MWD is the average daily water use during the seven-day period with the highest use each year. MWD typically occurs during hot, dry periods in either July or August. Both ADD and MWD are measured in millions of gallons per day (mgd).

Two curves are shown for each of these conditions. The higher curve for ADD represents the mean forecast and the lower curve represents the 95 percent exceedance forecast. For ADD, Cascade anticipates that actual demands will fall within the range defined by the two curves under normal weather conditions in any given year.

Similarly, the higher curve for MWD shows the mean forecast while the lower curve shows the 95 percent exceedance forecast. Actual MWD is expected to fall somewhere in the range defined by these two curves.

These forecasts account for possible increased demands due to climate change, as well as water savings due to continued, long-term implementation of Cascade's water conservation program. Cascade's water supply planning is aimed at providing adequate supply to meet needs within this range for both ADD and MWD. Chapter 5 shows how Cascade intends to use current and future supply sources to provide adequate water for the expected needs.

As the 2010 adjustment indicates, demand conditions have shifted in the Puget Sound region in recent years. After decades of rapid growth in population and water needs, all of the regional water suppliers in the Central Puget Sound area have experienced flat or even reduced demands during the past decade. With the effects of the recent recession and housing downturn possibly lingering for many years into the future, it is possible that even the adjusted forecast may overstate future demands.

For supply planning, this means that the risk equation has changed. In the past, suppliers in the region faced the risk of growth outpacing supply, but today an equally critical risk is that new water supply projects may be built too soon and burden ratepayers with unnecessary costs. Since the region as a whole currently appears to have an abundance of supply, Cascade will continue to seek partnerships among regional water suppliers to use existing supplies and infrastructure for as long as possible. If demand remains flat or grows only slowly, it may be possible to delay some of the projects that Cascade has shown in its supply portfolio, thereby spreading costs over a longer time and reducing rate impacts.

As required by the Department of Health, Table 4.5 and Figure 4.2 show the effects of water conservation on the demand forecast. Again, both ADD and MWD are shown. In each case, the lower curve is the mean demand forecast with conservation (same as the mean forecast in Table 4.4 and Figure 4.1). The higher curve shows what water needs would be expected if Cascade and its Members did not provide water conservation programs. Water savings from conservation are projected to reduce average day demand by approximately seven percent by year 2030 and eight percent by year 2060.

Table 4.4: Cascade Water Needs Forecast

Year	Mean Forecast		95% Exceedance Forecast	
	ADD	MWD	ADD	MWD
2010	40.50	76.95	39.44	74.93
2020	41.30	78.47	39.89	75.78
2030	46.60	88.54	44.33	84.23
2040	51.30	97.47	48.13	91.45
2050	57.90	110.01	53.43	101.51
2060	65.30	124.07	59.02	112.14

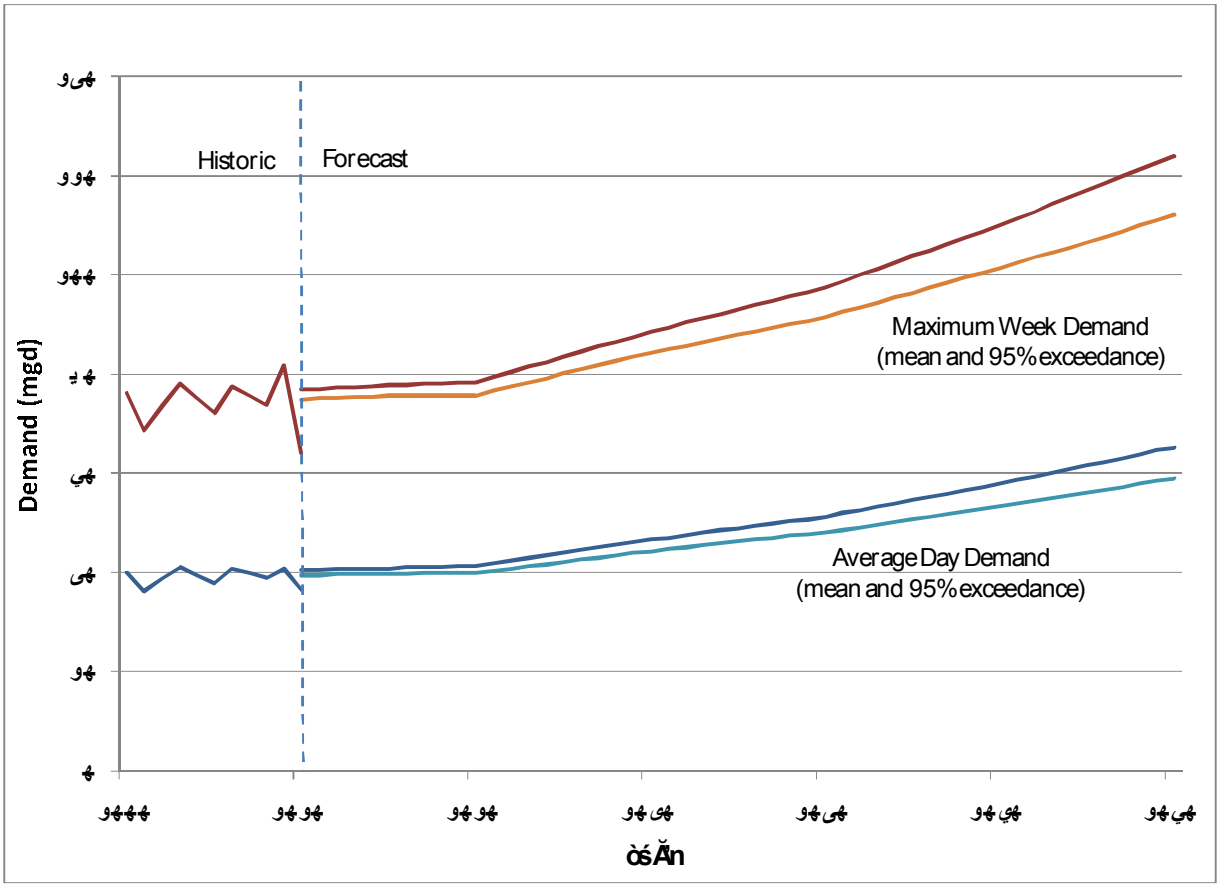

Figure 4.1: Long-range Forecast of Water Needs

Table 4.5: Effect of Water Conservation on Demand Forecast

Year	Mean Forecast with Conservation		Mean Forecast without Conservation	
	ADD	MWD	ADD	MWD
2010	40.50	76.95	41.00	77.91
2020	41.30	78.47	43.49	82.63
2030	46.60	88.54	50.13	95.26
2040	51.30	97.47	56.01	106.42
2050	57.90	110.01	63.45	120.56
2060	65.30	124.07	71.36	135.58

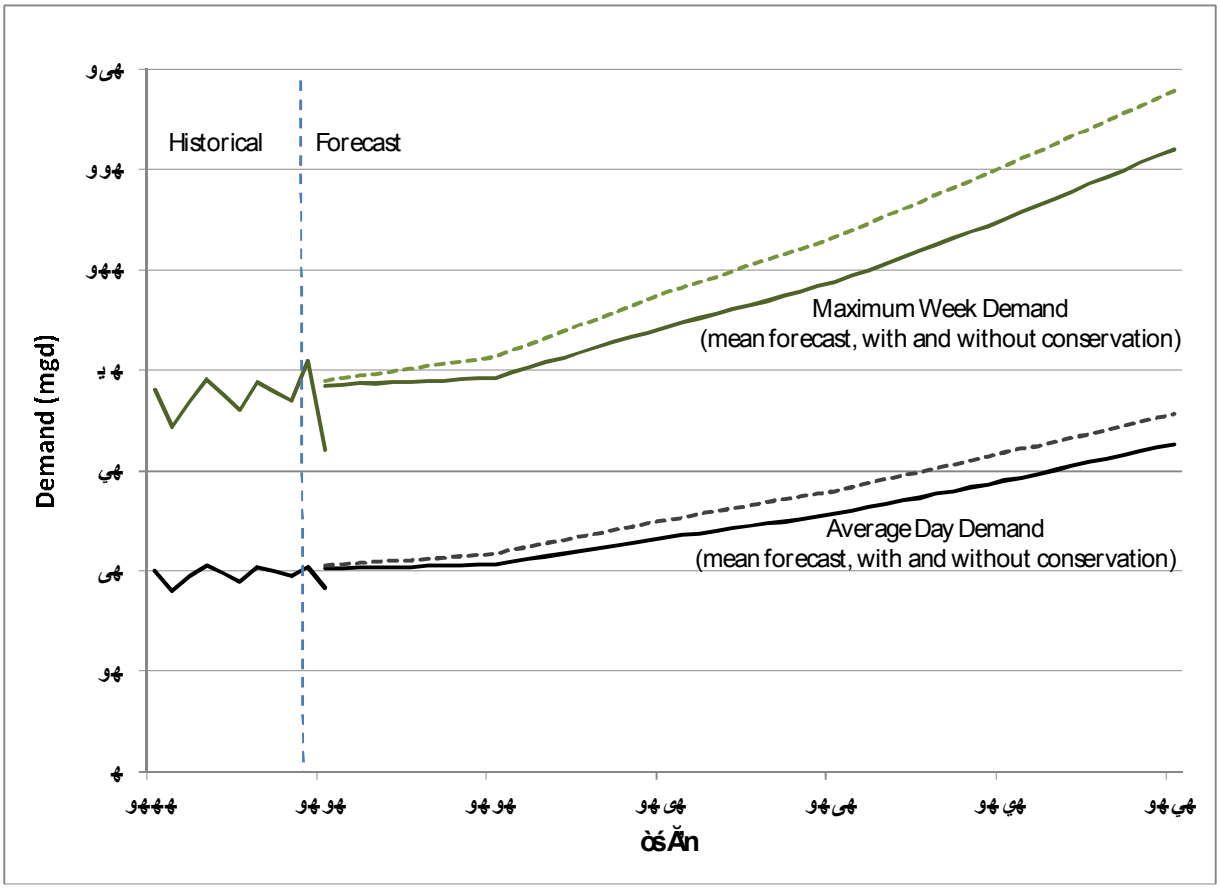

Figure 4.2: Effect of Water Conservation on Demand Forecast

4.5. Contingency for New Members and Other Needs

A variety of events in the future could increase the water needs served by Cascade. First, the Cascade Services Agreement allows for the addition of new Member water systems. If new Members join Cascade, then additional supplies may be needed to meet their water needs. The quantity needed would depend on the size of the new Member demands and the amount of independent supply, if any, owned by the new Member.

A second category of new needs involves potential loss of existing, independent supply from a current Cascade Member. If any Member's independent supply is lost due to groundwater contamination, groundwater depletion, regulatory action, or other causes, they may need to purchase additional supplies from Cascade to replace the supplies that are lost.

Finally, it is possible that other water systems in the Puget Sound region may request additional supply from Cascade on a wholesale basis, without becoming a Member. In this event, Cascade's Board would consider whether Cascade has sufficient supply to meet the request, and it is possible a wholesale supply arrangement could be developed.

The water needs forecast developed in 2009 included consideration of additional needs to be served by Cascade. While these needs cannot be predicted accurately, a contingency of 10 mgd was identified as providing a reasonable estimate of potential additional needs. This contingency would be in addition to the water needs forecast presented in Section 4.4. While not used in the supply planning presented in Chapter 5, Cascade remains alert to the possibility that any of these events could occur in the future.

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5. Long-term Sources of Supply

For the 2010 TSP Update, Cascade reviewed a wide range of potential water supply sources to meet the needs of its Members through at least the next 50 years. This chapter summarizes how this review was performed and identifies Cascade's preferred portfolio of water supplies to meet future needs to at least 2060.

5.1. Source Analysis Overview

The supply alternatives analysis was performed in stages, starting with a lengthy list of potential water supply sources and narrowing them to a preferred "portfolio" of supplies. Steps in the process are shown in Figure 5.1.

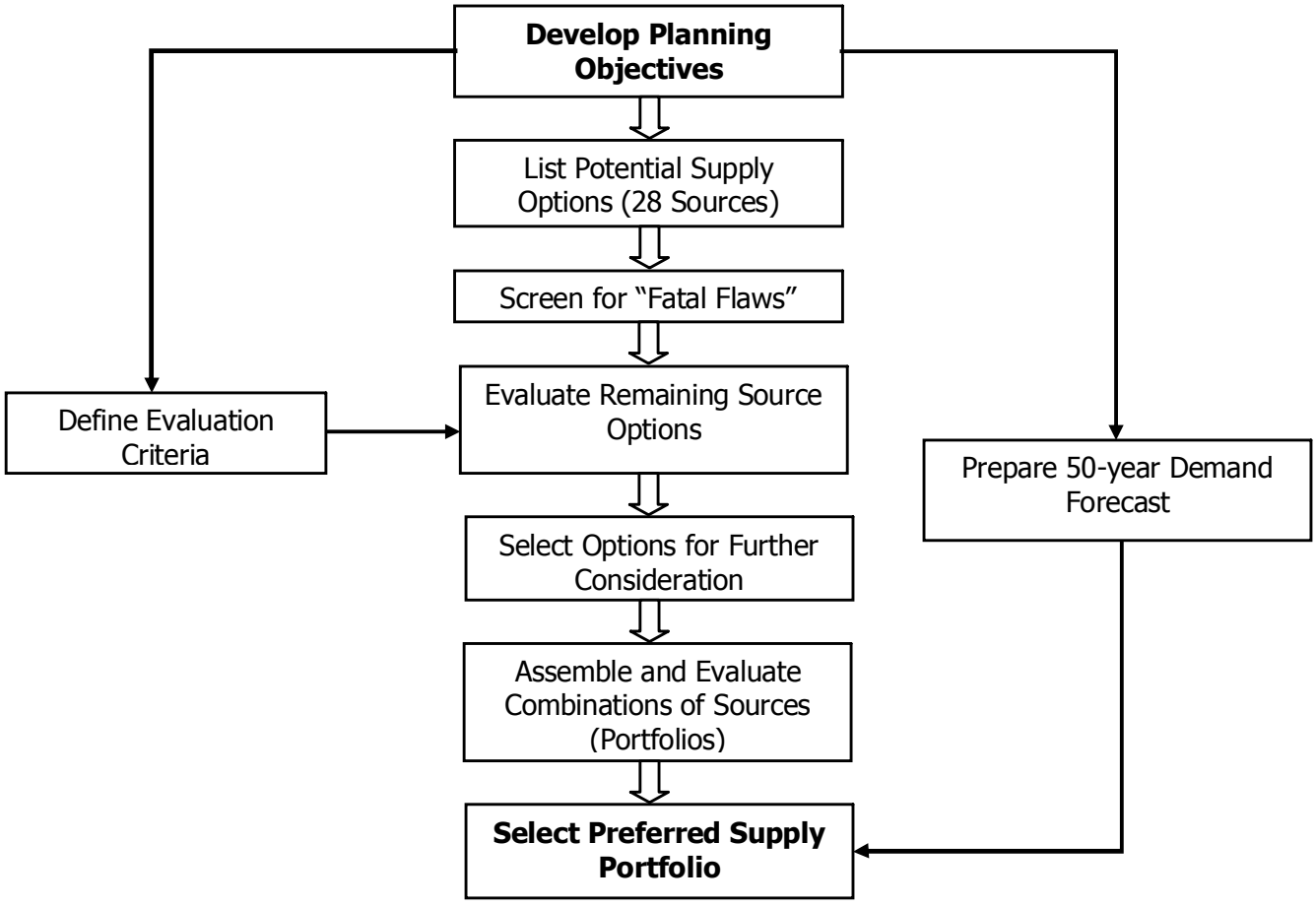

Figure 5.1: Source Analysis Overview

Cascade used the process described above to identify a combination of supplies for the period 2010 to 2060. Cascade reviewed data and results at each step with a stakeholder group formed to provide external input on the process. Information on the Cascade Connections Working Group is included in Appendix F.

Further information on the source analysis process and the specific sources selected is presented in the subsections that follow. Additional documentation of the source analysis is presented in two technical memoranda prepared for Cascade:

- *Supply Alternatives Assessment, Task 700*, December 2009 (CDM)
- *Supply Portfolio Analysis*, June 2010 (HDR)

5.2. Planning Objectives

Cascade held a Planning Objectives Workshop in February 2009. Participants included Cascade Board Members, Cascade Member staff, Cascade staff, and consultants. The following list of objectives was developed to guide the long-range planning process for the 2010 TSP:

- The TSP should identify a viable portfolio of water sources that can provide Cascade with secure and reliable supplies through at least 2050. A broad range of supply alternatives and project partnerships should be considered.
- The TSP should identify adequate supplies to at least serve the eight current Members of Cascade. It should also consider how investments in supply and infrastructure could serve additional water systems seeking new or replacement supplies and how these investments could improve reliability of supplies in the Central Puget Sound Region (King, Pierce and Snohomish Counties).
- The TSP should enable water rates to be managed at levels acceptable to water customers over the short and long terms.
- The TSP should provide flexibility to Cascade to adjust to changing circumstances or new opportunities. To this end, smaller supply projects, interim supplies, and phased development of larger supplies should be considered in the mix of source alternatives.
- The TSP should recognize the drop in current, contracted supplies at year 2024 and should outline a clear and viable path toward addressing Cascade's needs at that time.
- The plan should apply clear criteria and rationale for recommended actions. It should provide a sound basis for communication with elected officials, regulators, and water resource stakeholders in the Central Puget Sound Region.

These objectives guided decisions throughout the planning process. In addition, they served as the basis of a detailed set of criteria used to evaluate individual water supply options (see Section 5.4).

5.3. Identification and Screening of Potential Supply Sources

Several regional water studies have been carried out in the Central Puget Sound Region over the past 20 years. Cascade and its Members have participated in these studies and are familiar

with the range of water supply and management alternatives considered. An initial list of potential water supply options was developed based on the following sources:

- *Central Puget Sound Regional Water Supply Outlook* (2009).
- *East King County Coordinated Water System Plan* (1996).

Additional supply options were identified in workshops involving Cascade Members, Cascade staff, and the consulting team for the TSP. The resulting list of supply options considered in the initial screening step is shown in Table 5.1. Details on each option are presented in the Technical Memorandum *Supply Alternatives Assessment, Task 700* (December 2009).

Table 5.1: Initial List of Potential Water Supply Options

Existing Source Management	New Surface Water Options	New Ground Water Options	Reclaimed Water and Conservation
Tacoma "Light" TCP w/ Wheeling TCP w/ North Segment TCP Expanded SPU Expanded Block	Lake Tapps North Fork Tolt Everett- Sultan River Supply Expansion SRRWA – Snohomish River Supply Lake Washington Lake Sammamish Off-Stream Storage – Sammamish, Green River, Issaquah Creek Desalination	Chambers Creek Wells Snoqualmie Aquifer Deep Resource Aquifer Withdrawal (DRAW) OASIS Phases 1 & 2 OASIS Phase 3 Cascade Member ASR	Brightwater Reclaimed Water, South Segment South Treatment Plant Reclaimed Water, Tukwila Satellite Treatment Plants Reclaimed Water, King County Direct Potable Use of Reclaimed Water, Brightwater Enhanced Cascade Conservation 2 Stormwater Capture, Satellite Package Plants Rainwater Collection for golf courses Reduction in Regional Unaccounted-for-Water

ASR = Aquifer Storage and Recovery
OASIS = Lakehaven Utility District ASR Project
SPU = Seattle Public Utilities
SRRWA = Snohomish River Regional Water Authority
TCP = Tacoma-Cascade Pipeline

Six "fatal flaw" criteria were identified to eliminate any options that were clearly infeasible for Cascade to develop as regional sources. Failure on any one of these criteria led to removal of the option from further consideration. These criteria included the following:

- legal complications
- permitting/institutional complications
- water rights
- public acceptance
- quantity of supply yield (one million gallon per day threshold)

- location of supply (Sources outside Pierce, King and Snohomish County were not considered.)

Based on the fatal flaw criteria, eight sources were eliminated, as follows:

- North Fork Tolt
- Everett-Sultan River Supply Expansion
- Lake Sammamish
- Off-stream Storage
- OASIS Phases 1 and 2
- South Treatment Plant Reclaimed Water
- Rainwater Collection
- Reduction in Regional Unaccounted-for Water

Elimination of projects for purposes of the TSP does not mean these projects are not viable for local purposes or for development by other parties. For example, Tukwila uses reclaimed water from the South Treatment Plant, and either Tukwila or other water systems could expand local uses of that supply in the future.

5.4. Multi-criteria Evaluation of Supply Sources

The next step in the process was to further define and evaluate each of the remaining 20 supply options. Each of these projects is described in detail in the Technical Memorandum: *Supply Alternatives Assessment, Task 700*, December 2009 (CDM). The technical memorandum also provides details of the evaluation process.

Six criteria were defined to evaluate and compare the 20 source options. These criteria were developed at workshops with Cascade Members and staff held in March and April 2009. Each criterion was weighted so that more important criteria would have more influence in the evaluation. The criteria and weights are listed below:

- Financial considerations (26%)
- Supply reliability (weight: 22%)
- Operational considerations (18%)
- Environmental Considerations (16%)
- Implementation considerations (10%)
- Regional/intergovernmental considerations (8%)

The criteria were also discussed with the Cascade Connections stakeholder group that met periodically to provide input to Cascade's planning process. A separate weighting exercise was held with this group. Criteria weights assigned by the stakeholder group were similar to those assigned by Cascade.

Each criterion was further broken down into sub-criteria. For example, the reliability criterion was broken down into three sub-criteria: 1) availability of the supply; 2) variability of yield; and 3) vulnerability to emergency disruptions. All 20 sources considered in this step were then "scored" based on performance metrics defined for each sub-criterion.

Figure 5.2 displays the results of this procedure, using weighted scores from the highest ranked projects at the top to the lowest ranked projects at the bottom. The letters "I" and "P" designate interim supplies and permanent supplies, respectively. Water supply quantities shown are

expressed in million gallons per day (mgd) and represent approximate peak yield. Colors on the bars represent the weighted contribution from each major criterion.

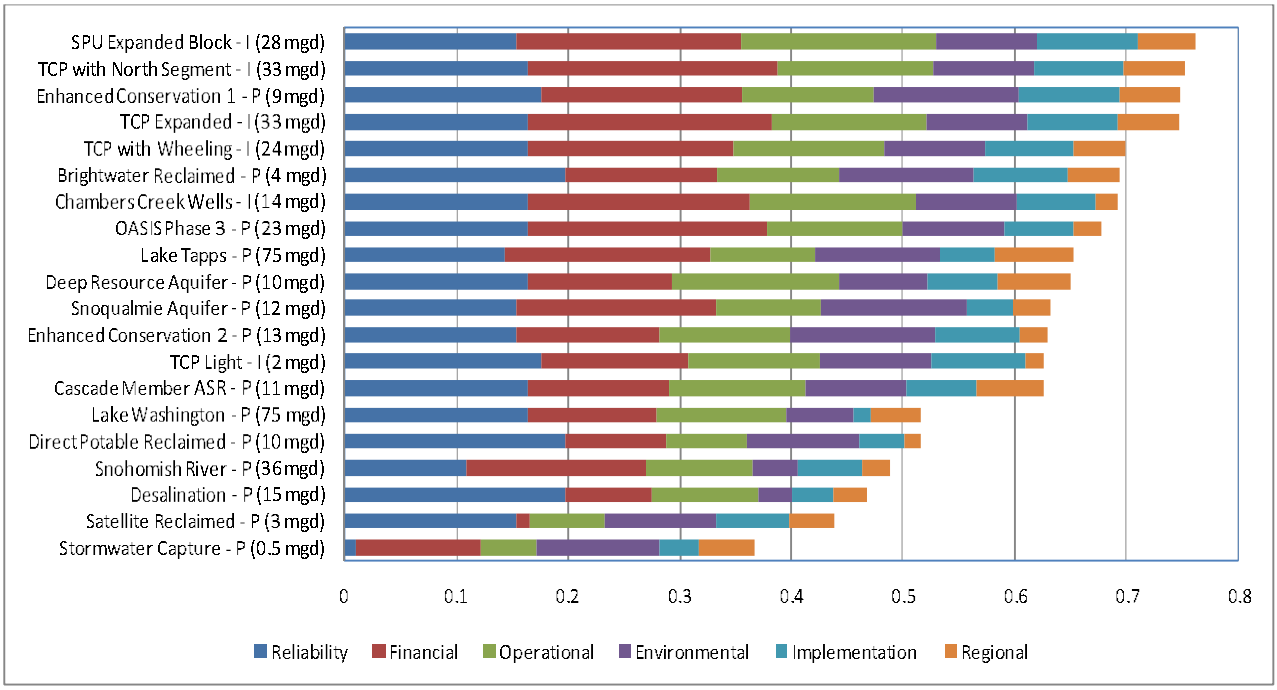

Figure 5.2: Results of Multi-criteria Evaluation

After reviewing the results of the multi-criteria analysis, the Cascade Resource Management Committee selected 11 of the 20 options for further consideration. However, three options representing water supply from Tacoma (TCP with wheeling, TCP north segment, and TCP expanded) were consolidated into a single option. The two options involving enhanced conservation by Cascade were also consolidated into a single option. This resulted in eight options carried forward into the next stage, as listed in Table 5.2.

Table 5.2: Water Supply Options Considered for Supply Portfolios

Existing Source Management	New Surface Water Options	New Ground Water Options	Reclaimed Water and Conservation
TPU Contract Supply* SPU Expanded Block	Lake Tapps	Deep Resource Aquifer Withdrawal OASIS Phase 3 Cascade Member ASR	Brightwater Reclaimed Water, South Segment Enhanced Cascade Conservation

* Includes alternative pipeline routes, wheeling, and/or a variation involving Covington Water District's share in the Tacoma Second Supply Project.

5.5. Development of Supply Portfolios

The next step of the supply evaluation was to examine how different water supplies could be combined into "portfolios" that could be developed in stages over a period of time to supply the projected needs of Cascade Members. The planning objectives described in Section 5.2 were

used to guide portfolio development. The portfolios include existing, developed sources of supply as well as the potential new supplies listed in Table 5.2.

A water demand forecast was prepared as described in Chapter 4 of this TSP. The demand curves were used to establish a range for the quantity of supply that will be needed year-by-year over the 50-year planning period.

Considerations used in assembling supply portfolios are listed below:

- Cascade's current Block Contract with SPU calls for the available supply to be reduced, in several stages between 2024 and 2045.
- Because of uncertainty in the long-term demand forecast, it is advantageous to include options that can delay the need for expensive infrastructure. Use of contracted supplies from one or a combination of sources (i.e., SPU, TPU, Covington Water District) can potentially make maximum use of existing regional supplies and infrastructure and reduce the need for new investments.
- At the same time, the White River - Lake Tapps Reservoir Project (Lake Tapps Project) provides a valuable future source of supply to Cascade and the region. If contracted supplies can be expanded in the future, Lake Tapps can serve as a long-term backstop supply for Cascade or its supply partners, or both. If contracted supplies cannot be increased at an economical cost, Lake Tapps can be used to supply Cascade's needs. Regional backstop supply will be particularly important in the event that climate change reduces water supplies that originate from the Cascade mountain range (SPU's Cedar and Tolt River sources and TPU's Green River source).
- Construction of one or more north-south transmission pipelines linking the Tacoma and Seattle regional supplies offers advantages not only to Cascade, but to both of these systems and their wholesale customers. A north-south link allowing water to flow in either direction could enhance reliability of the regional water supply system. These links would be constructed to deliver the Tacoma/Covington contract supplies and Lake Tapps Project supply.
- Of the larger sources of supply considered, the OASIS ASR project (Phase 3) appears less certain and more complex for Cascade participation. Therefore, OASIS was not built directly into the portfolios. However, this source remains a potentially viable supply option (in partnership with the project sponsor, Lakehaven Utility District) that could be substituted for another option.
- Four of the supply sources appear potentially viable yet are relatively small in terms of supply quantities available. These are: deep aquifer, Member ASR, reclaimed water, and enhanced conservation. Each of these sources also involves uncertainties and challenges for implementation. At the same time, the quantities of water available from these sources are highly flexible, and they can be developed more rapidly than large supplies requiring major infrastructure. For portfolio development, Cascade combined these supplies into a "small sources" category. While not directly included in the final portfolio, Cascade views the small sources as a menu of options that can provide additional flexibility if needed and can be activated in the event demands rise more rapidly than expected at any point during the planning period.

Cascade experimented with a variety of alternative portfolios. Three portfolios were reviewed and compared in a Technical Memorandum: *Supply Portfolio Analysis*, June 2010 (HDR). Briefly, these three portfolios are described below:

> **Portfolio 2:** Extension of the top block of SPU-contracted supply through 2030, activation of the Lake Tapps Project at 2030, and activation of small sources at 2055. (One variation of this portfolio also includes participation in Lakehaven's OASIS project [Phase 3] after 2060.)
>
> **Portfolio 4:** Activation of supply from TPU (and Covington Water District) at 2030, delaying the need for the Lake Tapps Project until 2045. Small sources used to fill supply gaps beginning in 2040 (or as needed at any time).
>
> **Portfolio 5:** Similar to Portfolio 4, but with additional extension of SPU supplies to defer the need for the Lake Tapps Project beyond 2060. This portfolio would also involve greater reliance on the menu of small sources.

The June 2010 Technical Memorandum presents appraisal-level cost estimates and results of a risk assessment for these three portfolios. In addition, the multi-criteria evaluation procedure described in Section 5.4 was applied to the three portfolios. The three portfolios received similar scores under the various criteria except for the financial criterion. The financial criterion ranked Portfolio 5 highest, then Portfolio 4, then Portfolio 3. This reflects the increased financial burden by constructing major infrastructure associated with the Lake Tapps Project, as opposed to deferring those costs by many years. Results were discussed in workshops and meetings held in 2010 with Cascade Members. Results were also discussed with the Cascade Connections Outreach Group.

5.6. Preferred Supply Portfolio

Cascade held extensive discussions with SPU and TPU aimed at increasing use of contracted supplies in a manner similar to Portfolios 2 and 4. However, at the time the Transmission and Supply Plan was prepared, these discussions had not led to updated agreements. While supply expansion from these sources remains a possibility for the future, Cascade determined the current TSP should treat existing contracts with SPU and TPU as fixed quantities.

Based on this outcome and the supply evaluation discussed earlier in this chapter, Cascade determined that the portfolio shown in Figures 5.3 and 5.4 (for maximum week and average day conditions, respectively) offers the best balance between supply and fiscal objectives, consistent with the planning objectives listed in Section 5.2. This preferred portfolio is similar to Portfolio 4 discussed above, though it does not include expanded use of water supply from SPU.

Figure 7.1 (see Chapter 7) displays the location of the larger supply elements included in this supply portfolio. More detailed information on the supplies and demands shown in Figures 5.3 and 5.4 is included in Appendix G.

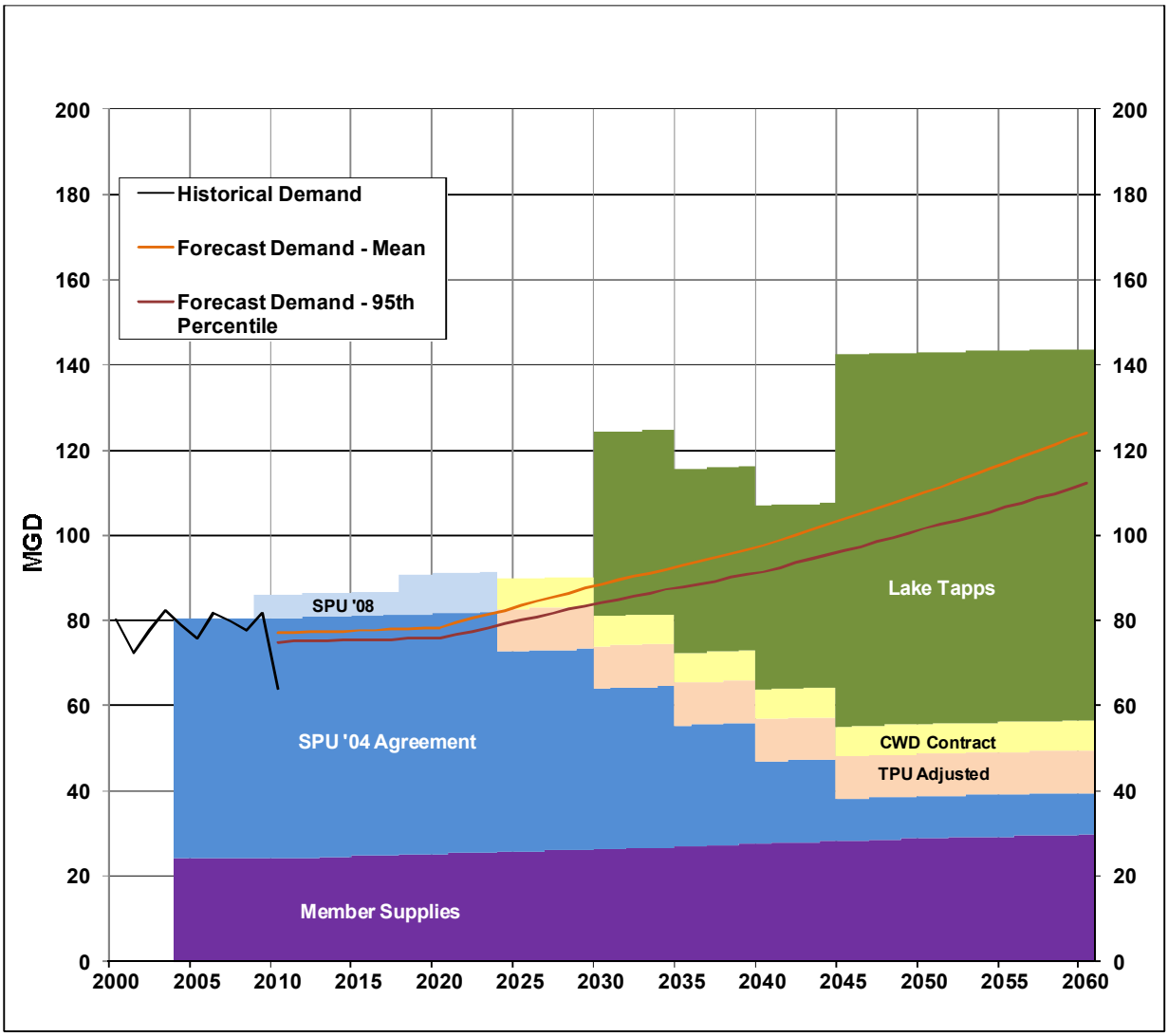

Figure 5.3: Cascade Supply Portfolio (Maximum Week Conditions)

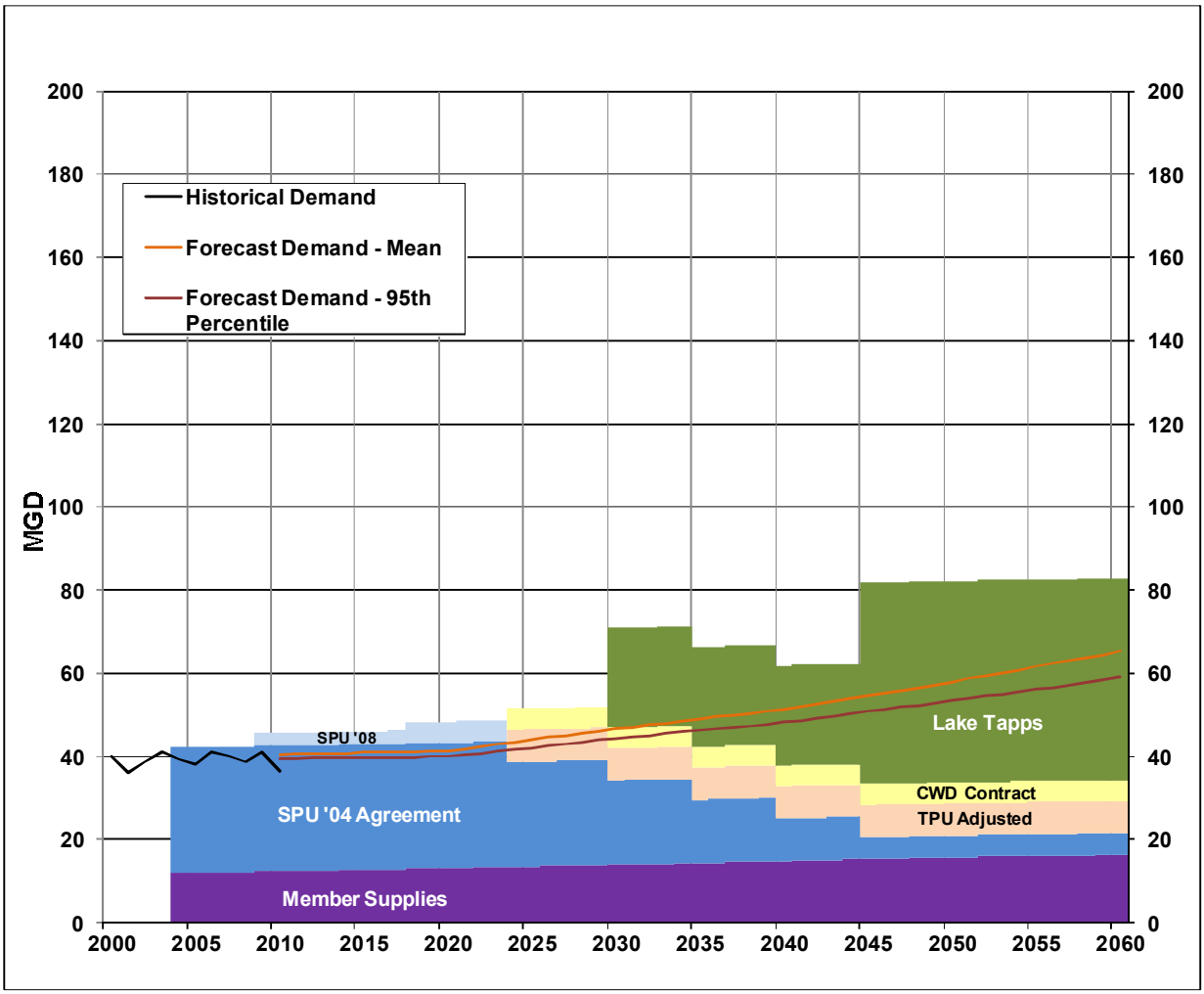

Figure 5.4: Cascade Supply Portfolio (Average Day Conditions)

Table 5.3 lists the various supply agreements that Cascade has with other water suppliers in the region to meet the long-term needs of Cascade Members.

Table 5.3: Agreements Affecting Future Water Supplies

Document	Date	Location
50-Year Declining Block Water Supply Agreement between the City of Seattle (SPU) and the Cascade Water Alliance	December 2008	Appendix B
Agreement for the Sale of Wholesale Water between the City of Tacoma, Department of Utilities, Water Division (TPU), and the Cascade Water Alliance	October 2005	Appendix H
Member Water Audits (Covington, Issaquah, Redmond, Sammamish Plateau, Skyway)	May 2008	Cascade Files
Lake Tapps Area Water Resources Agreement, with Auburn, Bonney Lake, Buckley and Sumner (Four Cities Agreement)	February 2010	Cascade Files

The exact quantities and timing of each supply may change, as supply investments will be made in stages based on actual growth in Cascade Member water demands over the coming decades. Cascade's supply planning principles call for maintaining a high degree of flexibility to match new supplies with water needs as economically as possible. For example, Cascade anticipates renewed discussions with SPU and TPU from time to time regarding possible expansion of contracted supplies in the future. It appears that both suppliers will have surplus supplies available for several decades, and access to these supplies on mutually-agreeable terms could potentially delay construction of the Tacoma-Cascade Pipeline or the Lake Tapps Project, or both, while reducing costs for all parties involved. Therefore, Cascade expects to review and optimize this portfolio each time the TSP is updated at six-year intervals.

The preferred supply portfolio includes the following sources:

- Continued production from Member supplies serving their respective service areas. (Five Cascade Members have their own sources of groundwater or contracted surface water supply).
- Continued use of water from SPU under the 2004 Block Contract, as amended in 2008.
- Beginning in 2024, Cascade's initial use of Green River supply from the contract with TPU.
- Beginning in 2024, Cascade's initial use of additional Green River supply from Covington Water District's share in the Regional Water Supply System (RWSS)[1] over and above water used within the District's own service area. A contract between Cascade and the District is under discussion to make this supply available.
- Water from the Lake Tapps Project, to be developed in the future using Cascade's water rights for Lake Tapps and the White River (see Chapter 6). The exact timing of this source will depend on growth in demand and any future increases in contracted supplies from SPU, TPU, and Covington contracted supplies.

Additional flexibility in the supply portfolio will be developed, if needed, from alternative sources such as further enhanced conservation, reclaimed water, deep groundwater supplies, aquifer storage, and recovery projects within Member service areas. These sources are collectively referred to as "small sources" in the Cascade supply planning process.

These sources are described in greater detail in the subsections below.

As discussed in Section 4.4, demand conditions have shifted in the Puget Sound region in recent years. After decades of rapid growth in population and water needs, all of the regional water suppliers in the Central Puget Sound area have experienced flat or even reduced demands during the past several years. For supply planning, this means that the risk equation has changed; in the past, suppliers in the region faced the risk of growth outpacing supply but today an equally critical risk is that new water supply projects may be built too soon and burden ratepayers with unnecessary costs.

Since the region as a whole currently appears to have an excess of supply, Cascade will continue to seek partnerships among regional water suppliers to use existing supplies and infrastructure for as long as possible. SPU and TPU currently have supplies that exceed their

[1] The RWSS was formerly known as the Tacoma Second Supply Project, or TSSP.

existing and near-term forecasted demands. During 2010 and 2011, Cascade actively engaged with both of these regional suppliers to discuss possible expansions or extensions of existing supply contracts. While mutually-acceptable terms and conditions have not yet been identified, Cascade anticipates returning to these discussions periodically in the future. If regional demand remains flat or grows only slowly, it may be possible to delay some of the projects that Cascade has shown in its supply portfolio, thereby spreading costs over a longer time and reducing rate impacts to Cascade Members.

5.6.1. Member Independent Supplies

In order to provide a complete picture of the supplies serving Cascade Members, the preferred portfolio includes supplies owned and operated by five of the eight Cascade Members (the other three Members meet all of their drinking water needs with Cascade supplies). These include groundwater supplies owned by Covington Water District, the City of Issaquah, the City of Redmond, Sammamish Plateau Water and Sewer District, and Skyway Water and Sewer District, as well as a share in the RWSS held by Covington Water District. Information on Member independent supplies is provided in Section 2.4 of this TSP. The quantities of supply projected are based on Independent Supply Audits issued by Cascade in 2008.

For purposes of the TSP, Covington's RWSS supply is partly included in the Member independent supplies category and partly in a separate category. The portion of the RWSS included as Member independent supply is the quantity needed to exactly serve Covington's projected growth in demand over time. The remaining water available to Covington from its share of the RWSS is shown separately as a source of supply that Cascade can contract from Covington. Because of this approach, the Member independent supplies appear to grow over time, while the Covington RWSS surplus supply appears to decline over time as more and more of the RWSS water is needed for Covington's own service area.

Other Member-specific factors also contribute to the gradual growth in the total quantity of their independent supplies from 2011 to 2060, and these factors are documented in the supply audits. Taking these factors and the Covington considerations into account, the total quantity of independent supplies rises from approximately 12 mgd in 2011 to 17 mgd in 2060 on an annual average basis. Supplies available to meet maximum week needs rise from 25 mgd to 33 mgd during the same time period.

More information on Members' independent supplies and associated water rights can be found in the Members' individual water system plans.

5.6.2. SPU Contracted Supply

As described in Section 2.1 of this TSP, Cascade has a contract with SPU for regional water supply, which is delivered to seven of Cascade's eight Members. The sources of this supply are SPU impoundments and treatment facilities on the Cedar and Tolt Rivers. Existing supplies are provided under the "Block Contract" executed in 2004, which is attached as Appendix B. Water supply quantities available under the Block Contract vary over time and are shown in Table 2.1 (see Chapter 2). These quantities are also displayed in Figure 5.3.

While developing the TSP, Cascade held extensive discussions with SPU regarding possible expansion of the supply quantity available to Cascade, or extension of the current "block" for a longer time period. At this time, neither of these options has been negotiated on terms

satisfactory to both parties. However, it appears that SPU will have surplus supply from its regional water supply system for many decades into the future. Cascade anticipates there may be renewed discussion of Block Contract modifications in the future, with an aim toward mutually-beneficial outcomes that make the best use of existing supply infrastructure. Specifically, this could offer the opportunity to delay construction of Cascade's planned Tacoma-Cascade Pipeline (TCP) or Cascade's planned water treatment plant and pipeline for the Lake Tapps Project, or both.

5.6.3. TPU-contracted Supply

Cascade and TPU executed an agreement for the Sale of Wholesale Water in October 2005, attached as Appendix H. The contract includes a permanent component and a reserved (temporary) component, as shown in Table 5.4.

Table 5.4: Contracted Supply from TPU

	Permanent Supply* (mgd)		Reserved Supply (mgd)		Total Supply (mgd)	
Time Period	Average Day	Maximum Week	Average Day	Maximum Week	Average Day	Maximum Week
2008-2026	4.0	5.32	6.0	7.98	**10.0**	**13.3**
2027	4.0	5.32	4.0	5.32	**8.0**	**10.64**
2028	4.0	5.32	3.0	3.99	**7.0**	**9.31**
2029	4.0	5.32	2.0	2.66	**6.0**	**7.98**
2030	4.0	5.32	1.0	1.33	**5.0**	**6.65**
2031 and beyond	4.0	5.32	0.0	0.0	**4.0**	**5.32**

mgd = million gallons per day

* Under the contract with TPU, "permanent" means until the date that Tacoma ceases making wholesale water sales to any water systems that resell water to end users.

At the time the 2004 TSP was prepared, Cascade anticipated rapid growth in its service area and a need to begin using the Tacoma supply as early as 2010. Since that time, growth has slowed sharply in the region and the annual growth in water use by Cascade Members has flattened out. Therefore, this updated TSP anticipates use of the TPU supply beginning in 2024 when supply under the SPU Block Contract begins to decline.

While developing the updated TSP, Cascade held extensive discussions with TPU regarding possible changes in the quantity and terms for supply available to Cascade. At this time, changes have not been negotiated on terms satisfactory to both parties. However, it appears that TPU will have surplus supply from its regional water supply system for many decades into the future. Cascade anticipates there may be renewed discussion of TPU contract modifications in the future, with an aim toward mutually-beneficial outcomes that make the best use of existing supply infrastructure. Specifically, this could offer the opportunity to delay construction of Cascade's planned water treatment plant and pipeline for the Lake Tapps Project.

The existing contract includes a permanent component and a reserved (temporary) component. However, it also permits conversion of the reserved component to permanent status under

certain conditions. Currently, Cascade anticipates it will request conversion as permitted by the contract and that the necessary conditions will be fulfilled. These assumptions appear valid based on current information. Therefore, the portfolio chart shown in Figure 5.3 includes the conversion to permanent status. All of the TPU supply, whether reserved or permanent, is shown as a single block of supply.

The TPU contract permits Cascade to begin taking water deliveries from TPU at any time after October 2008. However, in order to use this supply, Cascade will need to construct a transmission pipeline from the RWSS pipeline north to the vicinity of SPU's Lake Youngs Reservoir (see Figure 7.1 in Chapter 7) and execute an agreement to convey water through SPU's water transmission system. (If an agreement cannot be negotiated, the pipeline would be built to Issaquah instead).

5.6.4. Four Cities Agreement

Cascade has an agreement with the Cities of Auburn, Bonney Lake, Buckley, and Sumner (collectively, the "Four Cities") regarding the availability of a portion of Cascade's TPU supply to meet these Cities' needs in the future. Each City has an allocation that it can purchase from Cascade. The total for all four cities combined is 4.54 mgd on an average day basis and 6.65 mgd on a maximum week basis. At this time, it is not certain how much of this allocation will actually be purchased by the Four Cities. Only Auburn and Bonney Lake have requested specific supplies from their allocation, and the Auburn request is for a temporary supply that would end in 2026. Since the quantities that will ultimately be needed are uncertain, the portfolio chart shown in Figure 5.3 assumes the Four Cities will use only 50 percent of their allocated amounts. This is reflected in a reduction in the TPU supply quantity available to Cascade (TPU supply available to Cascade is assumed to be reduced by 2.27 mgd on an average day basis and 3.33 mgd on a maximum week basis).

Cascade has also analyzed a scenario in which 100 percent of the Four Cities allocation is used by the cities. Under this scenario, Cascade will still have adequate supply, assuming the surplus supply shown as contracted from Covington Water District Cascade is available (see Section 5.6.5).

Cascade is not responsible for financing or constructing infrastructure needed for the Four Cities to access their allocations.

5.6.5. Covington Supply from RWSS

Covington Water District is a partner with TPU, the City of Kent, and Lakehaven Utility District in the Regional Water Supply System (RWSS) that delivers water from the Green River. Covington expects it will be many years before Covington fully utilizes this supply. In the interim, Covington has expressed willingness to allow Cascade to contract for Covington's surplus RWSS water for use by other Cascade Members. This water could be delivered to the other Members once the Tacoma-Cascade Pipeline is built.

Covington's share of the RWSS is 18.47 mgd on an instantaneous basis and 3,889 acre-feet annually. An agreement for Covington to supply Cascade with 5 mgd annual average and 7 mgd peak season is currently under discussion. The supply from this proposed agreement is included in the portfolio chart in Figure 5.3.

Based on Covington's forecasted water needs, Cascade anticipates that a larger quantity (up to 14 mgd) of Covington's surplus supply may be available for use by other Cascade Members to meet maximum week demands in 2024. This surplus will decline gradually to approximately 10 mgd by 2060 as Covington requires more of the water for customers within its own service area. Cascade anticipates continued discussion with Covington in future years regarding potential interim use of this surplus supply. For example, if the Four Cities require larger shares of their available allocation than currently anticipated, the additional Covington supply could be needed.

5.6.6. Lake Tapps Project

Cascade's White River - Lake Tapps Reservoir Project is described in detail in Chapter 6 of this TSP. Cascade acquired Lake Tapps for future use as a municipal water supply. Water rights issued in December 2010 authorize Cascade to produce 87.25 mgd as a maximum quantity and 48.5 mgd as an annual average for municipal supply deliveries. This water right augments Cascade's supplies to meet its Members' long-range supply needs and also provides the opportunity to improve reliability of water supplies for the Central Puget Sound region as a whole, particularly in the context of climate change concerns.

Water from Lake Tapps is not currently used for municipal supply. Cascade plans to develop the necessary water treatment and delivery infrastructure in phases over time. The first phase will include construction of a water transmission line and partial development of water treatment capacity. Additional water treatment capacity will then be developed in a later phase of construction. The portfolio chart in Figure 5.3 reflects these assumptions. It shows Phase 1 of the Lake Tapps Project completed in 2030 and Phase 2 in 2045.

However, the ultimate phasing of Lake Tapps Project development will respond to the timing of Cascade needs, as determined by actual growth in demand as well as any increases in other supplies over time. Cascade will likely seek opportunities to delay construction of both phases of the Lake Tapps Project to spread the costs of infrastructure development over a longer period of time. For example, if the Four Cities take less than their nominal allotment, which seems likely, then a larger share of Cascade's TPU contract supply will be available for use by Cascade. In addition, there may be opportunities to contract for additional supplies from both SPU and TPU in the future. These developments or lower growth in demand, or a combination of these factors, could delay the need for the Lake Tapps Project well beyond 2030.

For more information on the Lake Tapps Project, see Chapter 6.

5.6.7. Additional Supply Sources

Section 5.5 discussed considerations used in assembling a range of supply portfolios that led ultimately to the preferred portfolio. The following four small, potential sources appear potentially viable, yet are relatively small in terms of supply quantities available:

1. Reclaimed water from King County's Brightwater Treatment Plant

2. Aquifer storage and recovery (ASR) projects that could be developed within Cascade Member service areas

3. Deep groundwater supplies that can potentially be accessed by wells within Member service areas

4. Enhanced water conservation programs to reduce consumption beyond levels achieved by the water conservation program embedded in Cascade's demand forecast.

Each of these sources involves uncertainties and challenges for implementation. At the same time, the quantities of water available from these sources are highly flexible, and they can be developed more rapidly than large supplies requiring major infrastructure. While not directly included in the final preferred portfolio, Cascade views these sources as a menu of options that can provide additional flexibility if needed and can potentially be activated in the event demands rise more rapidly than expected at any point during the planning period.

Information on each of these sources is summarized below. Additional information can be found in the Technical Memorandum: *Supply Alternatives Assessment, Task 700* (December 2009).

- ***Reclaimed Water.*** Reclaimed water is recycled municipal or industrial wastewater that has been treated to meet rigorous standards for reuse defined under Washington State regulations. Reclaimed water can be used for a variety of non-potable purposes, such as irrigation and industrial supply. King County's new Brightwater Treatment Plant will produce reclaimed water, and King County has been seeking communities able to use the water. King County pipelines will provide capacity to convey reclaimed water to the Sammamish River Valley, which passes through or near the water service areas of four Members of Cascade: the City of Redmond, City of Kirkland, City of Bellevue, and Sammamish Plateau Water and Sewer District.

  Potential users of reclaimed water within those communities include parks, golf courses, and commercial sites with large irrigated landscapes. It is anticipated that reclaimed water supply from Brightwater to the Sammamish River Valley would be approximately 1.6 mgd on an average annual basis and 4.0 mgd during the summer irrigation season. Installation of local distribution piping would be needed to deliver the water from King County's pipeline to individual user sites.

  Other options also exist to use water from King County's South Treatment Plant in Tukwila (where some of it is already used) or other communities, and to construct satellite plants to produce reclaimed water in outlying areas such as the Covington Water District. Cascade's 2004 Transmission and Supply Plan included an analysis of potential customer sites within Cascade Member service areas. That information is reproduced in Appendix D.

  The primary obstacle to using reclaimed water in Cascade Member service areas is the cost of installing distribution mains. Reclaimed water distribution mains are often "redundant" in that they duplicate the function of water lines that deliver potable water supplies to the same customers. Since reclaimed water can be used only for limited purposes, and since the main use is irrigation that occurs only during the summer months, it is more costly on a per-unit basis to deliver reclaimed water than potable water. Despite these limitations, reclaimed water is viewed as a viable element of the "small sources" category for Cascade's future needs.

- ***Member ASR Projects.*** Western Washington typically receives abundant rainfall from November through June and experiences dry conditions from July through October. One way of managing water supplies in response to this natural pattern is to take water during the winter months and store it for the summer. Where geologic conditions are

favorable, one way to do this is to store the water in underground aquifers. Storing water in aquifers to be pumped and used later is called Aquifer Storage and Recovery (ASR). ASR is a relatively new approach to managing scarce water supplies.

One Cascade Member, Sammamish Plateau Water and Sewer District, has experimented with an ASR system. Another water system in King County, Lakehaven Utility District, has extensively studied ASR and plans to develop an ASR project known as OASIS. It is reasonable to expect that ASR could be viable in other areas within King County, including some additional locations within Cascade Member service areas. If suitable geologic conditions are present, the primary infrastructure requirement is installation of injection and recovery wells. (Sometimes existing supply wells can be retrofitted.) Substantial investigation is required to validate the feasibility of ASR at specific locations and to obtain the necessary permits.

The Supply Alternatives Assessment performed as part of the TSP project assumed that up to 11 mgd could be produced during the peak season using ASR within Member service areas (4.6 mgd annual average). This is based on extrapolation of the production quantity already developed in the Sammamish Plateau service area to the other seven Cascade Members. Water injected into aquifers could potentially come from one or a combination of sources such as SPU, TPU, and Lake Tapps. The viability of ASR in specific areas and the quantities that are feasible will require further study to demonstrate feasibility.

- ***Deep Ground Water Resources.*** The State of Washington has a series of regulations designed to protect streams and lakes from being depleted by new water uses. As a result, many surface water basins within the state are "closed" to further appropriations for municipal or other uses. New uses of groundwater are also difficult to get permitted, because pumping groundwater can reduce water available to streams and lakes.

  The Central Puget Sound region has a productive, deep aquifer zone lying 300 feet to 500 feet below sea level. This is considerably deeper than most existing wells in the region. However, wells drilled on the Sammamish Plateau, and historically in Kirkland, Bellevue, Seattle, and Tukwila have penetrated this deep aquifer zone. Sammamish Plateau WSD taps this aquifer in 3 of its 12 production wells and one of these was permitted as recently as 1998.

  Water flowing through this zone likely feeds Puget Sound directly, rather than supporting freshwater streams that require protection under State law. If this is correct, it is possible that Cascade Members could acquire State permits to utilize this deep aquifer zone. Further study would be needed to validate the concept. Where feasible and assuming permits are issued, wells could then be constructed at various locations within Cascade Member service areas.

  The Supply Alternatives Assessment performed as part of the TSP project assumed that up to 10 mgd could be produced during the peak season (8 mgd annual average) from wells distributed across the eight Member service areas.

- ***Enhanced Water Conservation.*** Cascade and its Members administer water conservation programs to assist their customers in using water more efficiently. Assumptions regarding continued implementation of water conservation are built into Cascade's demand forecast, as detailed in Chapters 3 and 4 of this TSP. However, it

may be possible to achieve even larger reductions in water use, if more aggressive programs were implemented in the future. This element is based on the "Enhanced Conservation - 2" option from the technical memorandum titled *Supply Alternatives Assessment, Task 700* (December 2008). Under this option, three modifications would be made to the conservation assumptions built into the demand forecast:

1. Customers would be required to use the highest-efficiency plumbing equipment available, exceeding current (2010) State plumbing code requirements. This may occur from future actions by the state or federal government, or could be mandated by each local jurisdiction in the Cascade Member service areas.

2. There would be restrictions on landscape design and materials to limit the need for water and to improve efficiency of irrigation systems.

3. Metering requirements and rate structures would be modified to enhance customer incentives to save water. For example, this could include requirements for installation of irrigation meters, sub-metering at apartment complexes, and rate structures based on "water budgets."

The Supply Alternatives Assessment estimated that water saved by these actions could be up to 13 mgd during the peak season (8 mgd annual average), by full implementation at year 2060. This level of savings depends, in part, on the extent of population growth from 2010 to 2060.

Implementation of these enhanced conservation measures could not occur without actions taken by local governments within the Cascade Member service areas, and would be subject to considerable debate and discussion by the public. Therefore, there is considerable uncertainty regarding feasibility. However, it is likely that if needed, some degree of enhanced conservation savings above the levels built into the demand forecast could be achieved over the 50-year planning period.

Based on the assumptions used in the Supply Alternatives Analysis, all four small sources together could produce up to 38 mgd in the peak season (22 mgd annual average). However, there are considerable uncertainties associated with some of these sources and Cascade anticipates that actual, economically-viable production available from these supplies could be much lower, perhaps on the order of 20 to 30 percent of the nominal total. Cascade will continue to consider how use of one or more of the small sources could be combined with the preferred supply portfolio to provide increased flexibility in meeting water needs.

5.7. Supply Reliability

The preferred supply portfolio described in this chapter is expected to provide a high degree of reliability for Cascade and its Members. This is because the individual supply sources offer high reliability, plus the combination of multiple supplies will provide system redundancies in the event that one source becomes compromised due to emergency conditions.

5.7.1. Reliability of Future Cascade Supplies

Reliability characteristics of the individual Cascade supplies include the following:

- **Member supplies.** Five of the eight Cascade Members have independent supplies separate from Cascade's regional supply. Generally, these consist of groundwater sources. The Covington Water District also has access to a large surface water supply from the RWSS. These supplies and their reliability characteristics are described in the Members' respective water system plans. Groundwater supplies experience very different effects from surface water supplies under conditions that cause shortages. Moreover, local groundwater supplies do not depend on the extensive transmission system used for Cascade's existing surface water supply from SPU. It is very unlikely that emergency conditions would disrupt all of the groundwater sources for any one Member, let alone all five Members. Availability of the Member independent supplies, therefore, provides significant reliability benefits at least within the service areas of these five Members.
- **SPU Supply.** The SPU supply system includes two major surface water sources (Cedar and Tolt Rivers) in addition to a smaller groundwater resource. Treatment facilities and transmission pipelines deliver water to Cascade from both the Cedar and Tolt systems. SPU's 2007 Water System Plan discusses firm yield and supply reliability. The system can produce a firm yield of 171 mgd in 98 years out of 100. SPU's system-wide demand including Cascade and other wholesale customers has been less than 130 mgd over the past five years, meaning the likelihood of a source deficiency is extremely low. SPU has projected that future demands through at least 2060 will remain below firm yield (or beyond 2045 when accounting for high-end uncertainty in the SPU system-wide demand forecast). Cascade could be vulnerable to disruptions in SPU supply caused by emergency failures to SPU treatment facilities or transmission pipelines. SPU has contingency plans in place to repair damaged infrastructure. In addition, the SPU Water Shortage Contingency Plan and Cascade Shortage Management Plan are designed to enable both regional systems to respond appropriately in the event of a shortage caused by infrastructure failures.
- **TPU Supply.** Upon completion of the planned Tacoma-Cascade Pipeline (TCP), Cascade's regional supplies will be augmented by another major surface water source, TPU's Green River. This will further enhance reliability, both due to the source redundancy and the existence of separate treatment and transmission infrastructure. The addition of the TPU supply will coincide with reduction in supplies from SPU under the declining block structure of Cascade's supply agreement with SPU. This will greatly improve the diversity and balance of Cascade's supply, which is an important consideration in reliability.
- **Lake Tapps Supply.** Upon completion of the planned Lake Tapps Project, Cascade's regional supplies will again be augmented. As with the TPU supply, this will further enhance reliability by adding source redundancy and treatment and transmission infrastructure.

Even with a diverse and robust set of supplies, there will be risks of shortages due to a variety of events. As part of the supply source evaluation procedure described earlier in this chapter, Cascade carried out a risk assessment for the various sources and infrastructure elements included in the range of supply portfolios that were considered. The methods and results of this assessment are documented in the technical memorandum *Supply Portfolio Analysis* (June

2010). This included consideration of events that could impede development of Cascade's planned future supplies as well as events that could disrupt water supplies once they come on line. The risk assessment combined qualititative assessments of the probability and consequences of various events. Table 5.5 identifies the risk events that were considered to be the most significant, along with actions Cascade can take to mitigate negative consequences from these events.

Section 2-9 of this TSP discusses Cascade's Shortage Management Plan (see Appendix C) for supplies that currently provide municipal water supply to the Cascade service area. Whenever new supply sources are developed through implementation of the TSP, the SMP will be updated. In addition, Cascade has an Emergency Management Plan for Lake Tapps. At the time Cascade begins using Lake Tapps to provide municipal water supply, the Emergency Management Plan will also be updated to reflect the new use of this facility.

5.7.2. Enhancement of Reliability in the Central Puget Sound Region

Implementation of the TSP offers the potential to improve the reliability of other regional water systems besides Cascade. For example, construction of either the planned Tacoma-Cascade Pipeline (TSP) or the Lake Tapps Pipeline (LTP) could enhance reliability of both the SPU and TPU regional systems if desired. The north-south pipelines associated with either of these projects could potentially provide interties linking the SPU and TPU supply systems and allowing water to flow from one regional system to another in the event of emergency disruptions to the SPU or TPU systems. Cascade will continue to engage SPU and TPU on this opportunity in future years when Cascade begins to develop final designs for these pipelines.

In addition, when the Lake Tapps Project is completed, this will add a significant new source of water supply to the region. If connections are constructed among Cascade, TPU, and SPU that permit this water to be used regionally, either on a regular or emergency basis, it would help provide insurance against the possible effects of climate change on regional supply reliability.

Table 5.5: Risk Events and Mitigation Actions for High-scoring Risks

Supply/Feature	Risk Event	Mitigation
Broad Portfolio Risks or Mitigation (cross-cutting)		
All Surface Sources	Future federal water treatment standards become more stringent.	Monitor potential changes pending. Anticipate needs when new treatment plants are built.
Tacoma Supply		
Tacoma-Cascade Pipeline (or Lake Tapps Pipeline north of Tacoma SSP)	ROW acquisition problems, franchise, easements etc.	Lock up ROW with development conditions.
	Urban development complicates pipeline construction.	Lock up ROW with development conditions.
	Permitting or construction challenges delay construction and increase complexity	Long lead time for pipeline project.
	Damage due to seismic event.*	Intertie with other utilities to have emergency supplies.
Lake Tapps Supply		
Lake Tapps source	Regulatory risk on water right issuance.	Effective communication of regional value of the project (already done).
	Seismic impacts affect dikes or other facilities.	Prioritized rehabilitation of vulnerable facilities.
	Volcanic mud flow (lahar) damages White River facilities.	Contingency plan for short- or long-term replacement supply.
	USACOE does not maintain facilities as planned. *	Monitor Corps activities. Legal action if not compliant with agreements.
Lake Tapps Pipeline (portion south of Tacoma SSP)	ROW acquisition problems.	Lock up ROW with development conditions.
	Urban development complicates pipeline construction.	Lock up ROW with development conditions.
	Permitting or construction challenges delay construction	Long lead time for pipeline project.
	Damage due to seismic event or other disaster. *	Intertie with other utilities to have emergency supplies.
Other Cascade Facilities		
Cascade BKR pipeline	ROW acquisition problems (note alternative configurations)	Lock up ROW with development conditions. Or acquire ESSL.
	Urban development complicates pipeline construction.	Lock up ROW with development conditions. Or acquire ESSL.
	Permitting or construction challenges delay construction	Long lead time for pipeline project.
SPU Supplies (Existing Block Contract)		
SPU Transmission system	Aging pipelines deteriorate or fail.	Encourage replacement by SPU, or acquire lines and carry out replacement.
	Damage due to Seismic Event	Intertie with Tacoma for emergency supply.

* Included in summary due to relatively high severity score (low probability but high severity)

6. White River - Lake Tapps Reservoir Project

Lake Tapps is an off-channel reservoir located in Pierce County that was created in 1911 to produce hydropower. Cascade began negotiations with Puget Sound Energy (PSE) to acquire the lake in 2001 with the intent of converting it to a municipal water supply project. In 2009, Cascade completed purchase of the lake, associated infrastructure and all water rights from PSE.

Lake Tapps does not currently provide water for municipal supply. Cascade intends to develop the White River - Lake Tapps Reservoir Project (Lake Tapps Project) in the future to provide water supplies to its Members, while also preserving Lake Tapps as a recreational resource and meeting natural resource protection obligations in the White River watershed. This chapter provides information on the lake, Cascade's water rights, current operations, and plans for future development of the Lake Tapps Project.

6.1. Facilities

Lake Tapps Project facilities owned by Cascade include a diversion structure and fish screens on the White River, an 8-mile-long lake fill system, the Lake Tapps Reservoir and associated lands and dikes, and a 1.3-mile-long lake drawdown system that returns water to the White River. The distance along the White River between the diversion and return flow is approximately 21 miles.

A fully developed residential community is present on the shores of Lake Tapps, and the lake provides a valuable recreational resource to citizens of Pierce County for boating, swimming, and fishing.

6.2. Water Rights

In 2000, PSE filed three water right applications to the Washington State Department of Ecology (Ecology) to facilitate development of Lake Tapps as a municipal water supply. In 2003, Ecology published three Draft Reports of Examination (ROEs) and took public comment on the proposal. These ROEs were appealed by the Muckleshoot Indian Tribe, the Puyallup Tribe of Indians, the City of Auburn, the City of Buckley and others to the Pollution Control Hearings Board (PCHB). The 2003 ROEs were remanded back to Ecology when PSE announced that it was ceasing hydropower generation at the Project. In 2005, PSE submitted a change/transfer application for its pre-code water right claim. All of these applications were included in the Project assets Cascade acquired from PSE in December 2009.

In 2006, Ecology issued a Draft ROE (in response to the remand of the 2003 ROEs) and took public comment.

Cascade proposed adjustments and additional mitigation measures for the Project and Ecology issued new Draft ROEs for review and comment in 2010. Final ROEs approving the Project were issued in September 2010. Final water right permits providing for Cascade to divert water

from the White River store water in the Lake Tapps Reservoir and withdraw it for municipal supply purposes were issued in December 2010. The water rights also provide for managing recreational water levels within the lake and for protection of flows in the White River by prohibiting diversions when flows in the river fall below specified levels.

Cascade's water rights are listed in Table 6.1 and permits are included in Appendix I. The place of use for municipal supplies from the Lake Tapps Project is shown in Figure 6.1.

Table 6.1: Lake Tapps Project Water Rights Issued to Cascade in 2010

Permit No. S2-29920(A):	Authorizes diversion of up to 54,300 acre feet per year from the White River for municipal supply, including industrial and commercial purposes. Maximum flow rate varies seasonally from 150 to 1,000 cfs. Subject to minimum flows in the White River. Priority date: June 20, 2000.
Permit No. R2-29935	Authorizes storage of water from the White River in the Lake Tapps Reservoir, limited to 46,700 acre feet. Priority date: September 15, 2000.
Permit No. S2-29934	Authorizes withdrawal of up to 54,300 acre feet per year from Lake Tapps for municipal water supply, including industrial and commercial purposes. Maximum flow rate of 135 cfs. Priority date: September 15, 2000.
Claim No. 160822	Authorized withdrawal of 931,281 acre feet per year to provide recreational water levels in Lake Tapps, maintain the reservoir in the winter, and to protect and enhance fish and wildlife. Maximum flow rate of 1,988 cfs, subject to minimum flows in the White River. Priority date: 1895.
Permit No. S2-29920(B):	Establishes a Regional Reserved Water Program to be used by the Cities of Auburn, Bonney Lake, Buckley, and Sumner to mitigate impacts to the mainstem White River and Puyallup River in connection with future water right applications. Authorizes diversion of up to 5,060 acre feet per year from the White River for municipal water supply, including industrial and commercial purposes. Maximum flow rate of 10 cfs. Subject to minimum flows in the White River. Priority date: June 20, 2000 (but junior to Permit S2-29920[A]).

Significant steps in the issuance of the water rights are listed below:

- In September 2006, Ecology issued a Draft ROE for the Lake Tapps Project Application for public comment. While this 2006 Draft ROE was replaced by the water rights issued in 2010, this earlier issuance resulted in significant public involvement in the development of the Lake Tapps Project.
- In February 2008, Cascade published an Environmental Checklist and SEPA Mitigated Determination of Non Significance for the Lake Tapps Project.
- In June 2008, Cascade issued a Determination of Significance and Request for Comments on Scope of an Environmental Impact Statement.
- In February 2010, Cascade published the Draft Environmental Impact Statement (EIS) for the Lake Tapps Reservoir Water Rights and Supply Project for public comment. The Final EIS was published in June 2010.
- In May 2010, Ecology published draft ROEs of the project for public comment. Final ROEs approving Cascade's water right applications for the project were published in September 2010. The water right permits were issued in December 2010.

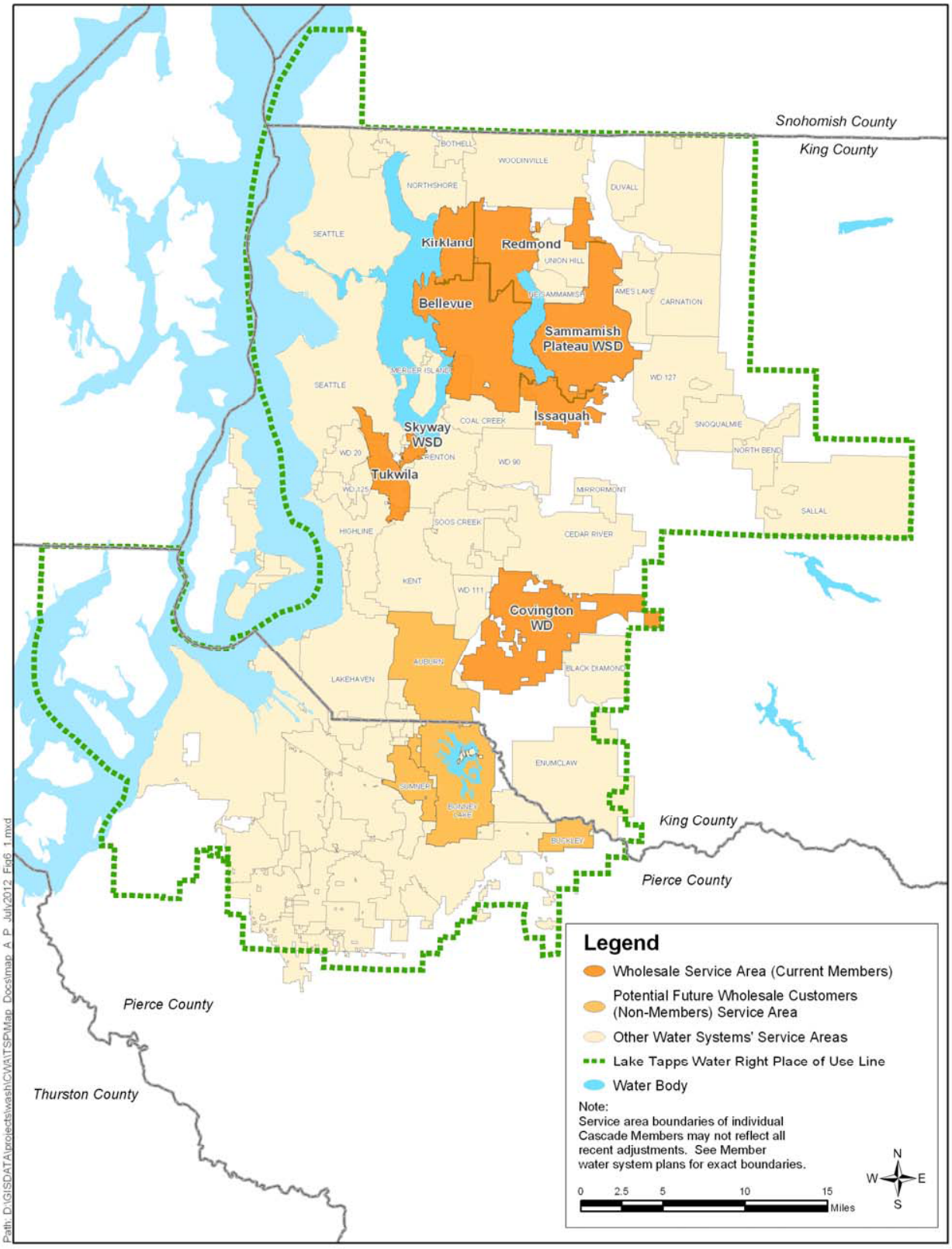

Figure 6.1: Water Right Place of Use

The authorized withdrawal from Lake Tapps under Application S2-29934 is 87.25 mgd during the maximum week and 48.5 mgd as an annual average. These quantities are used in the water supply portfolio discussed in Chapter 5.

The development schedule for Permit S2-29920(A) requires construction of municipal supply facilities to begin by December 31, 2040, and perfection (full use) of the water right to occur by December 31, 2060. In order to put the water right to use, Cascade anticipates construction of a water treatment plant, transmission pipelines, and associated facilities.

6.3. Related Agreements

In the course of acquiring the Lake Tapps Project and associated water rights, Cascade has executed agreements with several organizations that have interests in the lake and the natural resources and water supplies of the White River watershed. These agreements are summarized below:

Tribal Settlement Agreements. In August 2008, Cascade entered into the *2008 White River Management Agreement* (WRMA) with the Puyallup Tribe of Indians (PTI) and the Muckleshoot Indian Tribe (MIT), which established parameters related to management of White River flows. The WRMA Recommended Flow Regime for the White River was included in the municipal water rights issued by the Ecology in 2010. Since 2008, Cascade and the Tribes have worked closely on several projects including approval of the water rights, the 2010 Flowline Maintenance Outage (and associated fish recovery activities), the Barrier Dam repairs in 2011, lobbying the Corps of Engineers and Congress for continued funding of the Mud Mountain Dam Fish Passage Project (the permanent Barrier Dam replacement and improved/expanded fish trap facility), development of expanded water quality and stream flow monitoring programs (with the U.S. Geological Survey), and a donation of a portion of the Lake Tapps Claim to the State Water Right Trust Program. Since 2009, Cascade has had regular conference calls with the fishery and natural resources staffs of both Tribes and an annual meeting with the leadership of the Tribes.

In addition, Cascade entered into the *Natural Resources Enhancement Agreement* with the PTI and the *Lake Tapps Reservoir Water Rights Settlement Agreement* with the MIT. These individual settlement agreements with each Tribe provide for funding fishery enhancement activities in the White River Basin.

Lake Tapps Community Agreement. In May 2009, Cascade entered into the *2009 Agreement Regarding Lake Tapps Between Cascade Water Alliance and the Lake Tapps Community*. The 2009 Agreement includes Cascade's commitment to the maintenance of Lake Tapps Reservoir's surface level within a range of elevations called "Normal Full Pool during an extended Recreational Season" which were included in the municipal water rights issued by Ecology. Cascade's municipal supply is subject to maintenance of these recreational lake levels. The Lake Tapps community supported the municipal water rights and since 2009 has worked closely with Cascade on projects affecting Lake Tapps, including milfoil eradication and the development of a recreational management plan.

In November 2010, Cascade, Pierce County, the Cities of Auburn, Bonney Lake, Buckley and Sumner, and other key governments and jurisdictions who share responsibility for Lake Tapps, began a neutrally-convened public process with the Lake

Tapps community to develop the Collaborative Plan for Managing Lake Tapps (plan), to ensure that Lake Tapps remains a safe, clean, and enjoyable resource well into the future. The end of the five-month process culminated with the development of a plan that includes an overview of the lake's history, physical characteristics and current conditions; and provides information regarding existing rules and regulations. As part of the process, a list of roles and responsibilities was also developed and included in the plan.

Four Cities Agreement. In February 2010, Cascade and the Cities of Auburn, Bonney Lake, Buckley, and Sumner entered into the *2010 Lake Tapps Area Water Resources Agreement* that provides for the Regional Reserved Water Program for the Lake Tapps region. This program was included as a portion of Cascade's municipal water rights. It provides a mechanism for a portion of Cascade's water rights to be used by the Cities to mitigate White River impacts in connection with applications by the Cities for new water rights or changes to existing water rights. The Cities supported the municipal water rights and dismissed a lawsuit filed during PSE's ownership which was due to their uncertainty of the impact of the project on the Cities. Since that time, Cascade has assisted the Cities' efforts to optimize their existing water supplies and secure additional supplies.

6.4. Lake Tapps Project Contract Operator Transition

The Asset Operating Agreement (AOA) between Cascade and PSE provides for PSE to operate the lake Tapps Project for up to five years (through 2014). In August 2011, Cascade issued a Request for Proposals (RFP) to private contract operators for project operation and maintenance. Following review of proposals and interviews with qualified contract operators, the Cascade Project Team determined that Veolia Water North America – West, LLC (Veolia) was the top-ranked potential contract operator. A contract was negotiated and awarded to Veolia in December 2011.

The RFP process and contract provided for Veolia to begin a transitions operating phase (concurrent with PSE operations) in January 2012. The AOA with PSE was terminated in April 2012 and Veolia assumed full operation and maintenance responsibility for the project. The AOA was replaced with an "on-call" agreement under which Cascade and Veolia could receive assistance from PSE on an "as needed" basis through 2014.

The White River-Lake Tapps Reservoir Project Operations and Maintenance Agreement is structured as a five-year agreement with two phases and options for up to two additional periods of five years each. Compensation for the first year of operation and maintenance services (the Transition Phase) will be on a "time and materials" basis. During the Transition Phase, Veolia will transition into full operation and maintenance responsibilities and develop an O&M Manual for the project. This task will be a "fixed price" task as bid in the proposal.

The O&M Manual will be the basis for the scope and budget for the Performance Phase of the Agreement, beginning in January 2013 and extending through 2016 (or longer if renewed). Compensation during the Performance Phase will be based on the approved budget and in accordance with the requirements of a Qualified Management Contract.

In the event that Cascade and Veolia cannot agree on a scope and budget for the Performance Phase, Veolia will be obligated to continue to operate the project, beginning in January 2013,

under a “Force Account” scenario, until Cascade is able to complete a process to replace Veolia. Compensation will be on a “time and materials” basis, subject to certain limitations.

6.5. Watershed Management

As part of Cascade’s development of the Lake Tapps Project as a future drinking water supply, Cascade will develop, document, and implement a source water protection plan meeting the requirements for a filtered surface water source. Cascade is likely to begin active development of the Lake Tapps Project in 10 to 15 years, with the supply needed beginning in 2030 or later. The studies conducted to date are not sufficient to establish the level of treatment necessary to meet standards that may be applicable in 2030 when it is forecast that Lake Tapps will be utilized as a municipal water source. Further work on this topic will be conducted in the future.

In order to establish baseline water quality in Lake Tapps, Cascade has cooperated in a number of monitoring efforts since 2004. The Washington Department of Ecology conducted a study of Lake Tapps and the White River in 2004 - 2005 to document water-quality conditions soon after power generation had ceased and when flow through the Lake was reduced. Cascade, Pierce County Public Works and Utilities, the Muckleshoot Indian Tribe and the Puyallup Tribe of Indians also cooperated in collecting water quality data during the 2004–2007 time frame.

These studies indicate that Lake Tapps is oligotrophic and that phosphorus is the limiting nutrient for primary production (the Lake tends to function as a net sink for phosphorus). Reduced diversions from the White River and reduced releases from the Lake result in more settling of non-algal particles, including particles with adsorbed phosphorus, resulting in clearer water and lower total phosphorus concentrations.

The most recent and most comprehensive water quality monitoring since Cascade has taken over the Project was conducted from May to December 2010 and was designed by the US Geological Survey (USGS), in cooperation with Cascade and the Muckleshoot Indian Tribe and the Puyallup Tribe of Indians, to establish a baseline set of data collected under the flow regime in place from May to December 2010 (the flow regime contained in the Water Rights Permits) for selected reaches of the White River, White River Canal, Lake Tapps Diversion, and Lake Tapps. This report entitled *Quality of Water in the White River and Lake Tapps, Pierce County, Washington, May–December 2010* (Scientific Investigations Report 2012-5002) presents and summarizes water-quality data collected by the USGS from May to December 2010 from a total of 13 sites—two on the White River (at the Headworks and at R-Street in Auburn), one on the White River Canal (flowline), one on the Lake Tapps Diversion (Tailrace returning flow back to the White River), and from nine sites on Lake Tapps. Three sites (at the Headworks, at R Street in Auburn, and the Tailrace) were equipped for continuous 15-minute recording of water-quality data. Discrete water samples were collected bi-monthly in July and August at the Headworks and White River Canal (flowline) sites. The Tailrace site was sampled bi-monthly in July and August and monthly in November and December. Discrete water samples were not collected at the R-Street site; only continuous water-quality data were collected. The nine Lake sites were sampled bi-monthly from July through October and monthly in November and December.

The water-quality data collected for this study consist of concentrations of nutrients, suspended solids, fecal-coliform bacteria, and turbidity in discrete water samples, and 15-minute values of water temperature, specific conductance, dissolved oxygen concentration, pH, and turbidity continuously measured by in-situ water-quality sondes. Water-quality data collected from the Lake sites consist of concentrations of nutrients, suspended solids, fecal-coliform bacteria,

chlorophyll *a*, and turbidity, and vertical profiles of various water-quality and physical properties through the Lake water column. In addition, a one-time sampling of water from three of the Lake sites was analyzed for suites of organic chemicals.

The following is a brief overview summary of the initial results of the 2010 effort:

- Discrete samples indicated that water from the White River, White River Canal Inflow, and Tailrace sites generally was turbid, warm, chemically dilute, and well-oxygenated. The quality generally was good and generally met the freshwater criteria designated by Washington State Department of Ecology for recreational and aquatic-life uses.
- Lake Tapps water near the surface was relatively clear, warm, and well oxygenated. Lake Tapps water is pH neutral and chemically dilute. Concentrations of nutrients and chlorophyll *a* in Lake Tapps were low. Lake Tapps generally fits within the oligotrophic classification and primary production is phosphorus limited.
- In addition to general water quality parameters, water samples collected at three sites were screened for the presence of 250 organic chemicals. A total of 14 compounds (mostly belonging to the group of wastewater indicator chemicals) were detected in trace amounts (or determined to be present) at one or more of the three sites. Compounds detected (or with verified presence) at all three sites included the herbicide 2,4-D, the insecticide and mosquito repellant DEET, the herbicide fluridone used for Eurasian watermilfoil eradication, and the herbicide prometon.

Lake Tapps is significantly different than the drinking water sources managed by SPU and TPU. While the Cedar, Tolt, and Green River sources are located in protected areas with controls over human activities, the watershed upstream of Lake Tapps is less protected, includes both undeveloped and developed areas, and has multiple uses. The land immediately adjacent to Lake Tapps has been developed for residential and commercial uses.

Lake Tapps is subject to two types of potential contamination: point and non-point sources. Point sources include permitted discharges to the White River and potential point sources, such as underground storage tanks. One facility has a permit to discharge to the White River upstream of Lake Tapps: Crystal Mountain Sewage Treatment Plant.

Ecology regulates other facilities in the area, including some underground storage tanks and hazardous waste generators. Contamination from these types of facilities could reach Lake Tapps only through an accidental release. In 2001, a review of these regulated facilities indicated that there are also some inactive and active clean-up sites and leaking underground storage tanks near the Lake Tapps Reservoir and the White River upstream of the diversion to Lake Tapps.

Non-point source contamination will potentially occur primarily via streamflow runoff and septic tank leaching and failure. The types of contaminants reaching Lake Tapps Reservoir vary according to land use within the basin. Table 6.2 presents a summary of typical land uses and related contaminant sources near the Lake Tapps Reservoir, near the White River Canal (which diverts water from the White River to Lake Tapps), and upstream of the diversion. The primary concerns associated with residential, incorporated, and agricultural uses are contaminants transported by stormwater runoff. Runoff from urban and moderate-density residential areas could carry eroded soil, pollutants that build up on impervious surfaces, pesticides and fertilizers, animal manure, bacteria, protozoa, and viruses. Stormwater runoff from agricultural land uses are likely to transport fertilizer, pesticides, and manure to Lake Tapps. These may

contribute turbidity, nitrogen, organic contaminants, bacteria, protozoa, and viruses to nearby surface waters.

A concern associated with rural and moderate density residential land uses is the presence of septic systems. The majority of the area around Lake Tapps Reservoir (except for incorporated areas), the White River Canal, and upstream of the diversion, is not connected to a sewer system. In 2001, the Tacoma-Pierce County Health Department estimated that 1,250 to 1,450 septic tanks may be located within 400 feet of Lake Tapps. A septic system has the potential to contribute nitrogen, phosphorus, suspended solids, bacteria (such as fecal coliform), protozoa (*Giardia lamblia* and *Cryptosporidium*), viruses, metals, and organic and inorganic chemicals to nearby surface water bodies and groundwater.

In addition to these sources of contaminants, recreational activities could also introduce contaminants to Lake Tapps. Recreational boat use can contribute gasoline, gasoline additives, other petroleum products, and metals to surface water. Boating and swimming can also introduce microbial contamination.

Table 6.2: Land Use near Lake Tapps and White River above River Mile 24.3

Land Use Category	Description	Estimated Percentage of Surrounding Area	Potential Contaminant Source
Lake Tapps			
Rural	Maximum of 1 dwelling per 5 acres	60	Septic tanks
Moderate Density Residential	2 – 6 single family dwellings per acre	15	Septic tanks Stormwater Runoff
Incorporated	Within incorporated city limits	20	Stormwater Runoff
Agricultural	Commercial agriculture, such as crops or dairies	5	Stormwater Runoff
White River Canal			
Rural	Maximum of 1 dwelling per 5 acres	80	Stormwater Runoff
Incorporated	Within incorporated city limits	10	Stormwater Runoff
Agricultural	Commercial agriculture, such as crops or dairies	10	Stormwater Runoff
White River Above Diversion			
Forested	Land managed for forestry purposes	Virtually All	Stormwater Runoff

Source: Lake Tapps Reservoir Water Right Feasibility Report – Technical Memorandum No. 3 Public Water Quality Analysis: Water Quality Monitoring and Evaluation. 2001.

To address the issues associated with watershed control, Cascade has developed a three-pronged approach for a proactive watershed management strategy that is integrated with development of drinking water treatment. This strategy recognizes the need for watershed monitoring and continued management of existing practices to meet current state requirements and guard against degradation of existing water quality. The watershed management strategy will have these three aspects:

- Coordination with and support of other public agencies in watershed management efforts. Cascade plans to work with other agencies, such as Ecology, Tacoma-Pierce County Public Health Department, and the United States Forest Service to help ensure

that water quality regulations are met. Current examples of such coordination with other agencies include Cascade's: partnership with the USGS, DOH, the City of Tacoma and others in a multi-year study to characterize the groundwater flow system in the Puyallup Watershed; cooperating with Pierce County and the Cities of Bonney Lake, Buckley and Sumner on updates to Shoreline Master Programs; and cooperating with Pierce County, the City of Bonney Lake and State agencies in licensing (in accordance Cascade's Lake Tapps Reservoir Property Management Policy) and permitting (in accordance with appropriate State and local regulatory programs) improvements (i.e. docks, bulkheads, etc.) around Lake Tapps.

- Implementation of public education to ensure local stakeholders have an understanding of Cascade's watershed objectives and planned efforts and are able to provide input into watershed management. Since the area surrounding Lake Tapps is developed for residential and commercial land uses, Cascade plans to join with the community to maintain and improve water quality. Cascade will work with Lake Tapps homeowners in a program to enhance public education on existing activities that affect the water quality of the Lake Tapps Reservoir and to meet regulations designed to prevent degradation of water quality. This ongoing program would assist in raising awareness that it is in everyone's best interests to comply with existing state law and to promote "good neighbor" use practices to protect the current uses of the Lake Tapps Reservoir.
- Continuation of regular water quality monitoring, including periodic Lake Tapps water quality studies to provide additional baseline information and to track any changes over time. Cascade will continue to fund (through cooperative agreements with the USGS) White River flow and water quality monitoring stations to provide additional baseline information and to track any changes over time. These efforts will be coordinated with public agencies, the MIT and PTI and public education efforts and will assist in shaping the necessary water treatment process.

As yet, water quality monitoring of Lake Tapps has consisted of efforts to assess environmental parameters. Only limited monitoring of drinking water parameters has been conducted.

This approach will be implemented in phases to prepare for design and construction of a drinking water treatment plant and operation of the Lake Tapps Project as a source of supply. Activities will be implemented in the following phases. It is assumed that the Lake Tapps Project will not be used as a source of supply prior to 2030 and that activities associated with each phase may be adjusted as preparation, design, and construction of the treatment plant progresses.

6.5.1. Phase I Baseline Monitoring and Coordination

The objective of this phase will be initiation of agency coordination and public education and implementation of a baseline monitoring program. Additionally, after monitoring has been implemented, Cascade, in cooperation with other agencies and stakeholders, will share monitoring data that will form a technical basis to help protect and improve water quality at Lake Tapps.

Baseline water quality monitoring will be conducted to capture seasonal variation and information on the quality of water in Lake Tapps. This baseline monitoring will occur over a several-year period to capture seasonal variation of key water quality and public health parameters. At a minimum, the monitoring will be conducted at the following locations: (1) near the inlet of Lake Tapps, and (2) at the proposed point of withdrawal to the conveyance facilities leading to a future treatment plant. After conducting this monitoring for about three years, the

program will be reviewed and adjusted according to monitoring needs after this baseline information has been obtained. The monitoring will include parameters to assess:

- physical characteristics of the water
- levels of organic matter and solids
- presence or absence of microorganisms of concern
- presence or absence of regulated and unregulated inorganic and organic chemicals

Table 6.3 presents the proposed monitoring parameters and monitoring frequencies.

Table 6.3: Baseline Monitoring Program

Monitor Once Per Month	
pH	Total Dissolved Solids
Temperature	Total Suspended Solids
Turbidity	Total Organic Carbon
Color	Dissolved Organic Carbon
Conductivity	UV 254
Hardness	Fecal Coliform
Alkalinity	E. Coli
Nitrate	Algae
Nitrite	
Monitor Once Per Year	
Cryptosporidium	Giardia Lamblia
Regulated Inorganic Chemicals	Phosphate
Regulated Organic Chemicals	Silver
Chloride	Sodium
Fluoride	Sulfate
Iron	Zinc
Manganese	Geosmin
MIB (2-methylisoborneol)	
Monitor Once	
Contaminants Listed as Regulatory Priorities on EPA's Contaminant Candidate List	
Contaminants Monitored for under Unregulated Contaminant Monitoring Rule – List 1	
Pharmaceutical and Personal Care Products per USGS National Reconnaissance of Emerging Contaminants in US Streams.	
Radium-226	Beta/Photon Emitters
Radium 228	Uranium
Gross Alpha Activity	

6.5.2. Phase II Pilot-testing and Intensive Monitoring

The objective of this phase will be to carry out water quality monitoring tied directly to development and design of a treatment plant for the Lake Tapps Project. This monitoring will be more intensive than that described above. Additionally, this monitoring phase will be used to investigate any concerns that surface during Phase I. The monitoring program will be developed in conjunction with the pilot study associated with treatment plant design.

6.5.3. Phase III Ongoing Monitoring and Management

The objective of this phase will be to carry out continued monitoring, based on a program that will be developed specifically for continuing surveillance of the Lake Tapps watershed after the treatment plant comes on line. In addition to this monitoring, Cascade will initiate watershed management strategies deemed necessary based on the previous monitoring phases. This phase will also include ongoing coordination with other agencies and public education.

Cascade anticipates developing and implementing its source water protection program as part of Phase III monitoring and management. It is likely, however, that watershed management strategies will begin within the two-year period prior to operation of a treatment plant at the Lake Tapps Project.

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7. Infrastructure Needs and Costs

Chapter 5 of this Transmission and Supply Plan described Cascade's long-term supply program. This chapter identifies future infrastructure needed to deliver water from the various supply sources. It also provides information on costs of developing and operating the Cascade supply system. Cost information is provided at a planning level, and will be refined in the future after additional design work is carried out.

Infrastructure requirements for Member Independent Supplies, SPU, TPU or Cascade wholesale customer supplies are not described here, but can be found in water system plans and other documents prepared by those organizations. Cascade does not incur costs for Member supplies. Costs of SPU and TPU supplies are paid through Cascade's wholesale rate payments to SPU and are therefore treated as annual operations and maintenance (O&M) costs in this chapter.

7.1. Infrastructure Needs

The supply portfolio described in Chapter 5 will require construction of new infrastructure over a period of several decades. Cascade anticipates that new infrastructure will need to come on line beginning in 2024, when the first step down occurs in the SPU Block Contract (unless this contract is modified in the future). Additional infrastructure will be needed in the years after that.

Cascade has developed a long-term Capital Improvement Plan (CIP) for development of the supply portfolio. Primary elements of the CIP include the following:

White River - Lake Tapps Reservoir Project Improvements.

Estimated date in service: Ongoing.

Cascade has owned the White River - Lake Tapps Reservoir Project (Lake Tapps Project) since December 2009, and during that time has begun taking a detailed inventory of facilities and equipment and assessing the need for improvements, repair or replacement to meet both Cascade's immediate and long-term operational objectives. For example, during the 2010 Flowline Outage, repairs were made to the Timber Flume, sediment was removed from the settling basins and upgrades made to the Fish Screen Facility. In 2010 and 2011, repairs were made to various Lake Tapps dikes.

The CIP includes funding for additional improvements, repair or replacement to Lake Tapps Project facilities through 2025. Cascade is still evaluating the condition and future operational needs of Lake Tapps Project facilities and decisions on specific projects and timing have not been finalized. Examples of the types of projects that might be undertaken are:

- Improvements or replacement of the Headgates
- Replacement of the Timber Flume
- Installation of fish screens at the intake from Lake Tapps and/or fish barriers in the tailrace to the White River;

- New deep water intake structure
- Improvement, replacement, or modification of the water conveyance facilities between Lake Tapps and the White River (i.e. tunnel, forebay, penstocks, surge tanks and overflow structures, power house valves and tailrace canal
- Improvements/repairs to Lake Tapps dikes

In addition to these activities, the US Army Corps of Engineers (USACE) is proceeding with a project to replace the Barrier Dam on the White River near Buckley. This facility, currently owned by Cascade, is integral to the USACE's ability to move listed fish species above Mud Mountain Dam. The proposal is for the USACE to obtain the existing structure and land from Cascade and construct a new Barrier Dam and Trap-and-Haul Facility. The final design is unknown at this time and Cascade is working with the USACE and other interested parties (Tribes and State and Federal fishery agencies) on this matter. As the design of the USACE structure and facilities is finalized, there may be opportunity to improve/replace Cascade structures (such as the Headgates or the Timber Flume) while the USACE project is underway.

Tacoma-Cascade Pipeline

Estimated initiation of final design: 2020
Estimated start of construction: 2022
Estimated date in service: 2024.

This transmission link (see Figure 7.1) will be needed to convey supply contracted from TPU and Covington Water District. Various configurations are possible for the Tacoma-Cascade Pipeline (TCP). The configuration presented in this plan involves constructing the pipeline from the Regional Water Supply System (RWSS) pipeline in the vicinity of the Covington Water District north to connect with existing SPU transmission lines at Lake Youngs Reservoir, and conveyance of treated TPU/Covington water through SPU transmission lines to a point near the Eastside Reservoir in Bellevue. The length of the TCP under this configuration is approximately 8.5 miles. The assumed pipeline diameter is 30 inches, which would be capable of conveying 20.3 mgd in peak week supply under anticipated hydraulic conditions. This would be sufficient to convey the contracted supplies from TPU and Covington Water District discussed in Section 5.6.

Cascade also anticipates a storage reservoir will be needed to balance deliveries through the TCP. This need could be addressed either by acquiring the existing Eastside Reservoir from SPU or by constructing a new reservoir. Rights of way and some land acquisition would also be required. In addition a wheeling (conveyance) agreement with SPU will be needed (or additional pipeline construction will be needed if wheeling is not permitted by SPU).

Lake Tapps Project, Phase 1

Estimated initiation of final design: 2020
Estimated start of construction: 2023
Estimated date in service: 2030.

Development of the Lake Tapps Project for water supply will require construction of a water treatment plant and 30-mile pipeline from Lake Tapps north to the vicinity of Bellevue (see Figure 7.1). It is assumed the water treatment plant will use membrane filtration plus granular activated carbon and chlorination. The 66-inch-diameter pipeline would be sized to convey the peak flow of 87.5 mgd associated with the Lake Tapps Project water right. The pipeline must be fully constructed in Phase 1. However, the water treatment plant can be constructed in phases to spread out the cost of construction. For purposes of the TSP, two phases are assumed. Phase 1 would provide 43 mgd of water treatment capacity (half of the ultimate maximum week capacity of 87.25 mgd). Phase 1 will also include construction of a storage reservoir near the north end of the pipeline and a booster pump station in the Kent Valley. Rights of way and some land acquisition would be required. However, Cascade already owns the Lake Tapps impoundment and the adjacent land needed for the water treatment plant.

Lake Tapps Project, Phase 2

Estimated date in service: 2045.

Phase 2 would complete the Lake Tapps Project by adding an additional 44 mgd of water treatment capacity at the water treatment plant. This would enable full use of the Lake Tapps water right for municipal water supply.

Regional Distribution Pipelines and Eastside Connections

Estimated date in service: 2040s.

Water delivered to the northerly portions of the Cascade service area is currently conveyed through SPU's Tolt Pipeline and Tolt East Side Supply Line. As SPU water is replaced by water from TPU and Lake Tapps, and as growth continues at the north end of the service area, Cascade will need additional transmission capacity between Bellevue and Redmond. For purposes of the TSP, it is assumed that a new pipeline will be constructed, known as the Bellevue-Kirkland-Redmond (BKR) Pipeline. A number of new connections to Cascade Member systems east of Lake Washington are also included. The need for the BKR and new connections will be re-evaluated closer to the time of construction, It is also possible that Cascade will offer to acquire from SPU the existing transmission lines along the east side of Lake Washington.

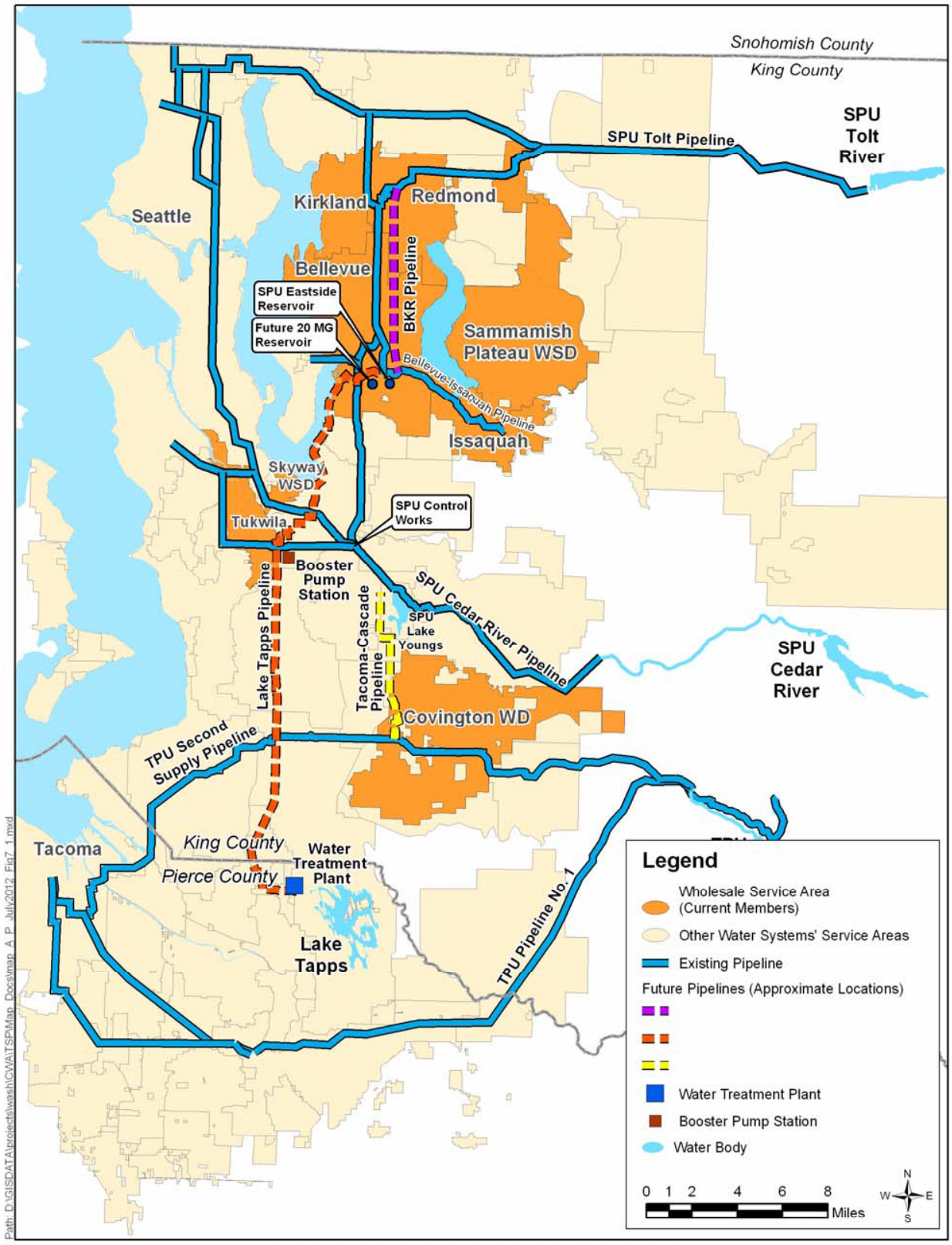

Figure 7.1: General Locations of Planned Infrastructure

7.2. Cost Estimation Methods

Planning-level costs were developed for the various infrastructure projects needed to implement the preferred water supply portfolio described in Chapter 5. The cost estimation approach was documented in a technical memorandum: *Opinion of Probable Cost Summary and Financial Analysis* (December 2011). Costs were estimated for each distinct component of the supply projects, and include all project life cycle costs associated with each supply. These include costs of contracted wholesale supplies, capital costs for infrastructure projects like pipelines and storage reservoirs, and O&M costs for the various supplies. In some cases, assumptions had to be made about the costs of supply agreements or land or infrastructure acquisitions in the future.

Costs were not estimated for Member Independent Supplies. Those costs are borne by individual Cascade Members and, therefore, are not considered in this TSP.

Construction costs were estimated for each supply project using a standard template and unit prices developed from various sources adjusted to 2011 dollars. Costs developed in prior years were escalated to 2011 dollars, using Engineering News Record cost indices. Once construction costs were estimated, allied costs were applied resulting in a complete project estimate. Standard percentages were applied to develop the allied costs.

Projects included in the portfolios range from those that are essentially conceptual at this time to those that have received substantial attention to engineering design. For example, the Bellevue-Kirkland-Redmond pipelines are conceptual in nature, while the proposed Tacoma-Cascade Pipeline (Central Segment) has been designed to the 90 percent level. A construction cost contingency was developed to address varying degrees of uncertainty among the supply projects. This contingency was based on the Cost Estimate Classification System, 2005, by the Association for the Advancement of Cost Engineering International. This system includes five classes of cost estimates based on differing levels of project definition (Table 7.1). Each class has its own cost range to express uncertainty, as follows:

Table 7.1: Contingency Ranges for Cost Estimation

Class	Level of Project Definition	Cost Range
5	Concept screening level, no design completed	-20% to +50%
4	Study or feasibility level (well defined project with no design completed)	-15% to +40%
3	Budget, authorization or control (well-defined project with preliminary design completed [20-30%])	-10% to +30%
2	Control or bid (well defined project with final design completed [75 – 90%])	-5% to +10%
1	Check estimate or bid tender (100% design completed, ready for advertisement)	-3% to +5%

Each supply project in the supply portfolio was evaluated as to its level of development, and the appropriate cost range from Table 7.1 was assigned accordingly.

Cascade's supply portfolio has an additional source of uncertainty. Some of the projects identified will not be constructed for decades. Many factors may change over that time, including regulatory requirements, the extent of urban development in areas to be crossed by transmission pipelines and other factors. A standard inflation percentage was used to address normal inflation. However, a time-dependent risk contingency was also included in the cost estimation methodology for project components subject to the risk of above average increases in cost over time.

Operation and maintenance costs were calculated based on estimated costs or typical percentages for all major elements of the supply portfolio. These elements included water treatment, storage, transmission, pump stations, and appurtenances. Costs included in the O&M category included: fixed institutional costs, energy and chemical costs for water treatment, energy costs for pumping, and the cost of repair and replacement of facilities.

7.3. Costs of Supply Portfolio

Cascade has estimated planning-level capital costs to implement the supply portfolio, as listed in Table 7.2. These include capital costs and up-front costs of contracted supplies. To be conservative, capital costs represent the high end of the contingency ranges discussed in Section 7.2.

Costs for Member Independent Supplies are the responsibility of individual Members and, therefore, are not included.

Not all of the capital cost items listed in Tale 7.2 will be implemented during the six-year planning period prior to the preparation of Cascade's next TSP update. The capital projects that are expected to occur within the current six-year planning period are:

- Cascade will "buy back" its Members outstanding RCFC Credits at a discounted price in 2012 in order to provide additional stability in projecting future rate revenue (assumed to be approximately $10 million);

- The expected upfront cost of contracting with Covington Water District for delivery of surplus supply from Covington's share in the Tacoma Second Supply Project (assumed to be approximately $16 million); and

- Cascade expects to have ongoing capital projects related to the operation of Lake Tapps as a recreational reservoir, prior to development as a source of municipal water supply (assumed to average approximately $24 million; $2 million annually through 2023).

Other capital costs will not begin until Cascade starts construction of the Tacoma-Cascade Pipeline. Those costs are expected to start in year 2020, to enable delivery of supplies through the pipeline by 2024.

Many of the projects listed in Table 7.2 will be constructed over a period of several years. A projected 50-year schedule of capital costs is displayed in Figure 7.2.

Table 7.2: Capital Costs of Supply Portfolio

Major Sources and Project Components	Capital Cost ($M) (2011 dollars)
RCFC Credit Buy-Back	
RCFC Credit Buy-Back (2012)	10
Tacoma-Cascade Pipeline and Associated Costs (In Service 2024)	
Tacoma-Cascade Pipeline (TCP)	50
Storage Capacity (acquire from SPU or build new facility)	23
TPU Contract Expand Permanent Supply (assumed up-front cost in 2025)	16
Subtotal:	**89**
Contracted Supply from Covington Water District (deliver through TCP)	
Assumed Up-front Fee - 2012	16
Subtotal	**16**
Lake Tapps Impoundment Improvements	
Lake Tapps Impoundment Improvements (2012-2023)	24
Lake Tapps Water Supply Project (In Service 2030)	
Lake Tapps Pipeline (all segments)	367
Storage Reservoir	45
Booster Pump Station	25
Water Treatment Plant – Phase 1	136
Water Treatment Plant – Phase 2	108
New Deep Water Intake at Lake Tapps	13
Subtotal:	**694**
Regional Distribution in Cascade Service Area (2040s)	
Bellevue-Kirkland-Redmond (BKR) Pipeline	97
Eastside Connections	22
Subtotal:	**119**
Total 50-Year CIP ($M)	**952**

Expected O & M costs associated with Cascade supply sources during the six-year planning period prior to preparation of Cascade's next TSP update include only the following items:

- Charges paid to SPU under the Block Contract
- Minimum-volume charges paid to TPU under the Water Supply Contract
- Projected O&M costs for maintenance of the Lake Tapps Impoundment

Chapter 8 provides information on Cascade's financial program, to generate revenues needed to pay for the costs of contracted supplies, capital projects, and O&M.

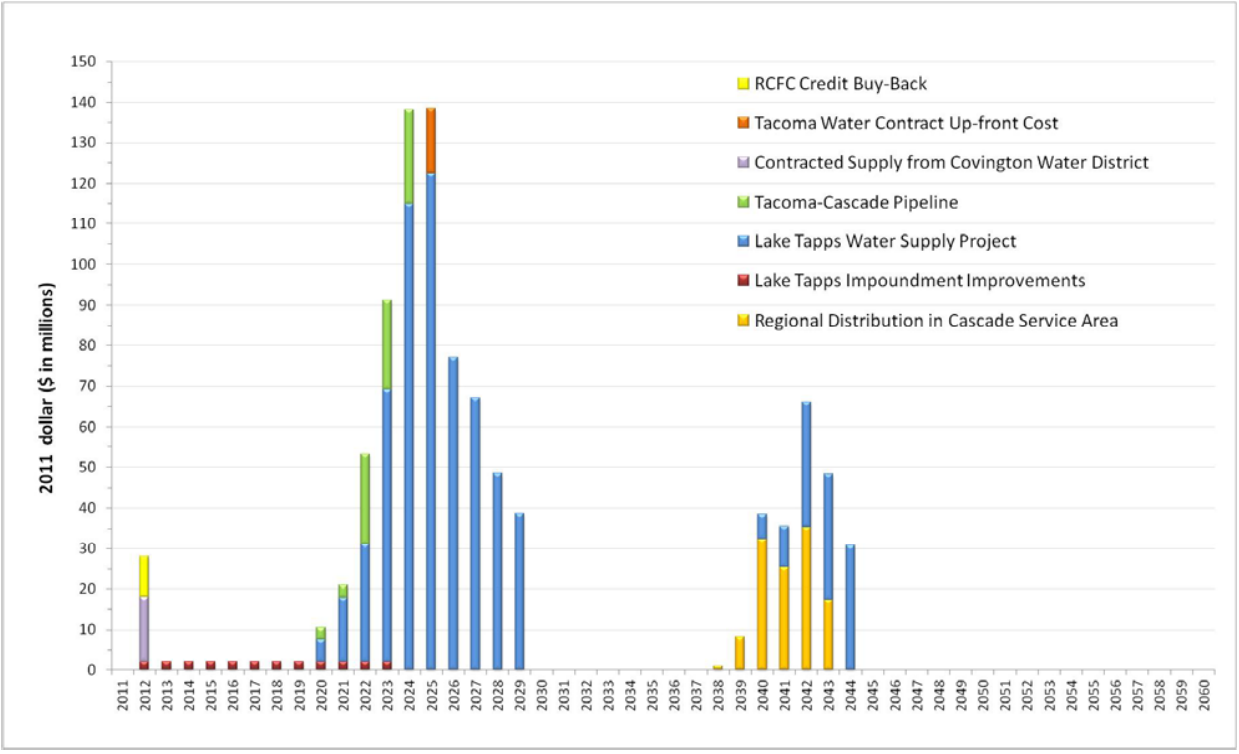

Figure 7.2: Projected Schedule of Capital Expenditures

7.4. Flexibility in Cascade's Infrastructure Program

As discussed in previous chapters, there are several factors that may lead to changes in the timing of particular infrastructure projects. Growth in Cascade's water demand has been flat in recent years, and it is difficult to tell whether the robust growth trends from prior years will return. SPU and TPU have seen similar effects in terms of their water demands, suggesting that substantial surplus supplies could be available from these regional suppliers at least into the 2030s. Cascade plans to re-engage with SPU and TPU periodically to determine whether the existing supply contracts can be expanded or extended. Similarly, the amount of supply available from the Covington Water District's share in the RWSS could be more or less than assumed. Finally, the small sources discussed in Section 5.6.6 may offer additional opportunities to defer large infrastructure projects.

All of these factors suggest a need for flexibility in the water supply and infrastructure program. No new infrastructure needs to be on line until 2024, providing approximately eight to ten years for decisions to be made on the timing and configuration of the Tacoma Cascade Pipeline and Lake Tapps Project. Cascade will periodically evaluate opportunities for expanded supply contracts and other alternatives, to determine whether they can provide an economical means to defer the costs of major infrastructure.

In summary, Cascade has a secure portfolio of supply sources through at least 2060, but will continue to evaluate the exact timing of supply development to meet its Members' needs, manage rate impacts, and maximize the use of existing regional infrastructure. This topic will be reviewed again six years from now in the next update to Cascade's TSP.

8. Financial Program to Support the TSP

This section addresses the financial condition of Cascade and its ability to fund supply system development. Beginning with a review of Cascade's financial history, it evaluates Cascade's current financial condition and financial management policies, as well as the revenue sources available to pay for Cascade's capital needs. Revenues and expenses are projected through 2030, a twenty-year forecast, including the level of rate revenue increases needed.

General principles, listed below, guide this section and provide the basis for this analysis.

- ***Adherence to Financial Policies*** - Cascade has a set of specific rules and procedures that guide its financial management. It periodically reviews and refines these policies to maintain a viable financial program responsive to Members' needs.

- ***Conservative Analysis*** - This analysis contains various assumptions regarding customer growth, capital costs, operating costs, and a number of other factors. The projections in this analysis aim to be financially conservative to facilitate sensible financial planning. While conservatism in planning is achieved by planning for substantial growth in demands, financial conservatism is achieved by planning for low growth and primary reliance on existing sources of revenue.

8.1. Cascade's Recent Financial Performance and Condition

Cascade's financial history reflects initiation of capital expenditures and the dominance of operating expenses by wholesale purchases. Table 8-1 shows Cascade's statement of revenues and expenses for 2006 through 2010. Cascade's fiscal policies incorporate a rate-smoothing policy that spreads rate increases over a 5-year period in anticipation of cost trends. This tends to create cycles of moderate surplus and deficit managed through use of the rate stabilization reserve.

Cascade's balance sheet is summarized in Table 8-2 for 2006 through 2010. It is characterized by the accumulation of debt related primarily to the acquisition of supply assets, including the White River - Lake Tapps Reservoir Project (Lake Tapps Project), and a contractual supply commitment from Tacoma.

Table 8.1: Statement of Revenue and Expenses and Changes in Net Assets

	2006	2007	2008	2009	2010
Water sales	$18,241,038	$20,298,751	$22,465,785	$24,083,868	$25,799,469
Administrative dues	715,781	1,139,257	1,247,488	1,337,898	1,269,289
Conservation program	631,009	706,732	733,086	812,351	1,049,648
Total Operating Revenue	**$19,587,828**	**$22,144,740**	**$24,446,359**	**$26,234,117**	**$28,118,406**
Cost of water sold	$14,464,094	$15,081,172	$16,508,432	$20,719,555	$20,842,438
Other operating costs	2,031,418	2,921,107	3,149,247	4,832,026	9,367,557
Total Operating Expenses	**$16,495,512**	**$18,002279**	**$19,657,679**	**$25,551,581**	**$30,209,995**
Operating (Loss) Income	**3,092,316**	**4,142,461**	**4,788,680**	**682,536**	**(2,091,589)**
Non-operating expenses	(159,736)	(240,657)	14,867	(822,145)	(1,075,993)
Capital contributions	6,019,577	8,859,354	8,544,479	2,844,401	3,797,144
Increase in Net Assets	**8,952,157**	**12,761,158**	**13,348,026**	**2,704,792**	**629,562**
Net Assets, Beginning of Year	32,596,509	41,548,666	54,309,824	67,657,850	69,596,551
Cumulative effective of change in accounting principle				$(766,091)	
Adjusted net assets, beginning of year	32,596,509	41,548,666	54,309,824	66,891,759	69,596,551
Net Assets, End of Year	**$41,548,666**	**$54,309,824**	**$67,657,850**	**$69,596,551**	**$70,226,113**

Table 8.2: Balance Sheet

	2006	2007	2008	2009	2010
Current assets	$11,566,596	$19,838,646	$27,489,607	$33,303,242	$39,996,322
Net capital assets	64,163,066	72,199,283	84,292,091	152,740,663	156,979,238
Other assets	26,600,970	22,254,355	12,919,407	46,784,489	28,116,127
Total Assets	**$102,330,632**	**$114,292,284**	**$124,701,105**	**$232,828,394**	**$225,091,687**
Current liabilities	$4,295,857	$4,690,108	$3,196,635	$12,213,679	$27,559,578
Long-Term liabilities	56,486,109	55,292,352	53,846,620	151,018,164	127,305,996
Total Liabilities	**$60,781,966**	**$59,982,460**	**$57,043,255**	**$163,231,843**	**$154,865,574**
Invested in capital assets, net of related debt	$7,958,066	$17,450,837	$30,751,038	$23,005,382	$15,777,306
Restricted	25,256,417	21,618,078	12,310,206	20,630,437	17,658,596
Unrestricted	8,334,183	15,240,909	24,596,606	25,961,232	36,790,211
Total Net Assets	**$41,548,666**	**$54,309,824**	**$67,657,850**	**$69,597,051**	**$70,226,113**
Total Liabilities and Net Assets	**$102,330,632**	**$114,292,284**	**$124,701,105**	**$232,828,894**	**$225,091,687**

Table 8-3 summarizes year-end fund balances held by Cascade for each of the last five fiscal years, 2006 through 2010. Cascade currently meets or exceeds all internal policy standards (e.g., working capital) and external requirements (e.g., bond covenants) for fund balances.

Table 8.3: Fund Balances

	2006	2007	2008	2009	2010
Operating	$3,435,892	$5,531,725	$5,709,894	$8,724,335	$10,815,939
Construction	16,124,933	11,854,815	1,593,738	32,076,178	26,544,174
RCFC	5,366,539	8,108,233	14,482,839	11,733,111	5,307,211
Bond	9,712,456	10,123,712	10,580,187	18,045,647	19,220,583
Rate Stabilization	950,000	2,034,317	6,356,112	6,590,647	2,725,811
	$35,589,820	**$37,652,802**	**$38,722,771**	**$77,169,919**	**$64,613,719**

RCFC = Regional Capital Facilities Charges

8.2. Existing Rates and Charges

Cascade serves Member agencies on a wholesale basis. As such, its rates and charges do not include retail rates. Cascade's charges to Members reflect the fixed nature of much of Cascade's costs, whether currently under block supply contracts or as anticipated with debt service related to financing of the capital program. As a means of mitigating financial risk, Cascade's rate structure is primarily fixed in nature. Member agencies pay for wholesale supply and transmission through a common structure of charges based primarily on their growth (Cascade Equivalent Residential Units, or CERUs) and historical demand (Demand Shares).

Cascade Equivalent Residential Units **(CERUs**): The CERU was established as a means of standardizing Cascade's Member base, given potential variations in the way that each Member defines an Equivalent Residential Unit (ERU). Each Member's CERU count is based on the number of retail connections that it serves (see Table 4.2 for the historical CERU counts) and the size of those connections. Industry-accepted meter flow factors provide the basis for the CERU conversion.

The CERU methodology currently uses the following basis for estimation:

CERU Conversion Factors

Meter Size	Flow Rate	CERUs
5/8 x 3/4 and 3/4 inch	20 gpm	1.0
1 inch	50 gpm	2.5
1.5 inch	100 gpm	5.0
2 inch	160 gpm	8.0
3 inch	320 gpm	16.0
4 inch	500 gpm	25.0
6 inch	1,000 gpm	50.0
8 inch	1,600 gpm	80.0

For commercial or industrial meters sized four inches or larger, Cascade reserves the right to determine CERUs based on specific water demands and requirements.

Fire sprinkler and deduct meters are not counted as CERUs, and no RCFC is imposed since these meters do not increase system demand.

Demand Shares: While the CERU provides a means of estimating average capacity requirements, it does not address levels of actual usage of regional water by each Member or variations of usage patterns among Members. Cascade uses a three-year rolling history of regional demand to define Demand Shares as a basis for Member charges, with adjustments to this history for special cases as defined by the Cascade Board. A Member's Demand Share is established as the greater of:

- Average daily demand (in mgd) from Cascade during the peak season, defined as June through September; or
- Average daily demand (in mgd) from Cascade for the entire calendar year; or
- An amount determined by the Cascade Board to address special circumstances such as those involving new Members or Members relying on Cascade investments in system facilities to extend or expand service.

Cascade's basic charges are described below:

- ***Administrative Dues*** - Cascade's administrative costs are allocated to Members on a CERU basis. The amount generated from this charge in any given year is limited by contract to 9 percent of total revenues. For 2012, the annual administrative charge is $15.26 per CERU and collects roughly $2.7 million.
- ***Conservation Charge*** - This charge recovers the costs associated with administering Cascade's conservation program. Like administrative dues, the conservation charge is based on an allocation of costs to Members on a CERU basis. For 2012, the conservation charge is $7.74 per CERU for the year and collects roughly $1.3 million.
- ***New Water Surcharge*** - The new water surcharge is an interim "phase-out" volume charge of $0.75 per ccf imposed on wholesale water usage in excess of a baseline level. It expires after 2011 and after that will no longer be applicable.
- ***Demand Share Charges*** - All remaining revenue requirements are recovered through the demand share charge. In 2012, roughly 85 percent of revenues are generated through the demand share charge. In 2012, there are 36.4 demand shares (in mgd) with a charge of roughly $776,000 per demand share, collecting approximately $28.3 million.
- ***Regional Capital Facilities Charges*** - The regional capital facilities charge is imposed as a one-time charge to Members for new connections to their systems. As a growth-based charge, this is the most volatile revenue source of Cascade. It is currently $6,005 per CERU, and funds generated are used for capital and debt service, with some funds accumulated in reserve for major capital projects scheduled in the future. In 2012, this charge is projected to generate approximately $7.2 million.

8.3. Cascade's Near-term Financial Forecast

Table 8-4 summarizes Cascade's forecasted financial activity for 2012 through 2016. Cascade adopts a biennial budget preceding odd-numbered years, and will adopt a 2-year budget in late 2012 for the 2013-14 biennium.

Cascade is shown to be accumulating funds during this short-term period, consistent with objectives related to providing cash funding toward future major capital investments.

Table 8.4: Near-term Financial Forecast

Sources & Uses	2012	2013	2014	2015	2016
Beginning Fund Balance	**$44,797,191**	**$35,545,596**	**$38,502,036**	**$43,063,365**	**$46,267,558**
Annual Member Charge Increase	***6.00%***	***4.00%***	***4.00%***	***4.00%***	***4.00%***
Sources:					
Member Charges (Excluding RCFCs)	$32,396,255	$33,692,105	$35,039,789	$36,441,381	$37,899,036
Member Charge Adjustments	(1,283,756)	(1,150,000)	-	-	-
RCFCs and SDCs	7,364,089	7,839,224	9,036,913	10,655,283	13,129,067
Interest Earnings	895,944	1,060,368	1,137,324	1,262,428	1,346,817
Debt Proceeds	3,156,762	19,063,665	2,223,836	-	-
Federal BABs Reimbursement Payments	1,284,637	1,267,621	1,246,509	1,221,102	1,221,102
Other Operating Revenues	706,479	912,895	928,546	944,665	961,269
Total	$44,520,410	$62,685,879	$49,612,917	$50,524,858	$54,557,290
Uses:					
SPU Water Purchases (Including Wheeling)	$19,338,799	$19,479,050	$19,879,050	$20,475,422	$21,089,684
TPU Water Purchases	2,976,208	2,932,212	2,882,897	3,959,179	3,932,313
Other Operating Expenses	8,450,401	8,526,755	8,670,007	9,230,107	9,317,416
Existing Debt Service	10,145,179	10,127,365	10,104,097	10,079,806	10,083,609
New Debt Service	78,919	681,943	1,214,131	1,303,199	1,629,617
Capital Outlays	12,782,500	17,982,113	2,301,406	2,272,952	2,346,823
Total	$53,772,006	$59,729,438	$45,051,588	$47,320,665	$48,399,462
Ending Fund Balance	**$35,545,596**	**$38,502,036**	**$43,063,365**	**$46,267,558**	**$52,425,386**

8.4. Cascade Capital Funding Strategy

As summarized in Chapter 7, Cascade plans major system improvements over the next 20 years. The capital improvement plan considered in the financial analysis includes the following major elements:

- Capital improvements needed to maintain the Lake Tapps Project prior to its use for municipal water supply;
- Construction of the Tacoma-Cascade Pipeline to convey Tacoma and Covington Water District supplies north to Cascade, including storage;
- Development of the Lake Tapps Project as a municipal supply, including transmission, storage and treatment;
- Completion of regional distribution elements needed to deliver future sources to Cascade Members.

The financial analysis considers the financial impacts of these projects. For that analysis, project costs are escalated to year of construction using an escalation factor of 3.25 percent per year (2011 base). Further, as discussed in Section 7.2 each project is assigned a time-related

contingency factor to reflect the cost impact of changing conditions. This factor adds 0.075 percent to 0.15 percent per year to the escalation factor on a project-specific basis. Figure 8-1 summarizes the projected capital expenditures for 2012 through 2030, including anticipated sources of funding:

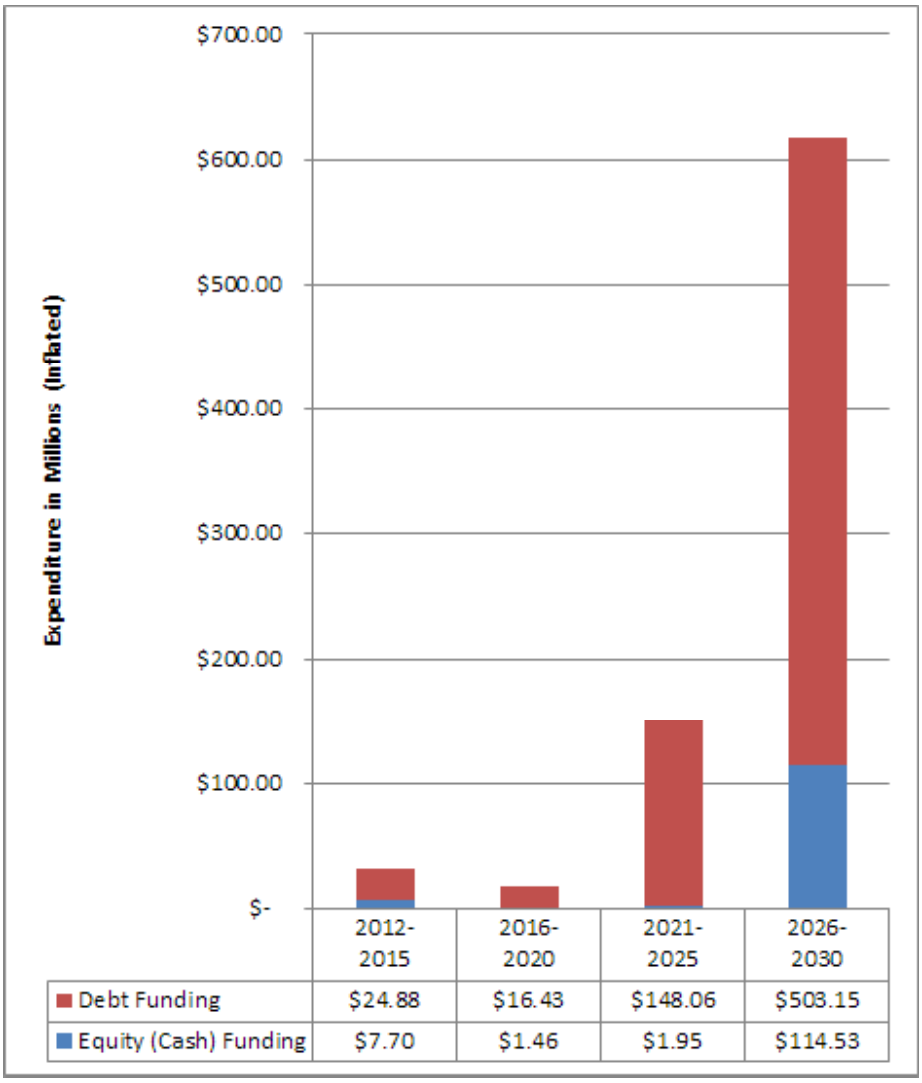

Figure 8.1: Summary of Cascade Capital Improvement Funding

In addition to revenue bonds, Cascade will monitor and pursue lower-cost funding sources, such as grant and loan programs, as projects are prepared for execution.

8.5. Projected Cascade Member Charges

The projection of Cascade Member charges is based on the capital and operating needs of the system. Figure 8-2 summarizes the forecast of Cascade's annual revenue requirements for the period 2012 through 2030, showing total requirements as broken down among major operating and debt service components. This figure does not show capital costs directly, but does show the impacts of those expenditures as well as operating and maintenance costs on Member charges. The annual revenue requirement increases by an average of 5.8 percent during this

period, relative to an assumed inflation rate of 3.0 percent, reflecting the substantial capital investment planned for this period. Looking at the longer-term forecast (not shown), subsequent increases are projected to average well below inflation, with the cumulative increase for 2012 through 2050 below 4 percent. This is indicative that near-term cost increases, especially during the capital intensive period after 2020, could be managed to some degree by debt structure and perhaps by refined capital project scheduling.

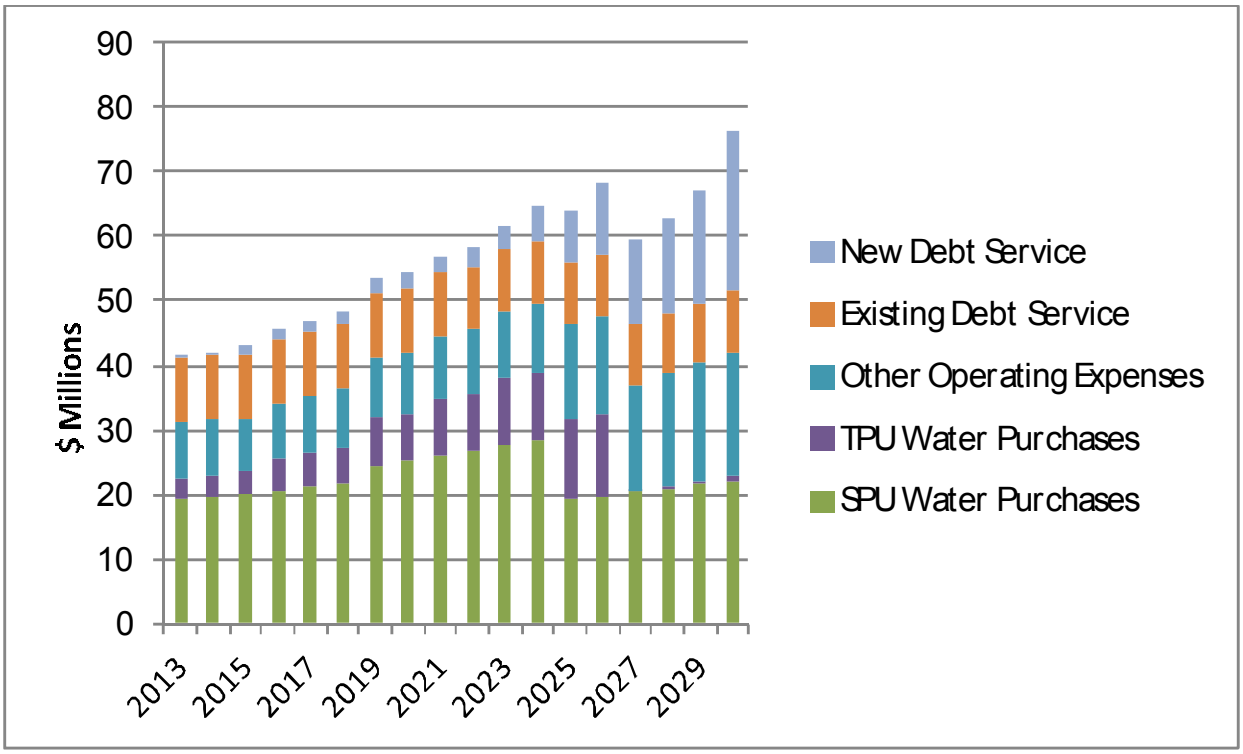

Figure 8.2: Summary of Cascade Revenue Requirements by Expenditure

Figure 8-3 summarizes the breakdown of Member payments by agency for the same timeframe of 2012 through 2030. This forecast assumes that no new Members are added and that no major new service areas are added by existing Members.

As discussed in Chapters 5 and 7, Cascade intends to continue seeking flexibility in its supply arrangements that may permit deferring either the Tacoma-Cascade Pipeline or the Lake Tapps Project, or both of these. There appear to be opportunities for expanded contract supplies from one or more sources, i.e., SPU, TPU, or Covington Water District. Expanded supplies from SPU could allow Cascade to defer both the TCP and the Lake Tapps Project. Expanded supplies from TPU or Covington could allow deferral of the Lake Tapps Project until after the TCP is constructed. Any of these options would favorably affect the financial picture and reduce financial burdens on Cascade Members and their ratepayers.

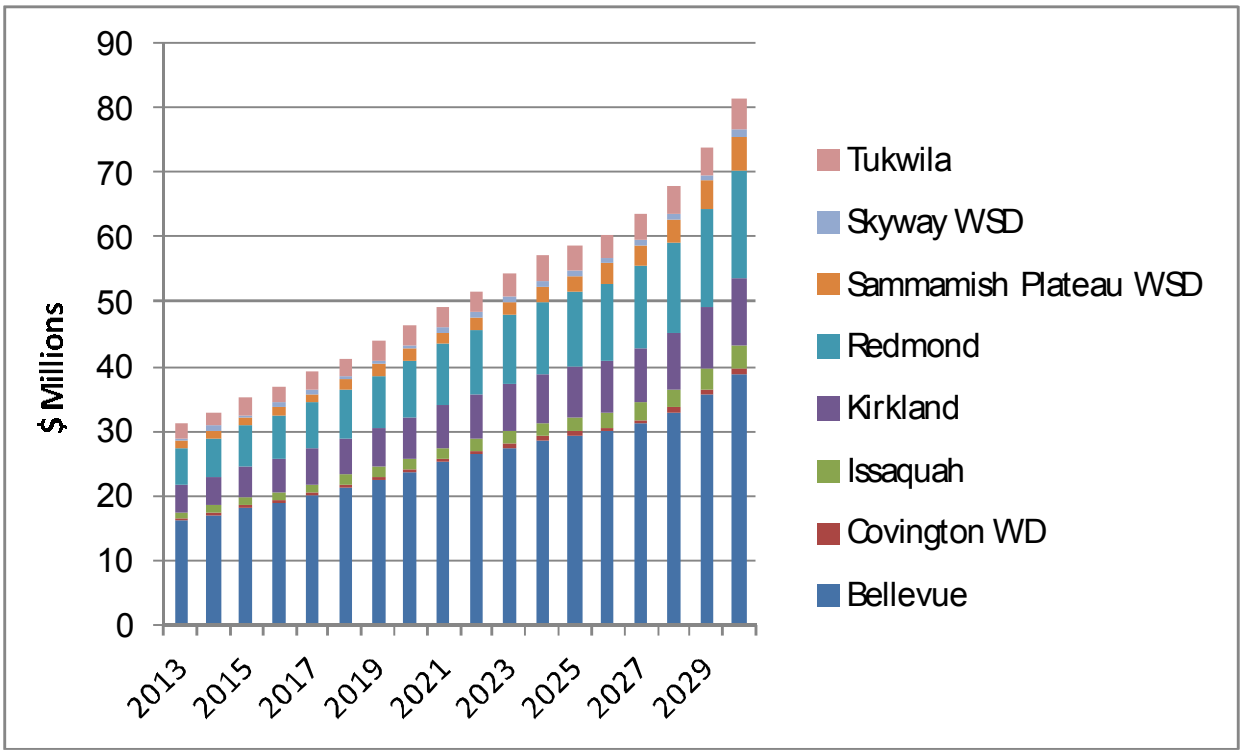

Figure 8.3: Summary of Cascade Projected Charges by Member

8.6. Qualitative Assessment of Sensitivity to Assumptions

Cascade continuously monitors and analyzes both near-term (5 years) and long-term (up to 70 years) financial forecasts and evaluates supply and transmission strategies in the context of projected financial and economic impacts. Sensitivity and risk analysis are a part of that evaluation process.

The strategy incorporated in this plan is highly sensitive to growth and demand assumptions. Lower growth would enable resource strategies to "bridge" supplies from current resources to Lake Tapps, allowing a moderated capital schedule and related rate and financial impacts. For example, a relatively small reduction in forecasted peak demands would allow extension of the Lake Tapps Project development schedule by five years, to about 2035, providing attenuation of financing needs and increased time for accumulation of equity funding, reducing net rate requirements. Short-term extensions of existing supply commitments could help provide similar flexibility in scheduling with commensurate reductions in financial impacts.

At the same time, higher growth within moderate bounds does not necessarily require acceleration of capital projects, instead providing added sources of funding through regional capital facilities charges and a larger customer base over which to spread capital development costs. This is particularly true with an active conservation and demand management program, including targeting peak system demands as a critical constraint. The strategy of incremental supply acquisition and demand management also offers short-term opportunities to maintain or even extend development schedules, providing reduced financial impacts on Cascade and its Members.

Cost escalation also introduces risk in terms of both operating and capital program costs. At the same time, inflationary pressures tend to be broad-based and relatively neutral in terms of customer impact when measured in real terms.

Finally, Cascade's projected high level of reliance on debt financing introduces market risk in terms of the cost of debt financing. Current uncertainty regarding tax treatment of municipal debt, limited funding available for grant and loan programs, and risk of inflationary pressures with related upward pressure on interest rates are outside of Cascade's ability to control. However, near-term funding decisions and fiscal policies can target measures that can mitigate this risk, for example through accumulation of funds for future projects and issuance of near-term bond issues with shorter maturities. Cascade continues to actively explore these and other options for mitigating projected financial impacts and risks.

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APPENDIX A

Joint Municipal Utility Services Agreement

Cascade Water Alliance
Joint Municipal Utility Services Agreement
March 28, 2012

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CASCADE WATER ALLIANCE
JOINT MUNICIPAL UTILITY SERVICES AGREEMENT

RECITALS

A. WHEREAS, the Members of Cascade Water Alliance ("Cascade") entered into an Interlocal Contract ("**Interlocal Contract**"), effective April 1, 1999, and amended and restated on December 15, 2004, and on October 26, 2011. Under the Interlocal Contract, Cascade was created as a public body and an instrumentality of its Members, which exercised essential governmental functions on its Members' behalf as authorized by the Interlocal Cooperation Act (Chapter 39.34 RCW), and has been functioning as a watershed management partnership, as authorized by RCW 39.34.200. Cascade was incorporated as a public nonprofit corporation in the manner set forth in the Nonprofit Miscellaneous and Mutual Corporations Act (Chapter 24.06 RCW).

B. WHEREAS, Section 3.3 of the Interlocal Contract provides that Cascade may be converted into a separate municipal corporation if and as permitted by law, and that upon the creation of such a separate municipal corporation, all Cascade rights and obligations and all Member rights and obligations shall transfer to that new municipal corporation. Section 10.4 of the Interlocal Contact provides that "upon a 65 percent Dual Majority Vote (ratified within 120 days by 65 percent), as measured by Dual Majority Vote of the Members' legislative authorities, all assets, liabilities, and obligations of Cascade may be transferred to any successor entity (including, without limitation, a joint operating agency or other municipal corporation, as permitted under state law), and all obligations of Members and parties contracting with Cascade become obligations to the successor entity." Cascade's Board resolutions also reserved Cascade's right to convert into a municipal corporation.

C. WHEREAS, the Washington Legislature enacted the Joint Municipal Utilities Services Act, (Chapter 258, Laws of 2011), codified as Chapter 39.106 RCW ("the Act"), which provides in RCW 39.106.080 for the conversion of existing an intergovernmental entity formed under the Interlocal Cooperation Act (Chapter 39.34 RCW) into a joint municipal utility services authority under the Act, if:

- The public agencies that are parties to an existing interlocal agreement would otherwise be eligible to form an authority to provide the relevant utility services;
- Those public agencies amend, restate, or replace that interlocal agreement so that it materially complies with the requirements of RCW 39.106.050;
- The amended, restated, or replacement agreement is filed with the Washington state secretary of state consistent with RCW 39.106.030; and
- The amended, restated, or replacement agreement expressly provides that all rights and obligations of the entity formerly existing under Chapter 39.34 RCW or other applicable law will thereafter be the obligations of the new authority created under Chapter 39.106 RCW.

D. WHEREAS, under the Act, upon compliance with the requirements set forth in Recital C above, the new joint municipal utility services authority shall be a successor of the former intergovernmental entity for all purposes, and all rights and obligations of the former entity shall transfer to the new joint municipal utility services authority. Those obligations shall be treated as having been incurred, entered into, or issued by the new joint municipal utility services authority, and those obligations shall remain in full force and effect and shall continue to be enforceable in accordance with their terms.

E. WHEREAS, in accordance with Sections 3.3 and 10.4 of the Interlocal Contract, Cascade's Members (who are all public agencies that are parties to an existing interlocal agreement) are otherwise eligible to form a joint municipal utility services authority under the Act to provide the relevant utility services.

F. WHEREAS, Cascade's Members intend to amend and restate the Interlocal Contract in compliance with the Act in order to convert Cascade into a joint municipal utility services authority.

G. WHEREAS, Cascade's Members intend to transfer all Cascade rights, assets, liabilities, and obligations to the joint municipal utility services authority, to be created as provided herein.

H. WHEREAS, Cascade's Members intend that, as a joint municipal utility services authority, it will constitute a municipal corporation and will no longer function as a watershed management partnership.

NOW, THEREFORE, it is agreed by Cascade Members as follows:

ARTICLE 1. Agreement.

Effective upon approval by 65 % Dual Majority Vote of the Board (as ratified within one hundred and twenty (120) days of such Dual Majority Vote by 65% Dual Majority of the Members' legislative authorities) the Interlocal Contract is hereby amended and restated as provided herein under the authority of the Act and shall be known as the Cascade Water Alliance Joint Municipal Utility Services Agreement.

ARTICLE 2. Definitions.

"Act" means the Joint Municipal Utilities Services Act, codified as Chapter 39.106 RCW, or as hereafter amended.

"Agreement" means this Joint Municipal Utilities Services Agreement.

"Asset Transfer Agreement" means an agreement between Cascade and a Member by which the Member transfers title to Water Supply Assets to Cascade, with or without monetary consideration, to be operated and maintained as part of the Cascade Water Supply System.

"**Authority**" means a joint municipal utility services authority formed under the Act and the successor in interest to Cascade as an interlocal agency.

"Authorized Issuer" means either: (a) Cascade (or a successor entity); or (b) a Member or other entity authorized to issue Bonds for the benefit of Cascade approved by Resolution of the Board.

"Board" means the Board of Directors of Cascade.

"Bonds" means short-term or long-term bonds, notes, warrants, certificates of indebtedness, or other obligations issued by, or on behalf of Cascade.

"ByLaws" means the ByLaws of Cascade, as adopted and amended by the Board.

"Cascade" means Cascade Water Alliance, a joint municipal utilities services authority.

"Cascade ERUs" ("CERUs") means equivalent residential units, calculated according to the Regional Capital Facilities Charge Methodology.

"Cascade Supply Date" means the date, established by a Resolution of the Board for each Member upon which Cascade undertakes a Supply Commitment.

"Demand Share" means either a Member's current share of water provided through the Supply System, or estimated share of water to be provided through the Supply System, whether Full Supply or Interruptible Supply, expressed in millions of gallons per day. Demand Share is calculated according to the Rate Calculation Methodology.

"Dual Majority Vote" means Board approval of a proposal on the basis of a simple majority of all Members, allowing one vote per Member, together with a simple majority of all Members on the basis of each Member's Weighted Vote. A "simple majority" means a majority of all Members of Cascade, not just the Members present and voting.

"65% Dual Majority Vote" means Board approval of a proposal on the basis of a 65% supermajority of all Members, allowing one vote per Member, together with 65% supermajority of all Members on the basis of each Member's Weighted Vote. A "supermajority" means 65% of all Members of Cascade, not just the Members present and voting.

"Gross Cascade Revenue" means all of the earnings and revenues received by Cascade from any source whatsoever including but not limited to: (a) Member Charges; (b) revenues from the sale, lease or furnishing of commodities, services, properties or facilities; (c) the receipt of earnings from the investment of money in any maintenance fund or similar fund; and (d) withdrawals from any rate reserve or rate stabilization fund or account.

However, Gross Cascade Revenue shall not include: (a) principal proceeds of Bonds or any other borrowings, or earnings or proceeds from any investments in a trust, defeasance or escrow fund created to defease or refund obligations relating to the Water Supply System (until commingled with other earnings and revenues included in Gross Cascade Revenue) or held in a special account for the purpose of paying a rebate to the United States Government under the Code; (b) taxes and other income and revenue which may not legally be pledged for revenue bond debt service; (c) improvement district assessments; (d) federal or state grants allocated to capital projects; (e) payments under Bond Insurance or other credit enhancement policy or device; (f) insurance or condemnation proceeds used for the replacement of capital

projects or equipment; (g) earnings in any construction fund or bond redemption fund; (h) deposits to any rate reserve or rate stabilization fund or account; or (i) any revenues generated by any Independent Supply except those amounts that are payable to Cascade pursuant to this Agreement or another agreement.

"Independent Supply" or **"Independent Supplies"** means a Member's Water Supply Assets that are not part of the Supply System.

"Joint Municipal Utilities Services Act" or **"Act"** means Chapter 39.106 RCW, or as hereafter amended.

"Member" or **"Members"** means one or more member agencies of Cascade.

"Member Charges" means all payments that Cascade Members are required by this Agreement to make to Cascade, including but not limited to all Rates and Charges, RCFCs, dues, assessments and other payments from Members.

"Net Cascade Revenue" means Gross Cascade Revenue less Operations and Maintenance Costs.

"Non-Member" means any person or agency that is not a party to this Agreement.

"Operations and Maintenance Costs" or **"O&M Costs"** means all expenses incurred by Cascade to operate and maintain the Supply System in good repair, working order and condition, including without limitation, payments made to any other public or private entity for water or other utility service. Except as approved by the Board, Operations and Maintenance Costs shall not include any depreciation, capital additions or capital replacements to the Supply System.

"Rates and Charges" means the rates and charges (not including RCFCs) chargeable to each Member using the Rate Calculation Methodology plus any late payment or other charge that may be due.

"Rate Calculation Methodology" means the method of setting Rates and Charges adopted by the Board in accordance with Section 7.5

"Regional Capital Facilities Charges" ("RCFCs") means the charges to each Member for new CERUs connected to that Member's water distribution system.

"Regional Capital Facilities Charge Methodology" ("RCFC Methodology") means the method of determining the RCFCs adopted by the Board in accordance with Section 5.5.

"Satellite Systems" means water supply facilities identified as such by the Board, including but not limited to facilities that serve a portion of a Member's customers but that are not part of the Member's main water system.

"Shortage Management Plan" means the plan adopted by the Board in accordance with Section 7.3.1.

"Supply Commitment" means the obligation undertaken by Cascade, established by Resolution of the Board to supply water to a Member. With respect to Members, that obligation shall be characterized as **"Full Supply Commitment,"** or an **"Interruptible Supply Commitment"** defined as follows:

"Full Supply Commitment" or **"Full Supply"** for any or all of a Member's water needs means that those needs, as projected in the Cascade Water Supply Plan and as agreed to by that Member, shall be met from the Supply System, net of Independent Supply and subject to the other limitations established in this Agreement, on an equal parity with all other Full Supply Commitments, and with a guaranteed priority no lower than for any other Supply Commitment made by Cascade; provided that no Member is guaranteed any given amount of supply or capacity.

"Interruptible Supply Commitment" or **"Interruptible Supply"** means a supply of all or part of a Member's water needs from the Supply System on an as-available basis on a lower priority than any Full Supply Commitment.

The Supply Commitment for a Member shall be defined by this Agreement, the terms and conditions of membership, and the Supply Commitment resolution.

"Supply System" or "Water Supply System" means the Water Supply Assets owned or controlled by Cascade.

"Water Supply Assets" means tangible and intangible assets usable in connection with the provision of water supply, including without limitation, real property, physical facilities (e.g., dams, wells, treatment plants, pump stations, reservoirs, and transmission lines), water rights, capacity and/or contractual rights in facilities or resources owned by other entities, and investments in conservation programs and facilities.

"Watershed Management Plan" means any Watershed Management Plan that existed on the effective date of the Authority which shall be considered a plan of the Authority.

"Water Supply Plan" or "Cascade's Water Supply Plan" means the Cascade's Regional Water Supply Plan adopted by the Board as provided in Section 8.1.

"Weighted Vote" means a vote in which each Member's vote is counted according to the Member's Demand Share, but no Member shall have a Weighted Vote of less than one.

ARTICLE 3. Formation of Entity; Purpose and Powers.

Section 3.1 Formation. Effective on the date of filing of this Agreement with the Washington state secretary of state, Cascade shall be a joint municipal utility services authority formed under the Act; and is the successor for all purposes to the former Cascade created under the Interlocal Contract as an intergovernmental entity existing under the laws of Chapter 39.34 RCW; and is no longer functioning as a watershed management partnership. All rights and obligations of the former intergovernmental entity are transferred to Cascade, the new Authority, which obligations shall be treated as having been incurred, entered into, or issued by Cascade, the successor, and those obligations (including without limitation, outstanding Bonds issued by the former Cascade) shall remain in full force and effect and shall continue to be enforceable in accordance with their terms.

Cascade Water Alliance, as a joint municipal utility services authority, is a municipal corporation.

Section 3.2 Membership. Subject to restrictions on future Cascade water rights, or to limitations upon place of use of water supply imposed by contract or permit, any city, town, county, water-sewer district, public utility district, other special purpose district, municipal corporation, or other unit of local government of this or another state that provides utility services, and any Indian tribe recognized as such by the United States government (or as may be allowed by amendments to the Act) may be admitted as a member of Cascade. The decision to admit new Members rests with the sole discretion of the Board, which shall determine whether to extend a membership offer taking into consideration the audit findings (as described in this Section 3.2), Cascade water resources, and any other factors the Board deems advisable.

When an entity that is eligible for membership under the Act, applies for membership, Cascade shall conduct a water supply audit according to the methodology and within the period determined by the Board. Audit results shall be provided to the Board and to the applicant.

If a membership offer is extended, it shall address the nature of the Water Supply Assets being transferred or retained and the "value" of those assets in terms of the calculation of an applicant's Demand Share, RCFCs and other matters relating to the rights and obligations of the applicant and Cascade, which must be recorded in the form that the Board determines and which will constitute, along with this Agreement, the conditions under which an applicant becomes a Member of Cascade. An applicant for membership shall be admitted by adoption of a Resolution of the Board accepting the application for membership and incorporating the terms and conditions of membership.

Each membership application must be accompanied by a nonrefundable application fee based on the estimated cost of the audit and other costs related to the admission of a new Member or a request for new supply. The Board shall set the application fee for each applicant based on the estimated cost of processing the application, including the cost of the audit.

As a condition of membership, each new Member admitted to Cascade shall, in addition to any other applicable fees, rates, charges or assessments, pay to Cascade the membership fee, as established by the Board.

If an applicant's planning process or plans are materially out of compliance with the requirements of applicable state law, the Board may condition an offer of membership upon the applicant's compliance with that state law.

Section 3.3 Purposes. Cascade's purposes include those related to water resources, or any other utility service as allowed under the Act, as authorized by a unanimous vote of the Board, and do not include the provision of other general services to the public, and are to:

a. provide a safe, reliable and high quality drinking water supply to meet the current and projected demands of Cascade Members, and for non-Members as determined by Cascade, and to carry out this task in a coordinated, cost-effective, and environmentally sensitive manner;

b. develop, contract for, manage, acquire, own, maintain and operate Water Supply Assets, including without limitation, surface water supplies, groundwater supplies, reclaimed water supplies, and other water supply resources as determined by the Board;

c. purchase and provide water supply, transmission services, treatment facilities and other related services;

d. provide conservation programs to promote the wise and efficient use of resources;

e. carry out emergency water supply and shortage management programs for its Members when demands exceed available supply;

f. coordinate and plan cooperatively with other regional or local water utilities and other entities to maximize supply availability and to minimize system costs;

g. develop a Water Supply Plan addressing the needs of Cascade and its Members and Cascade itself and develop a regional water supply plan with other water providers as Cascade may find convenient or necessary to meet regional, state and federal planning requirements, and to take a leadership role in developing and coordinating those supply plans;

h. share costs and risks among Members commensurate with benefits received; and

i. carry out, or to further other water supply purposes that the Members determine, consistent with the provisions of this Agreement.

Section 3.4 Powers. To further its purposes, Cascade has the full power and authority to exercise all powers authorized or permitted under the Act and any other laws that are now, or in the future may be, applicable or available to Cascade and to engage in all activities incidental or conducive to fulfill the purposes set forth in Section 3.3 of this Agreement, including but not limited to the authority to:

a. acquire, construct, receive, own, manage, lease and sell real property, personal property, intangible property and other Water Supply Assets;

b. operate and maintain facilities;

c. enter into contracts;

d. administer personnel matters in a manner generally consistent with the laws applicable to a code city (population over 20,000), to the extent applicable and with discretion left to the Authority, to the fullest extent otherwise permitted by law, related to the appointment, removal and/or compensation of officers, the establishment and/or administration of employee health and welfare benefit programs, and/or the establishment and/or administration of civil service/merit systems, retirement benefits/systems, and/or pension benefits/systems;

e. sue and be sued;

f. exercise all powers of eminent domain granted under Chapter 8.12 RCW and other applicable statutes (e.g. Chapter 8.25) , now or as hereafter amended;

g. impose, alter, regulate, control and collect rates, charges, and assessments;

h. purchase and sell water and services within and outside the geographical boundaries of its Members;

i. borrow money (through its Members or other entities at their individual discretion or as authorized by the Act and this Agreement now or as hereafter amended), or enter into other financing arrangements;

j. lend money or provide services or facilities to any Member, other governmental water utilities, or governmental service providers;

k. invest its funds;

l. establish policies, guidelines, rules or regulations by either ByLaws or resolution to carry out its powers and responsibilities;

m. purchase insurance, including participation in pooled insurance and self-insurance programs, and indemnify its Members, its Board of Directors and Alternate Board Members, officers and employees in accordance with law;

n. exercise all other powers within the authority of, and that may be exercised individually by all of its Members with respect to water supply, conservation, reuse, treatment and transmission, or any of the other purposes set forth in Section 3.3;

o. exercise, without limitation, all other corporate powers that Cascade may exercise under the law relating to its formation and that are not inconsistent with this Agreement or the Act or other applicable law;

p. for the purposes of contracting and public works, exercise all powers of a code city (population over 20,000) under RCW 35A.40.200 - 35A.40.210, now or as hereafter amended;

q. for disposal of surplus property, exercise all powers granted under RCW 35A.11.010, now or as hereafter amended, to code cities;

r. in the event Cascade charges connection charges or Rates and Charges for services supplied or available to its customers' property on a retail basis, exercise all powers granted under RCW 57.08.081, now or as hereafter amended, for the establishment of liens; and

s. for purposes of a Cascade code of ethics, exercise all powers of a municipal corporation and observe the requirements under Chapter 42.23 RCW, now or as hereafter amended.

ARTICLE 4. Organization Structure; Board.

Section 4.1 Composition, ByLaws and Meetings. Cascade is governed by a Board of Directors consisting of one individual representative appointed by Resolution by each of the Member's legislative authority. Members may similarly appoint Alternate Board Members. Each Board Member and each Alternate Board Member must be an elected official of the Member.

The Board shall adopt ByLaws consistent with this Agreement that specify, among other matters, the month of Cascade's Annual Meeting, Board powers and duties and those of the Executive Committee, Standing Committees, Officers and employees.

The Board shall meet as required by the ByLaws, but not less than quarterly.

Section 4.2 Powers of the Board. The Board has the power to take all actions on Cascade's behalf in accordance with voting provisions set forth in Section 4.3. The Board may delegate or assign to the Executive Committee or to specific Cascade Officers or employees any action that is not expressly reserved to the Board under this Agreement.

Section 4.3 Voting. All Board actions must be approved by Dual Majority Vote of all Members, except where this Agreement requires either a 65% Dual Majority Vote, as provided in Sections 4.7, 5.5, 7.3, and 7.5; or ratification by the Members' legislative authority, as provided in Sections 9.3 and 9.4 and Article 10. The Board may act by voice votes, as set forth in the ByLaws. Any Member may require a recorded tabulation of votes either before or immediately after a voice vote is taken. Although voting is, in part, based on Weighted Vote, the Members expressly agree that there is only one class of voting membership, and voting occurs within that single class.

Any Member that has been declared to be in default of its obligations under this Agreement by the Board shall lose its right to vote until the Board has declared the default to be cured.

Section 4.4 Officers and Committees. Cascade Officers shall include a Chair, a Vice Chair, a Secretary, and a Treasurer. The Chair serves as the chair of the Board (and may be known as the "President", if the ByLaws so designate) and performs those duties set forth in the ByLaws.

The Vice Chair shall perform the duties of the Chair in the Chair's absence and shall perform other duties as set forth in the ByLaws. The Secretary shall be responsible for Cascade records and perform other duties as set forth in the ByLaws. The Treasurer shall be responsible for Cascade accounts and financial records and perform other duties as set forth in the ByLaws.

Consistent with the provisions of this Agreement, the Board may, in the ByLaws, establish additional Officers and set forth their duties.

The Board may create and appoint Members to Standing Committees and special committees as it deems appropriate. Committee Members need not be elected officials or employees of Members, but Standing Committee Chairs must be Board Members or Alternate Board Members.

Section 4.5 Executive Committee. The Chair, Vice Chair, Secretary, and Treasurer shall constitute Cascade's Executive Committee. The Chair (or acting Chair) shall vote on matters before the Executive Committee only if necessary to break a tie. The Executive Committee's duties and responsibilities are set forth in the ByLaws. The Executive Committee shall not have the power to:

a. approve any contract for a term longer than three (3) years;

b. approve any contract involving expenditure by, or revenue to Cascade in excess of such amounts and under such circumstances as set forth in the ByLaws;

c. retain or dismiss the chief executive officer or determine the chief executive officer's compensation; or

d. take any actions expressly reserved to the Board by this Agreement or the ByLaws.

The Executive Committee shall have the authority, if necessary, to avoid default on any Bond, to withdraw from any capital reserve fund or rate stabilization fund, an amount equal to the amount necessary to avoid a default and to authorize payment of that amount to avoid default.

Section 4.6 Staff, Consultants and Contractors. Cascade staff shall consist of a chief executive officer and other positions established by resolution of the Board. The Board shall appoint, designate the title of, and establish the compensation range of the chief executive officer. The Board shall hire auditors for Cascade. The chief executive officer may hire all other staff and consultants, and those appointments may be subject to ratification by the Board or the Executive Committee if the ByLaws so provide. The Board may also provide that administrative, professional or technical services be performed by contract.

Section 4.7 Budget; Dues; Financial Management. The Board shall approve a budget for each fiscal year, determining Cascade's revenues and expenditures no later than sixty (60) days before the beginning of the fiscal year in which that budget will be in effect. The budget shall be developed and approved according to a schedule established by the ByLaws. The budget must identify the levels of Member Charges on which revenue projections are based. The Board may amend the budget.

Each Member shall pay dues to defray part or all of Cascade's administrative costs based on the number of CERUs served by its water system, regardless of water usage or capacity, and regardless of whether those units are served by the Supply System or by Independent Supply. Total administrative dues collected from all Members may not exceed nine percent (9%) of Cascade's revenue requirement. This limit may be amended in the budget by a 65% Dual Majority Vote of the Board. The Board may establish minimum dues per Member and may provide that less than all of a Member's CERUs be taken into account in establishing dues.

All Cascade books and records shall be open to inspection by the Washington State Auditor.

The Board shall approve, by Resolution, the treasurer of Cascade, which may be the treasurer or chief finance officer of any Member, or the treasurer of any Washington county in which any Member is located; or, if the total number of utility customers of all of the Members of Cascade is greater than two thousand five hundred (2,500), the treasurer may be an officer or employee of Cascade (or as may be allowed by amendments to the Act).

ARTICLE 5. Asset Development and Supply Commitment.

Section 5.1 Property Acquisition, Ownership and Disposition. Cascade may construct, purchase, rent, lease, manage, contract for, or otherwise acquire and dispose of Water Supply Assets and

other assets. Cascade may control and manage both the assets it owns and the assets that are owned by Members that have transferred control and management of those assets to Cascade. This Agreement does not vest in Cascade any authority with respect to Members' other facilities or assets, such as Water Supply Assets retained by Members as Independent Supply.

Subject to Cascade's agreement, a Member may transfer to Cascade its title to, or operational control and management of Water Supply Assets. Water Supply Assets may also be fully retained by Members as Independent Supply, subject to the provisions of Article 6. At the discretion of the Board, Cascade may accept title to, or operational control and management of Water Supply Assets offered by Members or accept supply assets that constitute all or part of a Member's Satellite System(s). The Board may accept supply assets subject to the terms and conditions arranged between Cascade and the Member, based on the result of the audit process and mutual needs.

Cascade may enter into Asset Transfer Agreements which shall provide for the terms and conditions of: (a) Cascade's operation of the transferred Water Supply Asset with respect to the Member transferring the asset; (b) Cascade's operation, maintenance and replacement of the Water Supply Asset as part of the Supply System; (c) return or disposition of the Water Supply Asset if Cascade terminates its existence or the Member withdraws; (d) continuation of service (if appropriate) to Members or former Members by the Member receiving the Water Supply Asset at reasonable rates and charges or payment to Cascade of the cost of replacing the Water Supply Asset; and (e) such other conditions as the Board and the Member agree upon.

Subject to Cascade's agreement, a Member that transfers title or operation, control and/or management to Cascade of any Water Supply Asset shall be deemed to also transfer, assign and/or convey the franchises, if any, associated with that Water Supply Asset.

Members shall not be deemed to hold legal ownership rights in any Water Supply Assets owned by Cascade whether those Water Supply Assets have been developed by, purchased by, or transferred to Cascade, and regardless of the accounting treatment of RCFC payments and other payments made to Cascade.

Section 5.2 Supply Commitment

Section 5.2.1 Commitment to Members.. Beginning on the Cascade Supply Date, Cascade shall provide a Supply Commitment to each Member. Cascade shall provide a Full Supply Commitment to a Member that joins with Water Supply Assets sufficient to provide for its needs during the following fifteen (15) years (whether or not those Water Supply Assets are transferred to Cascade or retained as Independent Supply.)

Any Full Supply Commitment shall be subject to water shortages, to Cascade's ability to implement the Water Supply Plan, and to the portion of the Member's needs that can be served by the audited capacity of its Independent Supply. If the needed supply is not available, the shortage shall be shared by all the Members in accordance with Cascade's Shortage Management Plan, except as otherwise provided in Section 5.5. Cascade shall be obligated to provide water supply to the entire service area of each Member (as that service area is defined in terms under which the Member is admitted or as in the

Member's adopted and approved Water System Plan as of the Effective Date of this Agreement), whether or not some of that service area is within the Member's current jurisdictional boundaries and/or within the current urban growth boundary. Cascade is not obligated to provide water supply to service area expansions in or outside the urban growth boundary, unless Cascade agrees to such expanded service area. Cascade is not obligated to provide increased water supply to any Member if it is determined that the Member's planning process or plans are materially out of compliance with the requirements of applicable state law.

A Member that joins with Water Supply Assets insufficient to provide for its needs for fifteen (15) years receives the Full Supply it desires only if, when, and to the extent it is available within reliability standards determined by Cascade's system reliability methodology. If sufficient Full Supply is not available within reliability standards determined by Cascade's system reliability methodology, the Member receives partial Full or Interruptible Supply, and Full Supply must be provided within fifteen (15) years. Cascade shall then undertake to include in Cascade's Water Supply Plan, and to acquire the facilities or other assets necessary in the Board's determination to provide for the identified deficit. If Cascade fails to develop sufficient assets to timely provide the increased Full Supply, the commitment becomes a Full Supply Commitment at the end of that fifteen-(15) year period, and any shortage shall be shared by all Members in accordance with Cascade's Shortage Management Plan.

If multiple Members request new Full Supply, requests must be honored in the order received (i.e., in the order in which application is made accompanied by the application fee). With respect to new Members, requests for Full Supply "vest" no earlier than the date that membership is effective. In cases of conflict or ambiguity, the Board may determine the order of requests.

Section 5.2.2 Additional Rules for Members Retaining Independent Supply. Members are not required to share shortages resulting from the loss of all or part of Independent Supply, although Cascade may make Interruptible Supply available to a Member that loses Independent Supply at prices that are consistent with the price of Interruptible Supply being made available to others at that time. Cascade may at any time and at its cost and expense carry out audits of a Member's Independent Supply.

A Member requesting an additional Full Supply Commitment due to loss of Independent Supply shall make that request by Resolution of the requesting Member's legislative authority. When and as determined by the Board, the Member shall pay an amount equal to the RCFCs allocable to the number of CERUs that can be served by the replacement supply provided or to be provided by Cascade. Cascade shall then include the supply in its Water Supply Plan, and provide the supply when it becomes available, but in any event within fifteen (15) years. If, within fifteen (15) years the supply is not available, Cascade's commitment becomes a Full Supply Commitment and any shortage with respect to that supply must be shared by all the Members in accordance with the Shortage Management Plan, except as otherwise provided in Section 7.3.

Section 5.3 Financing of Assets. The acquisition of new capital facilities and other Water Supply Assets may be financed using RCFCs, transfers or Water Supply Assets, Rates and Charges, the issuance of revenue Bonds and such other sources as the Board may deem appropriate.

Section 5.3.1 Issuance of Bonds. An Authorized Issuer may issue Bonds payable from and secured solely by all or a portion of Net Cascade Revenue, evidencing indebtedness up to an amount approved by Resolution for the Board in order to provide financing or refinancing to acquire, construct, receive, own, manage, lease or sell real property, personal property, intangible property and other Water Supply Assets, to establish debt service reserves, to provide for capitalized interest and to pay the costs of issuance of, and other costs related to the issuance of the Bonds. Such Bonds shall be payable solely from all or a portion of the Net Cascade Revenue or (if the Authorized Issuer is other than Cascade) from payments to be made by Cascade out of all or a portion of Net Cascade Revenue, and such Bonds shall not pledge the full faith and credit or taxing power or, except as expressly provided by contract, the revenue, assets or funds of any Member.

Members serving as Authorized Issuers may conduct the financing through "separate systems" permitted by their applicable bond resolutions, or in some other appropriate manner, and Cascade may compensate those Members for all costs associated with the financing. Bond-related documents of Authorized Issuers other than Cascade must expressly permit the Bonds to be refunded or prepaid without penalty prior to their stated maturity, on and after such dates as are approved by the Authorized Issuer and the Board, to allow for a transfer of the obligation to Cascade or to Cascade's successor entity, including without limitation, a joint operating agency or similar entity, as may be permitted by law.

Section 5.3.2 Pledge of Revenues. For as long as any Bonds payable from Net Cascade Revenue (or any portion thereof) are outstanding, Cascade irrevocably pledges to establish, maintain and collect all Member Charges in amounts sufficient to pay when due the principal of and interest on the Bonds (and, if the Authorized Issuer is other than Cascade, in addition to the foregoing pledge, to pledge to make timely payments to that Authorized Issuer for the payment of principal of and interest on the Bonds), together with amounts sufficient to satisfy all debt service reserve requirements, debt service coverage requirements, and other covenants with respect to the Bonds.

Each Member hereby irrevocably covenants that it shall establish, maintain and collect rates, fees or other charges for water and other services, facilities and commodities related to the water supply it receives from Cascade and/or its water utility at levels adequate to provide revenues sufficient to enable the Member to: (a) make the payment required to be made under this Agreement; and (b) pay or provide for payment of all other charges and obligations payable from or constituting a charge or lien upon such revenues. Each Member hereby acknowledges that this covenant and its covenant in Section 7.9 of this Agreement may be relied upon by Bond owners, consistent with this Agreement.

Each Member shall pay the Member Charges imposed on it whether or not the Water Supply Assets to be financed through the issuance of Bonds are completed, operable or operating, and notwithstanding the suspension, interruption, interference, reduction or curtailment in the operation of any Water Supply Assets for any reason whatsoever, in whole or in part. Member Charges shall not be subject to any reduction, whether by offset or otherwise, and shall not be conditioned upon the performance or nonperformance of any Member, or of any entity under this or any other agreement or instrument. However, credits against future RCFCs and Rates and Charges described in Sections 5.5 and 7.5, respectively, for development or addition of excess capacity that is either transferred to Cascade or

retained as Independent Supply, shall not be considered "offsets" or "reductions" for the purposes of this Section.

If, in connection with the issuance of obligations, any Member establishes a new lien position on revenues relating to its water utility, that Member shall covenant in the relevant documents that the amounts to be paid to Cascade as Member Charges shall be treated either: (a) as part of that Member's internal operation and maintenance costs payable prior to debt service on those obligations; and/or (b) for any portion of those Member Charges that is allocable to capital costs, as a contract resource obligation payable prior to debt service on those obligations. If any Member has existing outstanding revenue obligations relating to its water utility, it shall include substantially similar "springing covenants" in the documents relating to any new parity obligations.

Section 5.3.3 Continuing Disclosure. To meet the requirements of United States Securities and Exchange Commission ("SEC") Rule 15c2-12(b)(5) (the "Rule") as applicable to a participating underwriter for any Bonds and any obligation of each Member as an "Obligated Person" under the Rule, Cascade and each Member agree to make an appropriate written undertaking, respectively, for the benefit of holders of the Bonds consistent with the requirements of the Rule.

Section 5.3.4 Preservation of Tax Exemption for Interest on the Bonds. Each Member covenants that it will take all actions necessary to prevent interest on tax-exempt Bonds from being included in gross income for federal income tax purposes, and it will neither take any action nor make or permit any use of proceeds of tax-exempt Bonds or other funds treated as proceeds of those Bonds at any time during the term of those Bonds that will cause interest on those Bonds to be included in gross income for federal income tax purposes.

Section 5.3.5 Additional Certificates. Each Member further agrees to provide such certificates or verifications as are reasonably requested by an Authorized Issuer in connection with the issuance of Bonds under this Section.

Section 5.4 Supply System-Development. Cascade must provide for Supply System development to meet the needs of additional water customers of Members, subject to consistency with applicable state law, Cascade's Water Supply Plan, orderly asset development, reasonable cost and financing capacity. The Board shall establish a water supply development process, including criteria governing the evaluation of new projects, and that process must promote equality of costs and services (other than direct local services), regardless of geographic location. The results of the water supply planning process must be reflected in Cascade's Water Supply Plan. The Board shall have the authority to undertake new projects identified in Cascade's Water Supply Plan for the expansion of Water Supply Assets and regional transmission system extensions to meet Members' projected needs. To reduce costs, Cascade may, to the extent that the Board deems advisable, enter into agreements with Members to wheel water through their existing systems. When facilities are constructed that are used partially by Cascade for wheeling water and partially by Members or other entities for their purposes, the Board may determine an appropriate Cascade contribution to the cost of those facilities. Existing arrangements

among Members (and between Members and Non-Members), in place when a Member joins Cascade, remain unaffected except as otherwise agreed between Cascade and the other entities concerned.

Section 5.5 Regional Capital Facilities Charges. To allocate growth costs to those Members that require capacity increases, each Member shall pay to Cascade an RCFC for each new CERU connected to its water distribution system. Growth in water usage by existing CERUs is not subject to RCFCs unless that growth constitutes a CERU increase as provided in the RCFC Methodology. Members with a supply deficit must pay an RCFC commensurate with that deficit. To the extent that a Member transfers to Cascade or retains an Independent Supply water supply in excess of its needs, it receives a corresponding credit against future RCFCs.

A new Member with adequate supply shall commence paying RCFCs fifteen (15) years prior to the date that its Water Supply Assets are projected to be insufficient to provide for its needs as determined by the Board (taking into consideration the results of the Water Supply Audit).

A Member that joins with Water Supply Assets that are projected to be insufficient to provide for its needs for fifteen (15) years shall immediately pay RCFCs for the number of CERUs representing the deficit as determined by the Board.

RCFCs shall be calculated according to the RCFC Methodology, which shall define the analytical steps required to calculate the RCFCs according to the average unit cost of past construction of the existing system plus the Supply System improvements planned at the time of the calculation. The methodology shall provide for an annual escalator, recalculation and update not less frequently than every fifth year, and a methodology for determining CERUs. The RCFCs shall be imposed on the Member for each new CERU of that Member in accordance with the terms of this Agreement. Amendments to the RCFC Methodology shall require a 65% Dual Majority Vote.

If a Member owns Water Supply Assets or transfers Water Supply Assets to Cascade under Section 5.1, to the extent the audited capacity of those assets exceeds the Member's needs, that Member shall receive a credit against future RCFCs. If a Member seeks to transfer assets substantially in excess of its foreseeable needs, Cascade may negotiate appropriate compensation arrangements for the transfer.

Members that develop new Independent Supply that is approved by the Board in accordance with Article 6, similarly receive a credit effective when the Independent Supply is placed in service as determined by the Board.

A Member that accepts ownership of a Satellite System that Cascade agrees to serve shall pay an RCFC for the amount of supply needed to serve that system in excess of its rated capacity.

Members that experience a net reduction in the number of CERUs served shall receive a CERU-for-CERU credit against future RCFCs.

RCFC credits may not be transferred among Members without Board approval.

Members shall not be required to pass RCFCs to their customers as capital facilities charges, but may provide for the payment of RCFCs in whatever manner they deem appropriate.

For Members joining with an unmet net supply need, Cascade may, under circumstances determined by the Board, require the prepayment of RCFCs allocable to the full amount of the requested supply, e.g., when funds are needed to begin the construction of facilities immediately.

Section 5.6 Transfer Upon Mergers, Consolidations and Assumptions. If: (a) two or more Members merge or consolidate; (b) a Member or a Non-Member assumes jurisdiction of part or all of a Member; or (c) a Member assumes jurisdiction of part or all of a Non-Member, the jurisdictions' water supply rights from and obligations to Cascade shall be transferred or assumed under applicable law and consistent with the requirements of this Agreement and the obligations of Cascade.

ARTICLE 6. New Independent Supply.

Members may not bring new Water Supply Assets on-line as Independent Supply without Board approval. That approval may be granted or denied following an evaluation process, based on whether the Board determines that development of the proposed Independent Supply will benefit or be adverse to the interests of the Members as a whole. Recognizing that in certain circumstances the acquisition of additional Independent Supply might benefit (or cause no material harm to) the Members, new supplies under one (1) MGD may be approved by the Board regardless of the provisions of the Water Supply Plan and without a formal evaluation process. New supplies in amounts greater than one (1) MGD must be described in and be consistent with the Water Supply Plan.

Members that have invested in the development of new Independent Supply assets may offer to sell their interest in such assets to Cascade. Cascade may, in its sole discretion and subject to mutually agreeable terms and conditions, purchase the Member's interest in such Independent Supply asset by reimbursing or otherwise compensating the Member for its investment in the project to the extent that investment has been capitalized. Once Cascade has purchased a Member's interest in a project, the project will be considered a Water Supply Asset of Cascade and will be incorporated into the Water Supply Plan.

ARTICLE 7. Asset Management.

Section 7.1 Supply System Management. Cascade is responsible for managing, on behalf of all Members, the Supply System. Cascade is not responsible for managing Independent Supply unless it has expressly agreed to do so. Supply System management responsibilities shall be governed by Cascade's system management plan adopted by the Board. Cascade's system management plan concerns, without limitation, matters such as daily system operations and maintenance, interface with other supply providers, contractual obligations, water quality, billing, management and administration. Cascade may delegate and/or contract out its Supply System responsibilities.

Cascade must manage the Supply System in compliance with applicable laws, regulation, and Cascade's minimum service standards.

Section 7.2 Conservation. Cascade shall develop and carry out, and Members must participate in, water conservation programs that are uniform among Members. The Board shall develop

and implement a Cascade conservation management plan that provides a mandatory base conservation program that functions to reduce both average and peak demands and may establish a charge or assessment to fund development and implementation of the program. Members may implement additional conservation programs. The Board may adopt wholesale charges in addition to normal Demand Share charges to encourage resource conservation. The Board may also provide or contribute to additional local conservation programs that are not offered to all Members, and these local programs may be locally funded or funded by Cascade. Members that fail to comply with base programs as set forth in Cascade's conservation management plan may be required to assume a disproportionate reduction in water supply or to pay penalty charges, or both.

Section 7.3 Shortages and Emergency.

Section 7.3.1 Shortages. Members must respond to water shortages in a collective, shared fashion under a Cascade Shortage Management Plan adopted by the Board. Resources must be shared in a manner that reduces the risk of severe shortages to each Member. Cascade's Shortage Management Plan may include without limitation, a definition and classification of shortages, a shortage contingency plan including mandatory programmatic actions among all Members in the event of shortages, allocation of authority for determining and responding to shortages, and a communications and outreach program for the public. Members shall not be required to implement Cascade's Shortage Management Plan in areas not served by the Supply System.

In the event of shortages, Cascade shall reduce or halt Interruptible Supply before invoking the Shortage Management Plan with respect to all Members with a Full Supply Commitment. However, the Board may, by 65% Dual Majority Vote, continue service in the amounts it deems appropriate to one or more Members receiving Interruptible Supply.

The Board may require that Members failing to comply with mandatory shortage management programs implemented under Cascade's Shortage Management Plan assume a disproportionate reduction in supply or pay penalty charges, or both.

In the event of a Cascade-wide water shortage, Members with Independent Supply may, without penalty, decline to participate in the shortage management program for that shortage by foregoing all supply from Cascade for the duration of the emergency or shortage.

To avoid shortages resulting from emergencies or the inability to develop sufficient supplies, the Board may, by 65% Dual Majority Vote, establish moratoria on connections or additional commitments for future water services by the Members. A moratorium may be discontinued by a Dual Majority Vote of the Board.

Section 7.3.2. Emergency. The Board shall include in Cascade's Shortage Management Plan policies and procedures for addressing short-term disruptions of water supply, transmission or water quality, and it may delegate to the chief executive officer authority to address such disruptions according to such policies and procedures.

Section 7.4 Water Quality.

In addition to agreements under 5.1 of this Agreement,-Cascade shall be responsible for water quality that meets or exceeds all federal or state requirements at the point of delivery from Cascade to the Member, consistent with applicable laws and regulations. Cascade assumes source water quality responsibility and liability with respect to Water Supply Assets under its ownership or control (including water wheeled to a Member through another Member's facilities). Cascade is also responsible for preparing and carrying out water quality activities compatible with the water quality requirements of regional water suppliers integrated with Cascade's system (e.g., Tacoma, Everett, and Seattle).

Cascade may, in its sole discretion, determine and adjust the appropriate method and level of treatment of water that it supplies, so long as that water meets applicable state and federal requirements. If water that it supplies meets those requirements, Cascade shall not be obligated to adjust the method or level of treatment so that the water can be more readily blended with a Member's Independent Supply or more readily transmitted through a Member's internal system. Each Member shall remain responsible for water quality within its respective distribution system, assuming that adequate water supply quality is provided by Cascade at the point of delivery from Cascade.

Each Member shall be responsible for all costs related to making water supplied by Cascade compatible with that Member's internal system, including but not limited to, costs of additional treatment.

Section 7.5 Water Supply Rates and Charges. The Board shall set Rates and Charges according to a Rate Calculation Methodology adopted from time to time by the Board. The Rate Calculation Methodology for Members' Supply Commitment shall provide for the definition and calculation of Demand Shares and for a uniform pricing structure with a commodity charge and fixed charges allocated by Demand Share.

Cascade may sell water to a Non-Member under terms and conditions established by a 65% Dual Majority Vote of the Board. Revenue received from the sale of water to Non-Members shall be used to offset or reduce Rates and Charges to Members to the extent practicable, except that such revenue need not be treated as reducing or offsetting those amounts that are necessary for the payment of debt service on Bonds and for the provision of reserve and coverage requirements for the Bonds.

A Member shall be assigned a Demand Share based on the Board's best estimate of capacity to be used by that Member. The Demand Share shall be established based on an audit of that Member's past three (3) years of water use. After three (3) years as a Member, the baseline demand and capacity obligation for that Member shall be fixed based on actual experience as a Member. A specific Demand Share may be set by the Board to account for circumstances, such as (by way of example and not by limitation) costs of extending the Supply System to a Member, or when Independent Supplies affect regional demand patterns. When water supply from Cascade is wheeled through a Member to another Member, Cascade may presume that the first Member receiving the water is the "User" for calculation of Demand Shares unless the Members concerned instruct Cascade to use a different allocation. Rate credits for Water Supply Asset transfers are not deducted in the calculation of Demand Shares but are applied to reduce what a Member would otherwise pay.

The Board must set Member Charges at levels it determines to be sufficient, together with other available revenue sources, to provide adequately for Operation and Maintenance Costs, Bond debt service, coverage and other covenants, replacement and renewal of facilities, reserve, and other costs that the Board deems appropriate. The Board may provide that a Member's failure to participate in the planning process may result in penalty charges.

A Member that has transferred Water Supply Assets shall receive a credit, determined when those assets are audited and transferred, based on the useful life of those facilities and on the Member's use of the water produced by those assets or an amount of water equivalent to the amount of supply from them.

The Board may implement wholesale charges (additional to Demand Share-based charges and variable commodity charges) to reduce extreme peak use (e.g., "peaking-off of the pipe").

Water Rates and Charges must be the same for all Members receiving the same class of service (subject to credits, surcharges and penalty charges).

Section 7.6 Franchises and Easements. Except to the extent otherwise required by state law, each Member shall provide franchises and rights of way on, under or across that Member's streets or other property, to Cascade and to other Members for Water Supply Assets, without charging any fees, rent or charges other than the customary and usual right-of-way permit and inspection fees.

Section 7.7 Sales of Water to Non-Members. Unless approved by the Board, a Member shall not sell water supplied by Cascade, nor shall a Member sell Independent Supply offset by water supplied by Cascade to a Non-Member. Notwithstanding the foregoing, any Member may sell water supplied by Cascade to a Non-Member to the extent required by a contract in effect as of the date the Member joins Cascade.

Section 7.8 Payment Procedures; Default; Step-Up Provisions.

Section 7.8.1 Invoice and Payment.

(a) Cascade shall provide each Member with periodic invoices showing the Member Charges payable by that Member for the billing period and the due date. Invoices shall be provided monthly or on other such periodic schedule as determined by the Board, but no more frequently than monthly nor less frequently than once every six months. The Board will determine a due date for all invoices.

(b) Payment of any and all invoices shall be due and payable on or before the due date, and shall be made by wire transfer or such other means as are agreed to by Cascade and the Member. If a treasurer, trustee, fiscal agent or escrow agent is appointed in connection with the issuance of Bonds, Cascade may require, and specify on the invoice, that certain amounts be provided directly to that person or entity, and the Member shall pay those amounts in the manner and to the person so specified.

(c) If full payment of any invoice is not received on or before the due date, such payment shall be considered past due and a late payment charge shall accrue for each day that the invoice remains unpaid. The late payment charge shall equal the product of the unpaid amount and an interest rate

established by the Board. Late payment charges shall continue to accumulate until the unpaid amount of the invoice and all late payment charges are paid in full. Further, if an invoice or any portion thereof remains unpaid for more than sixty (60) days after the due date, Cascade may pursue any legally available remedy at law or equity for the unpaid amount, including without limitation, specific performance and collection of the late payment charge. Cascade's right to enforce payments in this regard may be assigned to a treasurer, trustee, credit enhancement provider or other entity. Furthermore, upon written notice, Cascade may reduce or suspend delivery of water until the invoice and late payment charges are paid.

(d) If any Member disputes all or any portion of an invoice, it shall notify Cascade immediately upon receipt. If Cascade does not concur, the Member shall remit payment of the invoice in full, accompanied by written notice to Cascade indicating the portions of the invoice that the Member disputes and the reasons for the dispute. The Member and Cascade shall make a good faith effort to resolve such dispute. If the Member fails to remit payment of the invoice in full pending resolution of the dispute, the prevailing party in an action relating to the collection of that invoice shall be entitled to reasonable attorney fees and costs.

Section 7.8.2 Default and Step-Up.

(a) If any Member fails to make any payment in full for more than fifty (50) days past the due date, Cascade shall make written demand upon that Member to make payment in full within ten (10) days of the date that the written demand is sent by Cascade. If the failure to pay is not cured within the ten (10) day period, the Member shall be deemed to be in default.

(b) Upon an event of default as described in subsection 7.8.2(a), the other Members shall pay Cascade (in addition to Member Charges otherwise due) the defaulting Member's Member Charges in proportion to each remaining Members' Demand Share in accordance with a schedule established by Resolution of the Board.

(c) The payment of a proportionate share of the existing defaulted Member's Member Charges by Members shall not relieve the defaulting Member of its liability for those payments. Cascade shall have a right of recovery from the defaulting Member on behalf of each Member. Cascade may commence such suits, actions or proceedings at law or in equity, including but not limited to, suits for specific performance, as may be necessary or appropriate to enforce the obligations of this Agreement against any defaulting Member. Cascade's right to enforce payments in this regard may be assigned to a treasurer, trustee, credit enhancement provider or other entity. Amounts recovered by Cascade as payment of amounts due shall be passed through to each Member in proportion to the share that each assumed, in cash or in credit, against future Member Charges as the Board shall determine.

(d) The prevailing party in any such suit, action or proceeding, shall be entitled to recover its reasonable attorney fees and costs.

ARTICLE 8. Planning.

Section 8.1 Water Supply Plan. Cascade must plan for its Members' water supply needs. That planning shall be compatible with the equivalent planning responsibilities of other wholesale water

providers and with state, county and city planning responsibilities under state law. The Board must adopt, and may from time to time amend, a Water Supply Plan that must be based on no less than a twenty- (20) year planning horizon. Cascade shall coordinate its planning effort with local and regional utilities and other appropriate agencies and work to encourage cooperative region-wide planning and coordination.

Each Member shall actively participate in Cascade's water supply planning and shall provide to Cascade accurate data regarding its facilities and operations together with good faith estimates of future needs and a description of any involvement in the development of new Independent Supplies. Each Member's water comprehensive or system plan shall be consistent with any plans adopted by Cascade, and shall be consistent with applicable requirements of state law and comprehensive plans.

Section 8.2 Watershed Management Plan. Upon the effective date of formation of the Authority under Article 3 of this Agreement, Cascade will no longer be a Watershed Partnership under RCW 39.34; and any Watershed Management Plans existing on the effective date shall become the plans of the Authority. Nothing herein shall limit Cascade's powers to adopt Watershed Management Plans or to enter into interlocal agreements thereafter.

Section 8.3 System Reliability Methodology. Cascade shall develop and adopt a system reliability methodology for planning, operation, and management purposes.

ARTICLE 9. Duration and Dissolution; Withdrawal.

Section 9.1 Duration. Except as provided in Section 9.3, Cascade shall remain in existence for the longer of the following: (a) the period it holds any assets; (b) the period during which Bonds are outstanding; or (c) the period it continues to include Members.

Section 9.2 Withdrawals. A Member may notify Cascade of its intent to withdraw by delivery to Cascade of a Resolution of its legislative authority expressing such intent. Upon receipt of such Resolution, the Member shall lose its right to vote and the Board shall determine (a) the withdrawing Member's allocable share of the cost of the then-existing obligations of Cascade; and (b) the withdrawing Member's obligations to Cascade. "Then-existing obligations of Cascade" means obligations or costs incurred by Cascade as of the date the Member's withdrawal notice is received, including but not limited to, Bond obligations, contract obligations, and cash financed capital projects; provided that a withdrawing Member's allocable share shall in no event include an obligation for future expenses for which Cascade has not incurred a legal obligation; and provided further, that to the extent the Member's obligation (with respect to such costs) is re-paid over time, the Member shall be entitled to a credit for supply abandoned by the Member and is otherwise used by Cascade. A "withdrawing Member's obligation to Cascade" includes but is not limited to, the Member's share of fixed operating costs, any other expenses contained in Cascade's adopted budget for that year, and any assessments or other similar charges lawfully imposed by Cascade. For purposes of the preceding sentence, "fixed operating costs" shall be determined in the year of withdrawal, and the Member's obligation with respect to such costs shall be limited only to that amount required to pay for supply abandoned by the Member and not otherwise used by Cascade.

The allocable share of cost or obligations shall be determined by the Board, taking into consideration as deemed applicable by the Board: (a) the ratio of the Member's Demand Share to total Member demand; (b) the ratio of the Member's contribution to Cascade revenue to total Cascade revenue including RCFCs; (c) the cost or a portion of the cost of capital projects or facilities specially benefiting the Member; and (d) and any other factor the Board deems appropriate to consider. The Member's withdrawal shall be effective on payment of such allocable share or provision for arrangements to pay such allocable share that are satisfactory to the Board. Until the effective date of withdrawal, the Member shall continue to comply with all applicable provisions of this Agreement.

Upon withdrawal, except as provided in an Asset Transfer Agreement, the withdrawing Member shall have no right to, or interest in any Water Supply Assets owned by Cascade. The withdrawing Member shall be deemed to have abandoned any and all rights to service, to the use of Cascade Water Supply Assets or other rights with respect to Cascade (except as otherwise expressly provided in this Agreement).

Notwithstanding the provisions of this Section 9.2, Cascade will, upon the withdrawal of a Member that has transferred operational control and management of (but not title to) an Independent Supply Asset to Cascade under Section 5.1, return operational control of such asset to the withdrawing Member. Return of operational control and management will be subject to: (a) continued use by Cascade, to the extent and for such time as the Board deems such use necessary for Cascade to continue providing service to its Members; and (b) payment or provision for payment of any Cascade costs, including but not limited to, those associated with the withdrawing Member's Independent Supply Asset.

The Board may establish additional generally applicable conditions and requirements for withdrawal.

Section 9.3 Disincorporation. Cascade may vote by a 65% Dual Majority Vote (as ratified within one hundred and twenty (120) days of such Dual Majority Vote by 65% Dual Majority of the Members' legislative authorities), to disincorporate. Upon disincorporation except as provided in an Asset Transfer Agreement, Cascade's assets initially shall be held by its then current Members as tenants in common. Each Member's ownership interest must be based on that Member's Demand Share as of the time of the dissolution. Cascade's liabilities (including Bonds and other contractual obligations) initially shall be distributed based on Members Demand Shares as of the time of the disincorporation. Assets and liabilities must be distributed in accordance with agreement or contract, under a voluntary mediation process, or by a court of law. A court may appoint an arbitrator or special master. Distribution shall be based on the best interests of efficient and economic water supply in the entire area served by the Members, subject to a rebuttable presumption that Water Supply Assets will be returned to the Member that originally transferred them to Cascade. That presumption may be overcome by a showing that another asset distribution is in the best interests of efficient and economic water supply. The proceeds of any sale of assets must be distributed among the then current Members based on the Demand Shares at the time of disincorporation.

Section 9.4 Successor Entity. Notwithstanding the provisions of Section 9.3, upon a 65% Dual Majority Vote of the Board (as ratified within one hundred and twenty (120) days of such Dual Majority Vote by 65% Dual Majority of the Members' legislative authorities), all assets, liabilities, and obligations of Cascade may be transferred to any successor entity (including without limitation, a joint operating agency or other municipal corporation, as permitted under state law), and all obligations of Members and parties contracting with Cascade become obligations to the successor entity.

ARTICLE 10. Amendments.

Amendments to this Agreement shall be effective upon approval by 65% Dual Majority Vote of the Board (as ratified within one hundred and twenty (120) days by 65% Dual Majority of the Members' legislative authorities).

ARTICLE 11. Applicable Law and Venue.

This Agreement is governed by the laws of the state of Washington. The venue for any legal action arising from a dispute under this Agreement is the Superior Court for King County.

ARTICLE 12. No Third Party Beneficiaries.

There are no third party beneficiaries to this Agreement except for the rights of Bond owners as provided in Section 5.3.2, no person or entity other than an agency signatory to this Agreement shall have any rights hereunder or any authority to enforce its provisions, and any such rights or enforcement must be consistent with and subject to the terms of this Agreement.

ARTICLE 13. Severability.

If any provision of this Agreement or its application is held by a court of competent jurisdiction to be illegal, invalid, or void, the validity of the remaining provisions of this Agreement or its application to other entities or circumstances shall not be affected. The remaining provisions continue in full force and effect, and the parties' rights and obligations must be construed and enforced as if the Agreement did not contain the particular invalid provision. But if the invalid provision or its application is found by a court of competent jurisdiction to be substantive and to render performance of the remaining provisions unworkable and infeasible, is found to seriously affect the consideration, and is inseparably connected to the remainder of the Agreement, the entire Agreement is deemed void.

ARTICLE 14. Entire Agreement.

This Agreement constitutes the entire and exclusive agreement between the parties relating to the specific matters covered in this Agreement. All prior or contemporaneous verbal or written agreements, understandings, representations or practices relative to the foregoing are superseded, revoked and rendered ineffective for any purpose. This Agreement may be altered, amended or revoked only as set forth in Article 10. No verbal agreement or implied covenant may be held to vary the terms of this Agreement, any statute, law, or custom to the contrary notwithstanding.

CASCADE WATER ALLIANCE

By: John Marchione
John Marchione

Title: Title Chair Date: April 10, 2012.

Attest: Chuck Clarke
Chuck Clarke

Title: Chief Executive Officer Date: April 10, 2012

Authorized by: Resolution No. 2012-06

Date: 3-28-2012

ARTICLE 15. Execution

This Agreement may be executed in one or more counterparts.

SIGNATORY AGENCY

CITY OF BELLEVUE

By: Brad Miyake

Title Deputy City Mgr Date: 6-6, 2012

Attest: Lori McCune

Title: Contract Admin Date: 6-6, 2012

Authorized by (Resolution or Ordinance): 8408

Date: 6/04/12, 2012

SIGNATORY AGENCY

CITY OF ISSAQUAH

By: Ava Frisinger

Title Mayor Date: 7.3, 2012

Attest: Original Mar

Title: City Clerk Date: 7.10.~~20~~ 2012

Authorized by (Resolution or Ordinance): AB 6396

Date: June 4, 2012

R-4924
Exhibit A

SIGNATORY AGENCY

CITY OF KIRKLAND

By: Marilynne Beard

Title Assistant City Manager Date: June 18, 2012

Attest: Kathi Anderson

Title: City Clerk Date: 6-18, 2012

Authorized by (Resolution or Ordinance): R 4924

Date: June 5, 2012

SIGNATORY AGENCY

CITY OF REDMOND

By: Mike Ball for John Marchione

Title Mayor Date: July 5, 2012

Attest: Cmcadm

Title: Deputy City Clerk Date: July 5, 2012

Authorized by (Resolution or Ordinance): AM No. 12-091

Date: June 5, 2012

SIGNATORY AGENCY

CITY OF TUKWILA

By: CAST PSG Jim Haggerton

Title Mayor Date: July 3, 2012

Attest: Melissa Hurt

Title: Deputy City Clerk Date: July 3, 2012

Authorized by (Resolution or Ordinance): Resolution NO. 1771

Date: July 2, 2012

SIGNATORY AGENCY

SAMMAMISH PLATEAU WATER & SEWER DISTRICT

By: _____

Title President Date: 6/18, 2012

Attest: _____

Title: Secretary Date: 6/18/12, 2012

Authorized by (Resolution or Ordinance): 4/61

Date: June 18, 2012

SIGNATORY AGENCY

SKYWAY W&S DISTRICT

By: Jon L. Cust

Title President Date: 6-26, 2012

Attest: Cheryl Scheuerman

Title: General Manager Date: 6/26, 2012

Authorized by (Resolution or Ordinance): 12-07-488

Date: June 12, 2012

APPENDIX B

Seattle Declining Block Contract – Amended 2008

AMENDED AND RESTATED

50-YEAR DECLINING BLOCK

WATER SUPPLY AGREEMENT BETWEEN

THE CITY OF SEATTLE

AND

THE CASCADE WATER ALLIANCE

December 17, 2008

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LIST OF SECTIONS

LIST OF EXHIBITS

AMENDED AND RESTATED
50-YEAR DECLINING BLOCK
WATER SUPPLY AGREEMENT BETWEEN
THE CITY OF SEATTLE
AND
THE CASCADE WATER ALLIANCE

This amendment to and restatement of the 50-Year Declining Block Water Supply Agreement between the City of Seattle, a municipal corporation ("Seattle"), and the Cascade Water Alliance, a non-profit organization of municipalities formed under authority of Chapter 39.30 RCW ("Cascade"), is dated and effective this 1st day of January, 2009.

Whereas, Seattle is a regional water supplier currently providing service to numerous water utilities in King County Washington; and

Whereas, the Cascade Water Alliance was formed for the purpose of providing water supply to its Members; and

Whereas, in 2004, the Cascade Water Alliance and Seattle entered into a single 50 year Declining Block Water Supply Agreement; and

Whereas, the Cascade Water Alliance and Seattle desire to amend the 2004 Declining Block Water Supply Agreement to increase the block of water available for purchase by Cascade for its Members through December 31, 2023; and

Now therefore, Seattle and Cascade agree to the following terms and conditions for the provision and purchase of a 50-year declining block water supply.

ARTICLE I - AGREEMENT

Seattle agrees to sell to Cascade and Cascade agrees to purchase from Seattle, according to the terms of this Agreement, a wholesale supply of water and the transmission capacity sufficient to deliver such water supply to Cascade.

The term of this Agreement is fifty (50) years, with an effective date of January 1, 2004 and a termination date of December 31, 2053.

Apart from the contract right to purchase water from Seattle under the terms of this Agreement, neither Cascade nor any Cascade Member has any right or claim to the Seattle Water System, the Cedar and Tolt Rivers and to the Highline Well Fields, or to any other water right or claim held by Seattle. Likewise, Seattle shall have no right or claim to the Cascade Water System or to any groundwater right or claim held by any Cascade Member, or to any future source of supply developed by Cascade or by any of its Members. At the termination of this Agreement, Seattle shall have no further obligation to supply Cascade or any Cascade Member with water, with the exception of Cascade's right to purchase up to 5.3 MGD as set forth in Section 3.5.

ARTICLE II - DEFINITIONS

Average Daily Demand ("ADD"). The amount of water supplied by the Seattle Water System to Cascade in a calendar year divided by the number of days in that calendar year.

AWWA. American Water Works Association.

Base Block. The amount of water Seattle commits to supply Cascade beginning on January 1, 2004 through the termination date of this Agreement, as specifically scheduled in Section 3.4 A.

Cascade Block. The total amount of water Seattle commits to supply Cascade under this Agreement, composed of the Base Block and the Supplemental Block, as more fully expressed in Article III.

Cascade Member. A municipal water supplier that has entered into a Membership Agreement with the Cascade Water Alliance.

Cascade Sub-regional System. Seattle Transmission assets serving Cascade Members as listed in Exhibit VII.

Cascade Volume Charge. In any year, the Cascade Volume Charge is the average cost to Cascade of each million gallons of water in the Base Block. The Cascade Volume Charge shall be calculated by dividing the projected annual cost of the Base Block calculated in accordance with Section 8.10.B, by the product of the Base Block and 365.

Cascade Water System. Tangible and intangible assets owned or operated by Cascade useable in connection with the provision of water supply.

Existing Supply System Facilities. Seattle Supply System assets as listed in Exhibit IV.

Existing Transmission System Facilities. Seattle Transmission System assets as listed in Exhibit V.

Firm Yield. The estimated amount of water that Seattle's Supply System can provide according to Seattle's supply reliability standard and expressed in annual average MGD. For purposes of this contract, Seattle's Firm Yield is 171 MGD, unless modified pursuant to Section 3.2.

Management Agreement. A written agreement, pertaining to subjects authorized by this Agreement, between the Director, Seattle Public Utilities, and the General Manager, Cascade Water Alliance.

MGD. Million gallons per day.

Party (ies). Seattle and/or Cascade, as well as their respective successors and assigns.

Peak Month. The consecutive thirty- (30) day period during a calendar year in which Cascade puts its maximum demand upon the Seattle Water System.

Peak Month Factor. Average Daily Demand multiplied by 1.69

Peak Season. June 1 through September 30.

Peak Season Factor. Average Daily Demand multiplied by 1.35

Points of Delivery. Specific metered delivery locations at which Seattle provides a defined level of service.

Rate of Return on Investment. The average cost of debt of the Seattle Water System plus 1.5 percent.

Seattle Water System. The Seattle Supply System as listed in Exhibit IV and the Seattle Transmission System as listed in Exhibit V together comprise the Seattle Water System.

Sub-regional Facilities. Any facilities owned and operated by Seattle that are not identified as Existing Supply System (Exhibit IV), Existing Transmission System (Exhibit V), or Cascade Sub-regional System (Exhibit VII).

Supplemental Block. The amount of water Seattle commits to supply Cascade beginning on January 1, 2009 through December 31, 2023, as specifically scheduled in Section 3.4 B.

ARTICLE III - SUPPLY

3.1 A. Each calendar year from the effective date of this Agreement Seattle shall make available to Cascade the Base Block, according to the schedule set forth in Section 3.4.A.

B. Each calendar year commencing January 1, 2009 and terminating on December 31, 2023, Seattle shall make available to Cascade the Supplemental Block, according to the schedule set forth in Section 3.4.B.

3.2 In the event the Firm Yield of the Seattle Supply System is reduced, the Cascade Block will be reduced in proportion to such reduction in Firm Yield only if the Firm Yield is reduced by order of a State or Federal regulatory agency with appropriate jurisdiction or as the result of updated climatic data utilized in the hydraulic model used to calculate Firm Yield. Cascade shall be notified of any potential change in Firm Yield as far in advance as possible, but in no event less than 180 days prior to the effective date of an adjustment to Firm Yield that affects the Cascade Block.

3.3 Seattle will supply the Cascade Block during the Peak Season and Peak Month as follows below and will be adjusted proportionately in relation to the decreases identified in Section 3.4:

A. During the Peak Season, Seattle shall make available the Cascade Block multiplied by the Peak Season Factor.

B. During the Peak Month, Seattle shall make available the Cascade Block multiplied by the Peak Month Factor.

3.4

A. The Base Block shall be supplied in accordance with the following schedule:
   1. Beginning January 1, 2004 through December 31, 2023, Seattle shall make available to Cascade 30.3 MGD Average Daily Demand;
   2. Beginning January 1, 2024 through December 31, 2029, Seattle shall make available to Cascade 25.3 MGD Average Daily Demand;
   3. Beginning January 1, 2030 through December 31, 2034, Seattle shall make available to Cascade 20.3 MGD Average Daily Demand;
   4. Beginning January 1, 2035 through December 31, 2039, Seattle shall make available to Cascade 15.3 MGD Average Daily Demand;
   5. Beginning January 1, 2040 through December 31, 2044, Seattle shall make available to Cascade 10.3 MGD Average Daily Demand;
   6. Beginning January 1, 2045 through the termination date of this Agreement, Seattle shall make available to Cascade 5.3 MGD Average Daily Demand.

B. The Supplemental Block shall be supplied in accordance with the following schedule:
   1. Beginning January 1, 2009 through December 31, 2017 Seattle shall make available to Cascade 3.0 MGD Average Daily Demand;
   2. Beginning January 1, 2018 through December 31, 2023 Seattle shall make available to Cascade 5.0 MGD Average Daily Demand.

3.5 At the expiration of this Agreement, Cascade shall have the right to purchase up to 5.3 MGD for the sole purpose of serving Cascade Members that cannot be economically served by any other means than the Seattle Transmission System. The right to purchase up to 5.3 MGD shall be exercised by Cascade upon a minimum of one year's written notice to Seattle prior to the expiration of the Agreement, specifying the Block of water from zero to 5.3 MGD and the Cascade Members to be served by that Block.

3.6 All water supplied to Cascade under this Agreement is for the purpose of re-sale to Cascade Members and other customers of Cascade; provided that all water supplied under this Agreement must be used within the designated place of use of Seattle's water certificates, permits, or claims.

3.7 A. Before December 31, 2011, if an agency identified in Exhibit III becomes a Cascade Member, Seattle will release that agency from its obligations under its existing water supply contracts with Seattle in accordance with the provisions of such contract and the Base Block will be increased by the allocated amount of water identified in Exhibit III, with corresponding proportional increase to the adjusted Base Block in Sections 3.3 and 3.4. If that agency takes delivery of all or a portion of its water through a Sub-regional Facility, Cascade and Seattle shall enter into a Management Agreement for the costs of such facility prior to increasing the Base Block.

B. Before December 31, 2011, if a Cascade Member, previously a Seattle wholesale customer, withdraws from Cascade and contracts for water supply directly with Seattle, Cascade will release that Member from its Membership Agreement in accordance with

the provisions of such Agreement, and the Base Block will be decreased by the amount of allocated water identified in accordance with the provisions of such Agreement in Exhibit III, with corresponding proportional decrease to the adjusted Base Block in Sections 3.3 and 3.4. If that agency takes delivery of all or a portion of its water through a Cascade Sub-regional System Facility, Cascade and Seattle shall enter into a Management Agreement for the costs of such facility prior to decreasing the Base Block.

3.8 For the purpose of determining the consecutive 30-day period, which constitutes the Peak Month, a daily average delivery may be calculated so long as meter readings occur no fewer than 26 days apart. In such cases, daily average delivery shall be calculated by dividing the total deliveries by the actual number of days between meter readings. Periods less than 26 days shall not be applicable for determining the Peak Month.

3.9 Daily average delivery during the Peak Season may be calculated using meter readings taken closest to June 1 and September 30 each year and dividing the total delivery during such time by the actual number of days between meter readings. Periods less than 110 days shall not be applicable for determining the Peak Season.

3.10 Seattle shall endeavor to read the meters at all Points of Delivery on the same day. In the event that meters at all Points of Delivery cannot be read on the same day, all meter reads for that metering period shall be considered to occur on the day on which the meters measuring the majority of the Cascade volume for that metering period were read.

3.11 Normal operation of the water system includes the periodic shutdown of various facilities for routine maintenance, rehabilitation and replacement. Seattle and Cascade shall cooperate in the timing of such activities. Cascade shall not use such activities as evidence of the unavailability of supply or transmission services provided by Seattle under this Agreement so long as Seattle proceeds in good faith to restore such facilities to service.

3.12 Nothing in this Agreement, including, but not limited to, any penalties for exceedance of the Cascade Block, shall be construed to require Seattle to sell or deliver water in excess of the following amounts:

A. Total deliveries during a calendar year in the amount of the Cascade Block multiplied by 365 days (366 in leap years);
B. Total deliveries during the Peak Season in the amount of the Cascade Block multiplied by 165 days;
C. Total deliveries during the Peak Month in the amount of the Cascade Block multiplied by 51 days;
D. Total deliveries during any consecutive 30-day period from October 1 to May 30 in the amount of the Cascade Block multiplied by 30 days;
E. Total deliveries during any consecutive 7-day period in the amount the Cascade Block multiplied by 13 days;
F. Total deliveries within any one-day period in the amount of the Cascade Block multiplied by 2 days.

Upon notice by Seattle of exceedance of these limits, Cascade must immediately reduce its deliveries of Seattle water. Upon the failure of Cascade to reduce its demand, Seattle may

install and operate devices that limit deliveries to Cascade to these amounts, all at Cascade's expense.

ARTICLE IV - TRANSMISSION

4.1 Each calendar year during the term of this Agreement, Seattle shall sell to Cascade and Cascade shall purchase from Seattle capacity in the Seattle Transmission System according to the following terms and conditions:

A. Seattle shall provide capacity sufficient to supply the Cascade Block to Cascade at Cascade's Points of Delivery. Adjustments in the Cascade Block shall result in an equivalent adjustment in Seattle's Transmission capacity commitment. The specific Points of Delivery that are to be adjusted and the adjustment for each Point of Delivery shall be determined by Management Agreement so long as a determination is made that there is no adverse impact on the overall Seattle Water System.

B. Points of Delivery are identified in Exhibit II. The location, hydraulic gradient and instantaneous flows at each Point of Delivery may be changed by Management Agreement.

C. Seattle shall supply water at the inlet side of each Point of Delivery meter at a hydraulic gradient no less than the minimum identified in Exhibit II provided that the instantaneous flow does not to exceed that set forth in the same exhibit. Seattle may change the minimum hydraulic gradient at any Point of Delivery once during any fifteen-year period, provided that four years prior notice is given to Cascade. Under emergency conditions or other unusual short-term operating situations Seattle shall not be obligated to meet minimum hydraulic gradients.

D. Cascade may request additional Points of Delivery from the Seattle Transmission System, which Seattle may approve or reject at its sole discretion. Seattle shall establish the minimum hydraulic gradient for any new Point of Delivery at its sole discretion, after consultation with Cascade. Changes in Points of Delivery shall be determined by Management Agreement.

E. No provision of this Agreement shall be construed to require Seattle to provide flows greater than those identified in Exhibit II. Upon notice by Seattle, Cascade shall immediately reduce Cascade deliveries at a Point of Delivery to not more than those identified in Exhibit II. In the event that Cascade is unwilling or unable to reduce deliveries as required under this provision, Seattle may install and operate flow restricting devices at non-compliant points of delivery, all at Cascade expense.

4.2 Cascade is served, in part, by transmission facilities referred to as the Cascade Sub-regional System listed in Exhibit VII. The costs of operating, maintaining, repairing and replacing these facilities shall be the responsibility of Cascade as outlined in Sections 8.6 and 8.7 below.

4.3 Nothing herein shall restrict Cascade's authority to construct an independent water transmission system for its own water supply.

4.4 Cascade Members have interties, listed in Exhibit I, with adjacent water utilities that are non-Cascade members. Any existing agreements related to the billing and meter reading arrangements for these interties are assumed as a part of this Agreement. If new interconnections between Cascade or Cascade Members and non-Cascade members require similar billing and meter reading arrangements, such arrangements shall be defined in an agreement to be entered into by Cascade, Seattle and the non-Cascade member.

ARTICLE V - WATER QUALITY

Seattle shall be responsible for water quality within the Seattle Water System, and it shall supply water to Cascade, that meets or exceeds federal and state drinking water quality standards, as those standards may change from time to time.

ARTICLE VI - CONSERVATION

Each Party is committed to the principles of water conservation and each intends to achieve its anticipated savings by implementing water conservation programs either unilaterally or in partnership with other agencies.

ARTICLE VII - PLANNING AND SHORTAGE MANAGEMENT

7.1 Each Party recognizes its obligation to plan for water supply and distribution in compliance with the State Department of Health water system planning regulations. Each Party shall develop a water system plan for its service area and the Parties shall coordinate those elements of overlapping responsibilities.

7.2 Cascade and Seattle shall coordinate the development, adoption and implementation of their respective Water Shortage Management Plans. Before invoking its Water Shortage Management Plan, the Parties shall communicate with each other concerning current and projected water supply conditions.

7.3 Seattle has negotiated agreements with federal agencies, state agencies and tribes for the long term preservation and enhancement of watersheds and in-stream beneficial uses and habitat. Such agreements have direct bearing on decisions to curtail the amount of water available for municipal and industrial water supply in any given season. Any water use restrictions imposed under the terms of such agreements shall be borne proportionately by Seattle, its other wholesale customers, and Cascade with respect only to the size of the Cascade Block at the time curtailment is required.

ARTICLE VIII - COST RECOVERY

8.1 The provisions of this Article shall apply to the establishment of fees and charges for water supply and related services beginning January 1, 2004. Prior to that date, the pricing provisions of each Cascade Members' individual water supply contract with Seattle shall be maintained.

8.2 For the purposes of allocating costs of water supply, there shall be two water supply cost pools consisting of an existing Seattle water supply assets cost pool ("Existing Supply Cost Pool") and a new Seattle water supply assets cost pool (the "New Supply Cost Pool").

A. Existing Supply Cost Pool. The costs of infrastructure, including operation, maintenance, repair and replacement of Seattle Supply System Facilities listed in Exhibit IV shall be included in the Existing Supply Cost Pool

B. New Supply Cost Pool. The costs of water supply resources developed in the future ("New Supply Resources") that expand the capacity of the Seattle Supply System, including the costs of the 1% conservation program from January 1, 2004 through 2010 shall be included in the New Supply Cost Pool. If any portion of a New Supply Resource project enhances reliability of Existing Supply Resources, the costs thereof may be allocated to the Existing Supply Cost Pool by Management Agreement.

8.3 For purposes of determining the cost of the transmission of water to the Wholesale Customers there shall be three transmission cost pools consisting of an existing transmission cost pool ("Existing Transmission Cost Pool"), a new transmission cost pool ("New Transmission Cost Pool"), and a Cascade transmission cost pool ("Cascade Sub-regional System Cost Pool").

A. Existing Transmission Cost Pool. Costs to be allocated to the Existing Transmission Cost Pool shall consist of the following: operation, maintenance, repairs and replacements to the Seattle Transmission System Facilities listed in Exhibit V. Costs incurred for purposes of transmission reliability may be included in the Existing Transmission Cost Pool by Management Agreement.

B. New Transmission Cost Pool. The cost of new transmission facilities shall be included in the New Transmission Cost Pool. A portion of the renewal, replacement or modification of existing transmission facilities which create an expansion of transmission capacity may be allocated to the New Transmission Cost Pool.

C. Cascade Sub-regional System Cost Pool. The costs of operating, maintaining, repairing and replacing the Cascade Sub-Regional System Facilities owned by Seattle and listed in Exhibit VII shall be included in the Cascade Sub-regional System Cost Pool, in an amount proportionate to the use of the facilities by Cascade, together with any other costs Cascade and Seattle agree to include by Management Agreement. In the event that Cascade ceases to receive water through one or more of the facilities in the Cascade Sub-regional System, these facilities may be decommissioned at Seattle's sole discretion, and Cascade shall pay Seattle for the remaining Net Book Value of the decommissioned facilities in an amount proportionate to the use of the facilities by Cascade together with any decommissioning costs.

8.4 A. If Seattle determines that changing the location of a Cascade Point of Delivery is required for the improved operation of the Seattle Transmission System then such costs shall be included in the Existing Transmission Cost Pool. Seattle shall notify Cascade of any proposed changes to a Cascade Point of Delivery and consult with Cascade to

ensure minimal impact on the affected Cascade Member's distribution system and appropriate coordination of operation and construction activities.

B. The costs of replacing, relocating, maintaining or improving Cascade Points of Delivery for any other reason than Section 8.4.A. shall be borne by Cascade regardless of the cause provided that such cause is consistent with AWWA and safety standards and practices. Costs will be invoiced and due in 30 days upon receipt or as otherwise provided for by Management Agreement. Seattle shall notify Cascade of any proposed improvements to a Cascade Point of Delivery and consult with Cascade to ensure minimal impact on the affected Cascade Member's distribution system and appropriate coordination of operation and construction activities.

8.5 Seattle shall maintain a cost accounting system consistent with the provisions of this Agreement and generally accepted accounting principles consistently applied in developing the financial information for determining the costs of construction, replacement, maintenance and operation of the facilities in each cost pool.

A. Asset Accounts. An asset account shall be maintained for each facility and within that account Seattle shall record the original cost of that facility plus betterments and less retirements.

B. Depreciation. Facilities shall be depreciated according to Standard Water System Asset Lives and a record of life-to-date depreciation shall be maintained for each facility. No depreciation shall be recorded in the first calendar year of operation of a facility. A full year's depreciation shall be recorded in every subsequent year.

C. Net Book Value. The net book value of any facility shall be its original cost plus betterments and less retirements as recorded in its facility asset account, less life-to-date depreciation.

8.6 Costs in each cost pool shall be calculated as follows:

A. Infrastructure Costs. Each cost pool shall include the infrastructure costs for its respective facilities, calculated on a utility, cash or other basis depending upon the facility and the cost pool as set forth below.

1. Utility Basis. The utility basis shall be used to calculate the infrastructure costs for all Existing Supply Facilities, all Existing Transmission Facilities, and all Cascade Sub-Regional System facilities, as well as their replacements and betterments. Under the utility basis, the infrastructure cost for a facility in any year shall be the sum of (i) the annual depreciation expense recorded for that facility and (ii) the product of the net book value of that facility and the Rate Of Return On Investment. At Seattle's discretion, interest costs may be considered current infrastructure costs during the construction of a facility. However, any such interest costs must then be considered contributions in aid of construction, and not included in the Net Book Value of the facility for purposes of calculating Utility Basis costs in future years.

B. Operations Costs. The costs of operating the assets assigned to a cost pool shall be included in the cost pool. The annual operations costs of a cost pool shall be the labor, materials, equipment and other direct costs required for the operation and maintenance of the facilities in that cost pool, together with any net profit or expense from the disposition of facilities in that pool. Operations costs shall include the cost of general and administrative overhead applied in a manner consistent with its application to facilities construction projects.

1. Existing Supply Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Supply Cost Pool shall be as follows: The Operations Cost base in the Existing Supply Cost Pool for the year 2001 shall be $17,780,262.00. In each succeeding year, the amount from the previous year shall be adjusted by the percentage change in the total cost of all the supply cost centers identified in Exhibit VI, except that the increase in treatment operations costs caused by the first full year start-up of the Cedar Treatment Plant at Lake Youngs in or around 2005 shall not be included in the percentage adjustment. Any increase in Cedar Treatment operations costs for the first full year of operation of the plant shall instead be added directly to the Operations Cost total from the prior year as adjusted by the index. For each year after the first full year of operation, increases in Cedar Treatment operations costs shall be included in the adjustment index.

2. Existing Transmission Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Transmission Cost Pool shall be as follows: the Operations Costs base in the Existing Transmission Cost Pool for the year 2001 shall be $4,531,931.00. In each succeeding year, the amount of these costs from the previous year shall be adjusted by the percentage change in the total cost of all the transmission cost centers identified in Exhibit VI.

3. Cascade Sub-regional System Cost Pool Operating Costs. Cascade Sub-regional System Cost Pool Operating Costs shall include: (i) the actual costs of operating the facilities listed in Exhibit VII in proportion to the actual use of such facilities by Cascade; (ii) the electricity costs paid by Seattle after the effective date of this Agreement, in accordance with certain contracts effective on or before January 1, 2002 identified in Exhibit I, for pump stations owned and operated by Cascade Members and connected to the Tolt East Side Supply Line; and, (iii) any other costs approved by Management Agreement shall be Cascade Sub-regional System Cost Pool Operating Costs.

C. Disposition Costs. The costs of disposing of assets within a cost pool shall be included in the cost pool. Net disposition costs shall be calculated as follows:

1. Disposition under the Utility Basis. The net book value of the facility, less any sales, salvage, or other revenues derived from the disposition of that facility.

8.7 For the Base Block, the costs in cost pools shall be allocated to Cascade as follows:

A. Allocation of Existing Supply Cost Pool. Cascade shall pay one hundred two percent (102%) of the product of the Base Block and the costs in the Existing Supply Cost Pool divided by the Firm Yield.

B. Allocation of New Supply Cost Pool. Cascade shall pay none of the costs in the New Supply Cost Pool.

C. Allocation of Existing Transmission Cost Pool. Cascade shall pay one hundred two percent (102%) of the product of the Base Block and the costs in the Existing Transmission Cost Pool divided by the Firm Yield.

D. Allocation of New Transmission Cost Pool. Cascade shall pay none of the costs in the New Transmission Cost Pool.

E. Allocation of the Cascade Sub-regional System Cost Pool. Cascade shall pay costs in the Cascade Sub-regional System Cost Pool as follows:

1. 100% of the costs associated with all facilities listed in Exhibit VII.A.
2. A proportionate share of those facilities listed in Exhibit VII.B. based on flows of Cascade Members. Costs will be allocated based on Peak 7 Day flows through each segment. In the event that Peak 7 Day flow data is not available, Peak Month flows may be substituted.

8.8 For the Supplemental Block, the charge to Cascade shall be the then current Full and Partial Requirements Customer Commodity Charge per 100 cubic feet (ccf) as approved by the Seattle City Council from time to time. The Growth Charge shall not apply. The Full and Partial Requirements Customer Commodity Charge shall be applied to the annual volume of the Supplemental Block allocated by month in accordance with the schedule in Section 8.10C. Seattle will provide Cascade 30 days' advance notice of any proposed changes to the Full and Partial Requirements Customer Commodity Charges. For months that include a rate change, the charge shall be prorated in accordance with the effective date of the rate change.

8.9 Cascade shall pay the costs of penalties for exceeding the Cascade Block, as defined in Section 8.11 and any other costs requiring invoice by Seattle within 30 days of invoice by Seattle.

8.10 Cascade shall pay the annual costs allocated to Cascade in accordance with Section 8.7for the Base Block and 8.8 for the Supplemental Block as follows:

A. Prospective Cost Estimate for the Base Block. Seattle may conduct a cost estimating study to revise estimates of the annual costs allocable to Cascade for the Base Block upon 120 days notice to Cascade. Cascade shall pay Seattle for the Base Block according to the estimated annual costs in such study, provided that not more than five years has elapsed from the time a study is conducted to the year in which the estimates from that study are used. Each study shall estimate the annual costs for the Base Block not less than the five following years.

B. Statement of Annual Costs. On or before October 1st of each year, Seattle shall provide Cascade with its best, non-binding estimate of the annual costs for the Base and Supplemental Blocks for the next year. On or before December 1st of each year, Seattle

shall notify Cascade of Cascade's annual costs for the Base and Supplemental Blocks for the next year. For the Base Block, such annual cost shall be the sum of the prospective cost estimate determined in accordance with Section 8.10A and the amount of excess or deficit identified in the most recent cost audit performed in accordance with Section 8.10D. For the Supplemental Block, such annual cost shall be in accordance with Section 8.8. In the event the Full and Partial Requirements Customer Commodity Charges change during the year, Seattle will provide Cascade with an updated cost estimate for the Supplemental Block for the remainder of that year.

C. Payment Distribution. On or before the last day of each month, Cascade shall pay Seattle that portion of Cascade's annual cost for that year, calculated pursuant to Section 8.10B for the Base Block and Section 8.8 for the Supplemental Block, according to the following schedule:

January 5%
February 5%
March 6%
April 6%
May 6%
June 12%
July 13%
August 15%
September 13%
October 7%
November 6%
December 6%

Overdue balances shall bear interest at the rate of 1% per month. In no event shall Cascade be required to pay Seattle a monthly payment during a year until at least 30 days after Seattle provides Cascade with a statement of annual costs for that year, and such payments shall not be considered overdue, until 30 days after such statement is provided to Cascade.

D. Cost Audit for the Base Block. No later than August 1 of each year, Seattle shall provide a statement of actual costs for the Base Block allocated to each cost pool and other costs and revenues received during the prior year, which statement shall be examined by an external auditor in an "agreed-procedures" engagement. In addition, Cascade may have the statement audited by an external auditor of its choice, solely at Cascade's expense. This statement shall clearly identify the amount by which payments for the Base Block made by Cascade during the prior year were in excess of, or insufficient to meet the actual costs allocable to Cascade for the Base Block for the prior year. This surplus or deficit shall earn interest at the Rate of Return on Investment, and shall be reduced in accordance with Section 8.10B. No later than December 31 of the year following the termination of the contract, any remaining surplus or deficit balance shall be paid in cash by the party owing the balance to the party to whom the balance is owed.

E. Payment from Gross Revenues. Cascade shall pay the Base Block and Supplemental Block charges out of its gross revenues. Cascade's payments to Seattle pursuant to this Agreement and payments otherwise required or provided for by this Agreement shall be maintenance and operation expenses of Cascade, payable prior to and superior to any charge or lien of any revenue bond issued by Cascade that are payable from the revenues of Cascade. Cascade shall establish rates and collect fees and charges for wholesale water service sufficient to pay for the maintenance and operation of its Water Supply System, including payments to Seattle, and the principal and interest on any and all Cascade revenue obligations that constitute a charge against the revenue of Cascade.

F. Emergency Surcharge. In the event of a catastrophe or other extraordinary condition that requires emergency expenditures to maintain a sufficient water supply, Seattle may impose an emergency surcharge proportionately on all of its retail and wholesale customers, including Cascade in order to pay for such expenditures. Any such emergency surcharge shall be presented to Cascade prior to adoption by Seattle. Seattle shall consider Cascade's comments but shall nevertheless have the full authority to adopt the charge.

8.11 A. Charges will be imposed for exceeding the Cascade Average Annual, Peak Season or Peak Month Block limitations. These charges will be determined through the application of multipliers to the Cascade Volume Charge. The charge for exceeding the Cascade Block, Peak Month or Peak Season shall be calculated by (1) multiplying the Cascade Volume Charge by the appropriate factor in the following table, (2) multiplying by the amount of the exceedance (in MGD) and (3) multiplying by the actual number of days in the year, Peak Month or Peak Season, whichever is applicable.

Category	0 to 1 MGD	>1 to 3 MGD	>3 MGD
Annual Average Daily Demand	1.0	1.1	1.2
Peak Month Demand	1.5	9.1	16.7
Peak Season Demand	1.5	3.1	4.7

B. In the event that the Cascade Block, Peak Season or Peak Month limitations are exceeded in 2 or more years during any consecutive five-year period, the following charges apply:

Category	0 to 1 MGD	>1 to 3 MGD	>3 MGD
Annual Average Daily Demand	1.0	1.2	1.2
Peak Month Demand	1.5	16.7	16.7
Peak Season Demand	1.5	4.7	4.7

C. In the event of a charge for exceeding the block occurs in more than one category in either a single year or in multiple years during any consecutive five-year period, only the category that results in the highest charge will be assessed.

8.12 Except in the case of an emergency, the provisions of Section 8.11 shall be applied reciprocally to Seattle to calculate credits to Cascade, should Seattle fail to deliver the Cascade Block as required by this Agreement.

ARTICLE IX - ADMINISTRATION

9.1 Seattle shall own and maintain appropriate metering devices to measure the water flowing from the Seattle Water System to each Point of Delivery. At Cascade's request and sole expense, Seattle will install and maintain equipment selected by Cascade and approved by Seattle to transmit signals to recording equipment of Cascade or its Members (located elsewhere) of the amount of water delivered, as measured by Seattle's meters.

9.2 As of the end of the calendar year immediately following the effective date of this Agreement and following a change in Cascade Membership through 2011, Seattle shall pro rate the balances in the Purveyor Balance Accounts among its contract Purveyors (1982 Water Purveyor Contract, Version A or B) and transfer to Cascade the pro rated balance of each Purveyor that is a Cascade Member, provided that such transfer shall occur only once for each Cascade Member.

9.3 Seattle shall keep full and complete books of accounts for the Seattle Water Supply System and Seattle's retail distribution system in compliance with current standards required by the State Auditor. Cascade, at its own expense, may at any time audit Seattle's book of accounts using the services of a public accounting firm and Seattle shall make the books and records of the Seattle Water System and Seattle's retail distribution system available to such auditors during reasonable business hours upon reasonable notice at the place where such records are normally kept. Seattle shall provide adequate facilities; i.e., room and workspace, so the audit can be performed. Seattle shall have reciprocal rights to audit Cascade books and accounts.

9.4 This Agreement shall be interpreted according to the laws of the State of Washington and the venue for any litigation between the Parties concerning its terms shall be in the Superior Court of King County at Seattle. The Parties shall be entitled to specific performance of the terms of this Agreement.

9.5 This Agreement shall inure to the benefit of and be binding upon successors of interest and assigns of the Parties. Neither this Agreement nor obligations to perform hereunder may be voluntarily assigned by either Party without the other Party's written consent, which shall not be unreasonably withheld; provided however, that a change in Cascade's corporate form; e.g., from interlocal organization to another form of organization authorized by Washington law, shall not be considered an assignment. Seattle may not convey the Seattle Water System or its component parts without providing for an assumption of this Agreement and the obligations contained herein by the conveyee. The Parties do not intend to confer rights or benefits upon any third party. Only a writing executed by the Parties may modify this Agreement.

9.6 All notices relating to this Agreement shall be sent to the following addresses, certified mail, return receipt requested, unless the other Party is previously notified in writing of a change in recipient or address:

To Seattle:	To Cascade:
Director	Chief Executive Officer
Seattle Public Utilities	Cascade Water Alliance
700 Fifth Avenue, 49th Fl.	11400 SE 8th Street, Suite 440
Seattle, WA 98104	Bellevue, WA 98004

9.7 If any provision of this Agreement or its application is determined by a court of law to be illegal, invalid, or void without rendering performance of this Agreement impossible or infeasible, then the Parties intend that the validity of the remaining provisions of this Agreement or their application shall not be affected and shall continue in full force and effect.

9.8 This Agreement is a contract for the purchase and sale of water and transmission services related to that water and no provision hereof shall be construed to make the Parties partners or joint ventures. Neither Party is the agent of the other nor shall either Party be held liable for the acts of the other on a theory of agency or any other representative capacity.

9.9 In the event of default of any provision of this Agreement, the non-defaulting Party shall issue written notice to the other Party setting forth the nature of the default. If the default is for a monetary payment due hereunder, the defaulting Party shall have thirty (30) days to cure the default. In the event of other defaults, the defaulting Party shall use its best efforts to cure the default within ninety (90) days. If such default cannot be reasonably cured within such ninety (90) day period, the defaulting party shall, upon written request prior to the expiration of the ninety (90) day period be granted an additional sixty (60) days to cure the default.

9.10 In the event of a default in payment by Cascade, Seattle shall have the right to compensation from the constituent Cascade Members up to the proportionate share of each Member's use of the Cascade Block which in the first 15 months of the Agreement shall be established by Exhibit III, and thereafter by the most recent annual report of Cascade Member's proportionate use of the Cascade Block, which proportionate use shall total 100 percent of the Cascade Block. Cascade's annual proportionate use report shall be completed and delivered to Seattle no later than March 31 of each year. Each Cascade Member must acknowledge and accept this individual, contingent liability to Seattle in writing at the time that Cascade enters into this Agreement. Those agencies that later join Cascade in accordance with Section 3.7A shall convey such written acknowledgment to Seattle within one month of joining Cascade. Should any Cascade Member required to do so fail to convey such written acknowledgement, Seattle shall have the unilateral right, upon written notice to Cascade, to reduce the Cascade Block by the amount allocated to such Cascade Member as set forth in Exhibit III, or by Cascade's most recent annual proportionate use report, until such written acknowledgement is provided to Seattle.

9.11 Upon entering into this Agreement, or upon later becoming a Cascade Member, each water utility that is listed in Exhibit III thereby relinquishes its then existing Seattle wholesale contract and the terms and conditions of that contract shall have no further force or effect as to those utilities that are or become Cascade Members.

ARTICLE X - TECHNICAL COMMITTEE

Technical Committees comprising Seattle staff and other affected parties will address day to day operational issues related to the Seattle Water System. Finance cost and rate issues will be addressed independently between the Director of Seattle Public Utilities and the General Manager of Cascade Water Alliance, or their respective designees as provided for in written notice to the other. It is recognized that daily operation of the Seattle Water System may require direct communication between Seattle staff and the staff of the Cascade Members.

ARTICLE XI - DISPUTE RESOLUTION

11.1 Cascade and Seattle shall make good faith efforts to resolve by informal discussion any dispute arising under or in connection with this Agreement. If at any time a Party to a dispute determines that such informal discussions will not result in a resolution, such Party may initiate non-binding mediation of any dispute arising under or in connection with this Agreement. Within ten (10) days of receiving written notice of initiation of non-binding mediation by one or both Parties, each Party shall designate in writing not more than five (5) candidates it proposes to act as a non-binding mediator. The Parties shall within an additional five (5) days select one of the mediators from either list to serve as mediator. Should the parties be unable to agree upon a mediator, a mediator shall be chosen from one of the two lists by the presiding judge of the King County Superior Court at Seattle. Upon selection of the mediator, the Parties shall use reasonable efforts to resolve the dispute within thirty (30) days with the assistance of the mediator. The cost of mediation shall be shared by Cascade and Seattle equally.

11.2 If mediation fails to resolve the dispute within thirty (30) days of selection of the mediator, the Parties may thereafter seek redress in court.

11.3 Pending the decision in any mediation or litigation process pursuant to this section, the Parties to such process shall continue to fulfill their respective duties under this Agreement.

ARTICLE XII - EMERGENCY EVENTS

12.1 The Parties recognize that unforeseen and unavoidable events may occur which would require Seattle to act unilaterally for what it deems to be in the best interest of the general public served by the Seattle Water System; including water shortages resulting from drought circumstances and temporary reduction in water supply associated with turbidity events. Upon the occurrence of an unforeseen or unavoidable event, Seattle shall, to the extent practicable, treat its wholesale and retail customers equally and any curtailment of supply shall be imposed proportionately among those customers. This authority to act

unilaterally carries with it a unilateral responsibility of Seattle to restore, expeditiously, the Seattle Water System to its pre-emergency capability to supply the region.

12.2 Upon occurrence of an unforeseen or unavoidable event that adversely impacts the Cascade Water System, Cascade may request Seattle to temporarily modify or suspend operational or supply provisions of this Agreement and Seattle shall make reasonable efforts to grant such request. Cascade will act expeditiously to restore the Cascade Water System to its pre-emergency capability.

12.3 The time periods for Seattle's performance under any provisions of this Agreement shall be extended for a reasonable period of time during which Seattle's performance is prevented, in good faith, due to fire, flood, drought, turbidity events, earthquake, lockouts, strikes, embargoes, acts of God, war and civil disobedience. If this provision is invoked, Seattle agrees to immediately take all reasonable steps to alleviate, cure, minimize or avoid the cause preventing such performance.

ARTICLE XIII - EXHIBITS

Exhibits I through VII are attached hereto and are hereby incorporated by reference into the Agreement as if set forth in full herein.

ARTICLE XIV - COMPLETE AGREEMENT

This Agreement, as amended and restated herein, represents the entire agreement between the parties concerning the subject matter hereof, and will supercede the original 50-Year Declining Block Water Supply Agreement dated December 15, 2003 upon the effective date noted herein. This Agreement may not be amended except as provided in Section 9.5.

THE CITY OF SEATTLE, a municipal corporation

By: _____ DATE: 1/22/09
Acting DIRECTOR, SEATTLE PUBLIC UTILITIES

THE CASCADE WATER ALLIANCE, a nonprofit corporation

BY: _____ DATE: Effective 1/1/09
~~CHAIR, BOARD OF DIRECTORS~~
CEO

EXHIBIT I

Other Agreements

A. List of documents, commitments, adjustments, reductions, agreements, and/or written approvals by Seattle regarding the supply, purchase and/or resale of water according to Section 4.4 of this Agreement:

1. Interties and associated agreements with other agencies as referenced in Section 4.4:

   a) Redmond/Union Hill Water Association Water Service Agreement
   b) Redmond/Union Hill Water Association Agreement for Water System Interties
   c) Redmond/Woodinville Water District Interlocal Agreement
   d) Redmond/Woodinville Water District Agreement for Water System Interties
   e) Redmond/Northeast Sammamish Water & Sewer District Agreement for Water System Interties
   f) Skyway / WD 125
   g) Bellevue/Coal Creek

2. Other pertinent Agreements:

   a. List of electric contracts for pump stations owned and operated by Cascade Members and connected to the Tolt Eastside Supply Line according to Section 8.6.B.3 of this Agreement:

      1. Between the City of Bellevue and the City of Seattle, effective August 1983, pursuant to Ordinance #111276 for SE 28th pumping station (50% / 50%) and N.E. 8th pumping station (Bellevue 60% / Seattle 40%)

POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS, AND MAXIMUM FLOW RATES OF WATER SUPPLIED

METER SERVICE				MINIMUM HYDRAULIC GRADIENT AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	FLOW UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT IS GUARANTEED (gpm)
LOCATION	STATION NUMBER (1)	PIPELINE SEGMENT NUMBER(1)	SIZE OF METER (IN.)		
Bellevue (* Redmond)					
132nd Ave. SE & SE 26th Street	59	8	8	425	1,300
128th Ave. SE & Newport Way	56	8	8	435	850
Mercer Is. Pipeline & 108th Ave. SE	66	9	8	420	700
140th Ave. NE & 40th Street	65	2	10	500	3,500
132nd Ave. NE & NE 14th St.	62	2	12	470	4,500
132nd Ave. NE & NE 24th Street	63	2	10	455	4,500
152nd Ave. NE & NE 8th Street	61	2	24	460	3,500
145th Pl. SE & SE 28th Street	58	3	12	470	3,000
14509 SE Newport Way (2)	60	3	10	525	4,600
14509 SE Newport Way (6) (7)	TBD	3	10	525	2,900
128th Ave SE & SE 56th ST (3)	47	8	8	440	Backup to Sta. 55 (5)
128th Ave SE & Newport Way (3)	55	8	6	435	800
120th Ave SE & SE 35th ST (3)	46	9	6	425	Backup to Sta. 124 (5)
I-90 & Lake Washington Boulevard (3)	50	9	6	425	Fire flow backup only
124th Ave SE & SE 38 PL (3)	124	9	8	425	1,500
128th Ave SE & SE 70th ST (4)	52	8	12	445	1,020

METER SERVICE				MINIMUM HYDRAULIC GRADIENT AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	FLOW UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT IS GUARANTEED (gpm)
LOCATION	**STATION NUMBER (1)**	**PIPELINE SEGMENT NUMBER(1)**	**SIZE OF METER (IN.)**		
Kirkland / Redmond					
132nd Ave. NE & NE 113th Street	74	1	10	555	4,500
132nd Ave. NE & NE 85th Street	75	1	16	535	4,080
140th Ave. NE & NE 70th Street	72	2	12	520	1,240
Redmond					
160th Ave NE & NE 104th Street	165	28	10	515	1,000 (combined with following planned new location)
NE 172nd Street & Tolt Pipeline No. 2	TBD	28	TBD	515	planned new location
Trilogy Parkway NE & NE 125 Street	164	26	10	610	2,000 (combined with following planned additional meter)
Trilogy Parkway NE & NE 125 Street	TBD	26	10	610	Planned additional meter
Skyway					
84th Ave. S & S 134th Street	1	10	6	455	210
Beacon Ave S & S 124th Street	5	10	8	455	720
Cornell Ave S & S 112th Street	172	4	6	375	Backup service
Tukwila					
39th Ave S & S 112 Street	11	15	10	460	Backup service
South Center Parkway & Tukwila Parkway	13	13	10	460	2,200
West Valley Hwy & S 162nd Street	14	13	8	460	Backup emergency service
Christensen Rd. & Baker Rd	15	13	8	460	480

METER SERVICE				MINIMUM HYDRAULIC GRADIENT AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	FLOW UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT IS GUARANTEED (gpm)
LOCATION	STATION NUMBER (1)	PIPELINE SEGMENT NUMBER(1)	SIZE OF METER (IN.)		
53rd Ave S & S 160th Street	16	13	6	460	20
E Marginal Way & S 112th Street	168	15	12	445	810
51st Ave S & S Leo Street	169	12	8	455	60
W. Marginal Place & s 102nd St.	170	5	12	300	80
47th Ave S & S Victor Street	173	12	6	425	Backup service
				TOTAL:	**50,070**

Notes:

(1) Station and Pipeline Segment Numbers pertain to the Demand Metering program.

(2) Assumes existing 16-inch sonic meter is replaced with a 10-inch Protectus meter as planned.

(3) These stations to be fully transferred from Coal Creek Utility District to Bellevue.

(4) This station supplies to Coal Creek Utility District directly. Assumes Coal Creek sub-meters 40 percent of total flow (average, peak) through this station to Bellevue.

(5) Maximum combined flow of primary and backup stations shall not exceed the flow for the primary station as shown on this Exhibit.

(6) Assumes a new 10-inch Protectus meter is installed as planned.

(7) If another supply source of equal or higher capacity is provided into the Issaquah - Sammamish Plateau area by any party other than Seattle to serve Cascade members, Seattle's supply obligation at this station will terminate. Seattle's delivery obligation at this station is not transferable to any other station.

EXHIBIT III

BLOCK ALLOCATIONS BY INDIVIDUAL WATER UTILITIES

As Measured at the Meter (Net of 2% Transmission Losses)

	Annual Block	Peak Season Factor	Peak Season Block	Peak Month Factor	Peak Month Block
CWA	**30.3**		**41.0**		**51.2**
Existing Purveyors	**30.28**		**41.02**		**51.23**
Bellevue	17.67	1.35 a, b	23.85	1.70 f, b	30.04
Kirkland	4.40	1.35 a, b	5.94	1.70 f, b	7.48
Redmond	4.56	1.35 a, b	6.16	1.70 f, b	7.75
Skyway	0.48	1.12 a, c	0.54	1.32 f, c	0.63
Tukwila	3.17	1.43 a	4.53	1.68 f	5.33
New Purveyors	**0.00**		**0.00**		**0.00**
Covington	0.00	1.24 e	0.00	1.45 e	0.00
Issaquah	0.00	1.24 e	0.00	1.45 e	0.00
Sammamish Plateau	0.00	1.24 e	0.00	1.45 e	0.00
NON-CWA					
Existing Purveyors	**42.38**		**54.86**		**68.30**
Bothell	1.62	1.42 a	2.30	1.78 g	2.88
Cedar River	2.83	1.45 a	4.10	2.08 f	5.89
Coal Creek	0.94	1.42 a	1.33	1.90 f	1.79
Duvall	0.83	1.34 a	1.11	1.66 f	1.38
Edmonds	0.00	1.00	0.00	1.00	0.00
Highline	6.89	1.22 a	8.41	1.45 f	9.99
Mercer Island	2.15	1.44 a	3.10	1.86 f	4.00
Northshore	6.05	1.31 a	7.93	1.64 f	9.92
Olympic View	1.02	1.14 a	1.16	1.53 f	1.56
Shoreline	1.91	1.24 a	2.37	1.55 f	2.96
Soos Creek	4.62	1.17 a	5.41	1.27 f	5.87
Woodinville	5.57	1.42 a	7.91	1.84 f	10.25
WD 20	2.73	1.22 a, d	3.33	1.47 f, d	4.01
WD 45	0.30	1.22 a, d	0.37	1.47 f, d	0.44
WD 49	1.39	1.22 a	1.70	1.39 f	1.93
WD 85	0.11	1.22 a, d	0.13	1.47 f, d	0.16
WD 90	0.93	1.27 a	1.18	1.67 f	1.55
WD 119	0.42	1.16 a	0.49	1.62 f	0.68
WD 125	2.07	1.22 a, d	2.53	1.47 f, d	3.04

Notes:
a. Based on water purchased from Seattle in 1998, which was the year in the period from 1994 to 2000 with the highest total system peak season factor. Billing data from May 22-Sept 22, 1998, was used to compute the factors.
b. Total average peaking factor for Bellevue, Kirkland and Redmond, since Redmond purchases Seattle water from Bellevue and Kirkland.
c. Based on total from Bryn Mawr and Skyway, which merged in 2001.
d. Total average peaking factor for W.D. 20, 45, 85, and 125, since these water districts operate as a consortium.
e. System average
f. Based on water purchased from Seattle in 1998, which was the year in the period from 1994 to 2000 with the highest total system peak month factor. Demand Metering data and Allocation Factor calculations for July 17-August 15, 1998, was used to compute the factors.
g. Because of possible metering errors during the peak month for Bothell in 1998, peak month factor is based on August purchases from Seattle in 2000.

EXHIBIT IV

Seattle Supply System Facilities

1. **Cedar Source**
   - All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the Cedar River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
   - All facilities located within the Lake Youngs Reservation as defined by Seattle ownership of the land except for conveyance facilities used to transport finished water during non-emergency operation
   - All facilities located within the Lake Youngs Aqueduct, the Landsburg Tunnel, and the Lake Youngs Supply Lines right-of-way, including the right-of-way itself
   - Existing Morse Lake Floating Pump Stations

2. **Tolt Source**
   - All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the South Fork Tolt River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
   - Tolt Treatment Facility

3. **Highline Wellfield**
   - Riverton Wells, including all pumping and treatment equipment, original yard piping, to the connection to CRPL4, and the low flow piping to Riverton Reservoir
   - Boulevard Well, including all pumping and treatment equipment, and all piping up to the connection to CRPL4

4. **Other**
   -
   - One Percent Conservation Program through December 31, 2003
   - Commercial Incentive Program through December 31, 2003
   - Commercial Toilet Retrofit Program through December 31, 2003
   - Showerhead retrofit Program through December 31, 2003
   - The Seattle Forecasting Model (SEAFM Model)
   - GIS Projects related to facilities identified herein as part of the Seattle Supply System

EXHIBIT V

Seattle Transmission System Facilities

1. Pipelines

- Tolt Pipeline No. 1 from the outlet of the Tolt Treatment Facility (TTF) to Lake Forest Reservoir, including any transfer and ancillary small diameter parallel pipes *(Note: Includes TPL1 and TPL2 between the Reg. Basin and TTF in Supply!)*
- Tolt Pipeline No. 2 (where constructed), including any transfer and ancillary small diameter parallel pipes
- Tolt Tieline
- Tolt Eastside Supply Line (from TESS Junction to the intersection of SE 16th ST and 145th Place SE)
- Tolt Eastside Line Extension (from the intersection of SE 16th ST and 145th Place SE to Eastside Reservoir)
- The 540 head Pipeline from Maple Leaf Reservoir to Lake Forest Reservoir
- Lake Youngs Bypass No. 4 from the outlet of each of the Cedar Treatment Facility clearwells to Control Works
- Lake Youngs Bypass No. 5 from the outlet of each of the Cedar Treatment Facility clearwells to the Lake Youngs Tunnel
- The Lake Youngs Tunnel (from the original lake outlet to Control Works)
- The Maple Leaf Pipeline (from the intersection of 18th Avenue E. and E. Prospect Street to Maple Leaf Reservoir)
- Cedar River Pipeline No. 1 from Control Works to the intersection of 18th Avenue E. and E. Prospect Street
- Cedar River Pipeline No. 2 from Control Works to the intersection of 12th Avenue E. and E. Olive Street
- Cedar River Pipeline No. 3 from Control Works to the intersection of 18th Avenue E. and E. Prospect Street
- 30" intertie between Cedar River Pipelines 2 and 3 in east Olive Street
- Cedar River Pipeline No. 4 from Control Works to the West Seattle Pipeline
- Cedar Eastside Supply Line (from the Cedar Wye to the intersection of SE 16th St and 145th Place SE)
- West Seattle Pipeline from Augusta Gatehouse to Cedar River Pipeline 4
- The 8th Avenue S. Pipeline between S. 146th Street and S. 160th Street
- The Bow Lake Pipeline (between 8th Avenue S. and CRPL 4, and as relocated outside runways at Seatac Airport)
- The Burien Feeder (in S. 146th Street between 8th Avenue S. and CRPL 4)
- The Fairwood Line (between Fairwood Pump Station and Soos Reservoirs)
- The 24-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 12-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 630 head pipeline between Lake Youngs Pump Station and the Cedar River WSD pump station at the eastern boundary of the Lake Youngs Reservation

2. Reservoirs, Tanks, and Standpipes, including overflow pipes, all valves, appurtenances, and disinfection facility located on the premises of each storage facility, unless otherwise noted

- Lake Forest Reservoir
- Eastside Reservoir
- Riverton Reservoir
- Maple Leaf Reservoir (excluding Roosevelt Way Pump Station and its suction and discharge piping, Maple Leaf Tank and 520 zone piping, except where solely serving the disinfection facility)
- Soos Reservoirs

3. Pump Stations, Major Valve Structures, and other Facilities

- TESS Junction Pump Station
- Lake Hills Pump Station
- Maplewood Pump Station
- Maple Leaf Pump Station
- Bothell Way Pump Station
- Fairwood Pump Station
- Lake Youngs Pump Station
- The Control Works
- Augusta Gatehouse
- Eastgate Pump Station

The facilities include the appurtenances to the transmission lines including but not limited to rights of way, line valves, system meters and remote automation devices. The facilities also include the existing meters, vaults and related equipment at all wholesale points of delivery to the extent that the costs of such meters, vaults and related equipment were unamortized as of December 31, 2003. New and replacement meter installations shall be treated consistent with Section 8.4B.

EXHIBIT VI

Cost Centers Used for Operations Cost Indices

The following costs centers or successor cost centers that capture the direct costs of operation of Existing Supply Facilities, Existing Transmission Facilities and the 1% Program shall be used as the indices for operations cost in the Existing Supply Cost Pool, Existing Transmission Cost Pool and for the 1% Program in the New Supply Cost Pool.

Supply

Program	Project	Project Name	Activity
Communications	N1203	Communications Activity Group	N120304 Purveyor Relations
Audit & Accounting	N3303	Customer Audit	N330303 Purveyor Audit
Watershed Management	N5401	Program Management	N540194 Department Support
Watershed Management	N5401	Program Management	N540195 General Expense
Watershed Management	N5401	Program Management	N540196 General Management
Watershed Management	N5401	Program Management	N540197 Training
Watershed Management	N5401	Program Management	N540198 Safety
Watershed Management	N5401	Program Management	N540199 Personnel
Watershed Management	N5401	Program Management	N540289 Capital Purchase
Watershed Management	N5403	Support Services	N540301 Modified Duty
Watershed Management	N5403	Support Services	N540302 Procuring/Paying/Receiving
Watershed Management	N5403	Support Services	N540303 Vehicle Equipment Downtime
Watershed Management	N5404	Watershed Protection	N540401 Hydrological Data Collection
Watershed Management	N5404	Watershed Protection	N540402 Fire Protection
Watershed Management	N5404	Watershed Protection	N540403 Inspection
Watershed Management	N5404	Watershed Protection	N540404 Boundaries
Watershed Management	N5405	Facility Management	N540501 WS Grounds
Watershed Management	N5405	Facility Management	N540502 WS Buildings
Watershed Management	N5405	Facility Management	N540503 WS Facilities & Roads
Watershed Management	N5406	Watershed Road Maintenance	N540601 Grade/Gravel/Ditching
Watershed Management	N5406	Watershed Road Maintenance	N540602 Bridges/Streams Culvert
Watershed Management	N5406	Watershed Road Maintenance	N540603 Roads/Row/Vegetation Cutting
Watershed Management	N5406	Watershed Road Maintenance	N540604 Tolt Roads & Streams
Watershed Management	N5407	Watershed Operations Support	N540701 Veh/Equipment Management
Watershed Management	N5407	Watershed Operations Support	N540702 Veh/Equip/Tool Repair
Watershed Management	N5408	Water Quality & Hydrology	N540801 Water Quality Monitoring
Watershed Management	N5408	Water Quality & Hydrology	N540802 Hydrological Monitoring
Watershed Management	N5409	Public/Cultural Programs	N540901 Recreation Planning
Watershed Management	N5409	Public/Cultural Programs	N540902 Management & Research
Watershed Management	N5409	Public/Cultural Programs	N540903 Watershed Education
Watershed Management	N5409	Public/Cultural Programs	N540904 Watershed Public Information
Watershed Management	N5410	Wildlife & Fisheries Programs	N541001 Program Planning & Evaluation
Watershed Management	N5410	Wildlife & Fisheries Programs	N541002 Interagency/Public Involvement
Watershed Management	N5410	Wildlife & Fisheries Programs	N541003 Ecological Monitoring & Research
Watershed Management	N5410	Wildlife & Fisheries Programs	N541004 Habitat & Species Inventory
Watershed Management	N5410	Wildlife & Fisheries Programs	N541005 Habitat Enhancement/Restoration
Watershed Management	N5411	Resource Information Mgmt	N541101 Program Plan/Evaluation
Watershed Management	N5411	Resource Information Mgmt	N541102 Information Maintenance
Watershed Management	N5411	Resource Information Mgmt	N541103 Information Services
Watershed Management	N5412	Special Projects	N541202 Silviculture
Watershed Management	N5412	Special Projects	N541205 Land Exchanges/Acquisitions

Program	Project	Project Name	Activity
Watershed Management	N5415	Cedar HCP	N541501 ASSESS OF EXPAND FOREST STAND
Watershed Management	N5415	Cedar HCP	N541502 ASSESS EXPAND FOREST ATTRIBUTE
Watershed Management	N5415	Cedar HCP	N541503 AUGMENT FOREST HABITAT INV
Watershed Management	N5415	Cedar HCP	N541504 LONG-TERM FOREST HABITAT
Watershed Management	N5415	Cedar HCP	N541505 OLD-GROWTH CLASSIFICATION
Watershed Management	N5415	Cedar HCP	N541506 RIPARIAN RESTOR PROJECT MONIT
Watershed Management	N5415	Cedar HCP	N541507 UP0LAND FOREST RESTOR PROJ MONT
Watershed Management	N5415	Cedar HCP	N541515 GIS DATA COMPATIBILITY STUDY
Watershed Management	N5415	Cedar HCP	N541516 FOREST HABITAT MODELING
Watershed Management	N5415	Cedar HCP	N541517 SPECIE HABITAT RELATION MODEL
Watershed Management	N5416	Cedar HCP	N541601 CRHCP GIS SUPPORT
Watershed Management	N5416	Cedar HCP	N541603 CRHCP TECHNICAL SUPPORT
Watershed Management	N5417	Cedar HCP	N541701 ROAD MAINTENANCE
Watershed Management	N5418	Cedar HCP	N541801 EXPERIMENTAL STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541802 LONG-TERM STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541803 AQUATIC RESTORATION MONITORING
Watershed Management	N5418	Cedar HCP	N541804 BULL TROUT SURVEYS (ADULT)
Watershed Management	N5418	Cedar HCP	N541805 BULL TROUT SPAWNING SURVEY
Watershed Management	N5418	Cedar HCP	N541806 BULL TROUT FRY/JUVENILE SURVEY
Watershed Management	N5418	Cedar HCP	Riparian Zone Studies
Watershed Management	N5418	Cedar HCP	N541809 BULL TROUT STREAM DISTRIBUTION
Watershed Management	N5418	Cedar HCP	N541810 BULL TROUT REDD INUNDATION STU
Watershed Management	N5418	Cedar HCP	N541811 COMMON LOON MONITORING
Water Quality & Supply	N5503	Water System Operations	N550301 Water Management
Water Quality & Supply	N5503	Water System Operations	N550302 Water System Control
Water Quality & Supply	N5503	Water System Operations	N550303 Anadromous Fishery Mgmt
Water Quality & Supply	N5503	Water System Operations	N550304 SCADA Management
Water Quality & Supply	N5503	Water System Operations	N550305 Highline Well Field
Water Quality & Supply	N5503	Water System Operations	N550306 Morse Lake PS
Water Quality & Supply	N5503	Water System Operations	N550307-SAFETY PROCESS MGMT COMPLIANCE
Water Quality & Supply	N5503	Water System Operations	N550308-EPA RISK MGMT COMPLIANCE
Water Quality & Supply	N5504	Water System Analysis	N550401 Eng Analysis/Modeling
Water Quality & Supply	N5504	Water System Analysis	N550402 Water Rights Mgmt
Water Quality & Supply	N5504	Water System Analysis	N550403 DEMAND METERING
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550501 Monitoring, Reporting & Admin
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550502 Cholrination Facilities O&M
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550503 Watershed Management
Water Quality & Supply	N5506	Total Coliform Rule Compl.	N550601 Monitoring, Reporting & Admin

Program	Project	Project Name	Activity
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550801 Monitoring, Reporting & Admin
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550802 Corrosion Trtmnt Facil O&M
Water Quality & Supply	N5509	Fluoridation Program	N550901 Fluoridation Program O&M
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551001 Otr Reg/Operational Analysis
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551002 Disinfection By-Product Rule
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551003 Limnology
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551005 WQ Lab
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551006 DW Reg Dev & App Research
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551007 Public Information/Notification
Water Quality & Supply	N5511	Special Projects	N551104 LIMS & QA/QC
Water Quality & Supply	N5512	Cedar HCP	N551201 INTERIM CHINOOK COHO
Water Quality & Supply	N5513	Cedar HCP	N551301 HCP STREAMFLOW GAUGING
Water Quality & Supply	N5513	Cedar HCP	N551302 SWITCHING CRITERIA STUDY
Water Quality & Supply	N5513	Cedar HCP	N551303 STEELHEAD REDD MONITORING
Water Quality & Supply	N5513	Cedar HCP	N551304 CHINOOK STUDIES
Water Quality & Supply	N5513	Cedar HCP	Salmonid Studies
Water Quality & Supply	N5514	WQ Monitoring	N551403 DRINKING WATER QUALITY MONITOR
Water Quality & Supply	N5515	HCP Fisheries	N551501 FRY CONDITION AT RELEASE
Water Quality & Supply	N5515	HCP Fisheries	N551502 FRY MARKING & EVALUATION
Water Quality & Supply	N5515	HCP Fisheries	N551503 FRY TRAPPING & COUNTING
Water Quality & Supply	N5515	HCP Fisheries	N551504 FISH HEALTH
Water Quality & Supply	N5515	HCP Fisheries	N551505 SHORT-TERM FRY REARING
Water Quality & Supply	N5515	HCP Fisheries	N551506 LAKE WASHINGTON PLANKTON STUDY
Water Quality & Supply	N5515	HCP Fisheries	N551508 ADULT SURVIVAL DISTRIBUTION
Water Quality & Supply	N5515	HCP Fisheries	N551509 PHENOTYPIC & GENETIC STUDY
Water Quality & Supply	N5516	Tolt DBO	N551601-CONTRACTOR PAYMENTS
Water Quality & Supply	N5516	Tolt DBO	N551603-MANAGEMENT COSTS
Resource Planning	N5609	Water Resource & Habitat Issues	N560903-ESA

Transmission

Program	Project	Project Name	Activity
Water Operation	N6540	WT - Headwork/Storage	N654001 Program Maintenance
Water Operation	N6540	WT - Headwork/Storage	N654002 Event Driven Repairs
Water Operation	N6541	WT - Transmission Pipeline Maint	N654101 Program Maintenance
Water Operation	N6541	WT - Transmission Pipeline Maint	N654102 Event Driven Repairs
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654201 Program Maintenance
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654202 Event Driven Repairs
Water Operation	N6543	WT - Grounds/Roads/ROW	N654301 Grade/gravel roads - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654302 Grade/gravel roads - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654303 Bridges/culverts - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654304 Bridges/culverts - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654305 Fences/gates - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654306 Fences/gates - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654307 Mow ROW - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654308 Mow ROW - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654309 Mow Other
Water Operation	N6544	WT - Facility Maintenance	N654401 Program Maintenance
Water Operation	N6544	WT - Facility Maintenance	N654402 Event Driven Repairs
Water Operation	N6545	WT - Castings	N654501 Casting Adjustments
Water Operation	N6546	WT - Customer Services	N654601 Communications/Dispatch
Water Operation	N6546	WT - Customer Services	N654602 Locating/Marking
Water Operation	N6547	WT - Damage by Others	N654701 P/L/ROW/Facility
Water Operation	N6548	WT - Transmission Shops	N654801 Shops/Fabrication
Water Operation	N6549	WT - General Expenses	N654905 Tools/small equipment
Water Operation	N6549	WT - General Expenses	N654906 Standy
Water Operation	N6549	WT - General Expenses	N654907 Truck Inventory
Water Operation	N6549	WT - General Expenses	N654908 Downtime - Job Related
Water Operation	N6549	WT - General Expenses	N654909-DISASTER-EMERG RESPONSE

1% Program

Program	Project	Project Name	Activity
Community Services	N5303	Resource Conservation	N530301 1% Conservation

EXHIBIT VII

Cascade Sub-regional System

The facilities included in this Exhibit incorporate all appurtenances including but not limited to rights of way, line valves, system meters, and remote automation devices.

A. Facilities used by Cascade:

- The NE 8th Street Feeder, from the Cedar Eastside Supply Line to the Bellevue pump station near the intersection of 151st PL NE and NE 8th Street
- The Bel-Red Road Feeder, from the Cedar Eastside Supply Line to the Bellevue Point of Delivery at the intersection of Bel-Red Road and 132nd Ave NE
- The NE 24th Street Feeder, from the Cedar Eastside Supply Line to the Bellevue Point of Delivery near the intersection of NE 24th Street and 132nd Ave NE

B. Other Sub-regional Transmission Facilities used in part by Cascade:

- SEGMENT 1 – Includes use by Bellevue, Coal Creek, Mercer Island, and Seattle and consists of:
  1. The portion of the of the original Mercer Island Pipeline from the tee off the Cedar Eastside Supply Line in Factoria Boulevard SE to the west flange of the main line tee at the east end of the 16-inch Mercer Slough Bridge Pipeline (30-inch).

- SEGMENT 2 – Includes use by Bellevue, Mercer Island, and Seattle and consists of:
  1. The portion of the of the original Mercer Island Pipeline from the west flange of the main line tee at the east end of the 16-inch Mercer Slough Bridge Pipeline to the west flange of the 20-inch valve west of the Enatai service to Bellevue (30-inch).
  2. The entire 16-inch Mercer Slough Bridge Pipeline (16-inch).

- SEGMENT 3 – Includes use by Tukwila and Seattle and consists of:
  1. The 20-inch pipeline in West Marginal Way from the West Seattle Pipeline to South Director Street.

Seattle may from time to time eliminate facilities from this list provided that it secures the written consent of Cascade in the event that Cascade is served by a tap or meter installation on the facility being eliminated. Seattle shall provide Cascade with 180 days prior written notice of any proposed change.

APPENDIX C

Shortage Management Plan

Cascade Water Alliance
Shortage Management Plan

November 2011

HDR

500 108th Avenue NE
Suite 1200
Bellevue, WA 98004-5549
(425) 450-6200

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List of Appendices

1.0 Introduction and Purpose

Municipal water suppliers must be prepared for water shortages in order to minimize effects on the communities they serve. This Shortage Management Plan (SMP) outlines how Cascade Water Alliance (Cascade) will respond to a water supply shortage affecting its regional water supply.

At the present time Cascade purchases all of its water from Seattle Public Utilities (SPU). Various events could cause a shortage in the SPU water supply system. These include reduced snowpack in the Cascade Range due to a dry winter or early spring melt; an earthquake or other event that damages reservoirs, treatment facilities or transmission lines; water quality problems; or intentional destructive acts. These different kinds of events may cause shortages with different characteristics in terms of advance warning, severity and duration. The SMP offers flexibility for a range of appropriate responses.

As required under Washington State Department of Health (DOH) regulations, SPU and each Member of Cascade has its own shortage management plan to guide water system operations and interaction with end-use customers in each community during a water shortage. Cascade's SMP complements the SPU and Member SMPs. ***Cascade's primary role in the event of a water shortage is to coordinate responses among the Cascade Member water systems that receive water from the regional supply, and SPU as the source of the regional supply. Therefore this SMP focuses on the communication and coordination activities to be carried out by Cascade staff during a water shortage.***

2.0 Related Agreements

2.1 Cascade Interlocal Contract

Cascade's *Interlocal Contract* (2004) provides the basis for Cascade's operations. Section 7.3 of the Interlocal Contract addresses water shortages and emergencies. The agreement says Cascade Members "must respond to water shortages in a collective, shared fashion under a Cascade shortage management plan adopted by the Board." The agreement allows the Board to impose penalty charges or to impose a disproportionate reduction in supply on any Cascade Member who does not comply with the shortage management plan during a shortage. However the agreement also indicates that Members are not required to impose Cascade's shortage management plan in areas not served by Cascade's regional supply; and that Members with independent supply may decline to participate in Cascade's shortage management program without penalty if they cease taking Cascade water during the period of the emergency or shortage.

A copy of Section 7.3 of the *Interlocal Contract* is included in Appendix A of this SMP.

2.2 Seattle Block Contract

In 2004 Cascade and SPU entered into a *50-Year Declining Block Water Supply Agreement between the City of Seattle and the Cascade Water Alliance* (Block Contract; amended in 2008). Article VII of the Block Contract provides for shortage management. Section 7.2 says that Cascade and SPU "shall coordinate the development, adoption and implementation" of shortage

management plans and "shall communicate with each other concerning current and projected water supply conditions" prior to invoking shortage management plans.

Section 12.1 of the Block Contract recognizes that unilateral actions by Seattle may be needed at times due to unforeseen and unavoidable events, including water shortages. It indicates that any curtailment of supply by Seattle shall be imposed proportionately among its wholesale and retail customers.

Consistent with Section 7.2 of the Block Contract, this SMP was provided to SPU for review prior to adoption by the Cascade Board.

As a separate matter, Section 7.3 of the Block Contract provides that if water use restrictions are imposed on SPU by the terms of its agreements with Federal and State agencies and Tribes, such restrictions will be borne proportionally by SPU and its wholesale customers, including Cascade. In this event, Cascade and its Members will need to review the restrictions and determine appropriate short-term or long-term actions.

2.3 Lake Tapps Community Agreement

Cascade entered into a *2009 Agreement Regarding Lake Tapps* with the Lake Tapps Community. The agreement addresses the Lake Tapps Community's desire for a management approach that assures the recreational and ecological viability of Lake Tapps. It stipulates that Cascade will maintain "Normal Full Pool" during an "Annual Recreation Period."

Cascade's obligation to maintain recreational Lake Levels will be implemented consistent with the following priority of interests for use of White River flows: (i) provision of minimum stream flows; (ii) provision of recreational lake levels; and (iii) provision of municipal water supply.

One way in which Cascade intends to meet this obligation is to reduce and minimize the need for Lake Tapps to provide for municipal water supply during drought conditions. Therefore, once Lake Tapps begins providing municipal supply, consideration of maintaining recreational water levels in Lake Tapps should become a criterion for triggering curtailment actions under Cascade's SMP.

Lake Tapps lake level triggers are not established in this SMP at this time, for the following reasons:

- Cascade is not currently using Lake Tapps for municipal supply.
- Cascade's current planning vision indicates that Cascade's use of Lake Tapps is at least 20 years away.
- Curtailment by Cascade Members now would have no effect on lake levels.

Cascade will update the SMP to include lake level triggers at such time as Lake Tapps is brought on line for municipal supply purposes.

2.4 Tacoma Public Utilities Water Supply Agreement

Cascade has an *Agreement for the Sale of Wholesale Water* (2005) with Tacoma Public Utilities (TPU). At this time Cascade is not using this supply source, and will not begin using it until a transmission pipeline is constructed to deliver the water from Tacoma's Second Supply Pipeline. Therefore at this time direct coordination with Tacoma is not addressed in this Shortage

Management Plan. At such time as Cascade begins receiving regional water supply from Tacoma, the need to incorporate shortage response actions in coordination with TPU will be reviewed.

3.0 Plan Activation and Applicability to Cascade Members

3.1 Activation of SMP

It is anticipated that the initial need for shortage management will be identified through a communication from SPU indicating that a supply shortage may occur or is in progress. If this is the case, SPU will activate its own Water Shortage Contingency Plan (WSCP). Cascade's response to activation of the SPU WSCP will be guided by the Block Contract between Cascade and SPU. Action by the Cascade Board will be required in order to activate Cascade shortage management actions under this SMP. This action could be taken during a regularly scheduled Board meeting, or during an emergency meeting called in response to the expected or actual water shortage. The Board may adopt a resolution directing Cascade's Chief Executive Officer (CEO) or designee to activate the Cascade SMP, including water use curtailment actions from Section 4.

Alternatively the Board also has the authority to activate the Cascade SMP without activation of SPU's SMP.

In the event of an emergency that requires immediate action to prevent risks to public health and safety, Cascade's CEO may activate the SMP on a temporary basis. In this event the Board shall meet as soon as possible to review the CEO's action.

Once the SMP has been activated, it may be necessary to move from one level of shortage management to another. This will likely be in response to a change in the stage of curtailment by SPU, but could also be done as an independent action by Cascade if conditions warrant. Cascade's Executive Committee shall have the authority to direct Cascade's CEO or designee to either elevate or diminish the level of curtailment from one level to another.

3.2 Water Shortage Management Committee

The Cascade CEO shall designate a member of Cascade's staff to lead Cascade's shortage response actions while the SMP remains activated. The CEO shall also designate a Water Shortage Management Committee consisting of select Cascade staff and Member staff to advise Cascade on implementation of the SMP once it has been activated and for the duration of the water shortage.

3.3 Coordination with SPU

Cascade's CEO or designee will communicate closely with SPU regarding activation of the SMP and a change in the level of shortage designated. Cascade will take the following actions in the event SPU activates its plan:

- If SPU initiates its **Advisory stage**, Cascade will assess the situation to determine whether to activate its plan and recommend the same to its Members.
- If SPU activates its **Voluntary or Mandatory stages**, Cascade (and its Members) should again assess the situation and consider whether to: a) activate their SMPs (if not

already activated), and b) rely more heavily on non-SPU sources of supply, in the Member service areas where this is applicable.

- If SPU activates its **Emergency Curtailment stage**, Cascade anticipates that Section 12.1 (Emergency Events) of the Block Contract would also be triggered. This section permits SPU to curtail supplies to Cascade, on a proportional basis with its retail customers and other wholesale customers. In the event of significant curtailment, Cascade and its Members would need to activate their SMPs in order to manage the situation effectively.
- Cascade and its Members have a key role in the communications strategy during a regional water shortage. It is anticipated that SPU will communicate with its own retail customers, wholesale customers, large retail customers, regional stakeholders, state/federal resource agencies, and regional media. Cascade Members should communicate with retail customers, wholesale customers, local stakeholders, and local media. Cascade will help to coordinate and facilitate communications between the regional level and the local level.

Cascade will maintain a current copy of SPU's WSCP on file at Cascade offices, and encourages Members that receive water from Cascade's regional water supply system maintain a copy of both the Cascade SMP and SPU WSCP readily available with their own Member SMP.

3.4 Applicability to Cascade Members

Consistent with the Interlocal Contract, Section 7.3 activation of shortage management applies to Cascade Members as follows:

- **Members receiving all of their water supply from Cascade:** Required to comply with Cascade's SMP.
- **Members receiving partial supply from Cascade:** Required to comply, in portions of their service areas that receive regional supply; *or* to discontinue use of Cascade supply during the water shortage.
- **Members not receiving Cascade supply.** Not required to comply with Cascade's SMP.

At the present time Covington Water District does not receive water from Cascade. As long as this remains true, the District would not be required to implement shortage management actions under this SMP.

Section 7.3 of the Interlocal Contract also addresses Cascade Members with interruptible supply. However at this time there are no members with interruptible supply.

3.5 Member Shortage Plans

DOH regulations at Chapter 246-290-100 Washington Administrative Code require water utilities to have their own water shortage response plan. These are typically submitted to DOH every six years with their comprehensive water system plan update. Cascade recommends that Members receiving a significant supply of Cascade water review their water shortage response plans and consider modifications if needed to ensure the Member plans use similar stages of

curtailment as listed in the Cascade SMP, and that provisions in the Member SMPs support effective coordination with SPU and Cascade during a water shortage.

4.0 Stages of Water Use Curtailment

Cascade's SMP has the same four stages of curtailment as SPU's Water Shortage Contingency Plan (WSCP). These are designed for progressive implementation during a drought or other long-range disruption of water supply. However if a shortage occurs due to a sudden, unexpected event, any of the four stages can be activated from the outset of the event.

Table 1 summarizes actions to be taken in the four stages of curtailment. Additional detail is provided in the subsections following Table 1.

4.1 Advisory Stage

This stage is advisory only, and does not require curtailment actions by water users. The public is informed as early as meaningful data are available that a water shortage may occur.

4.1.1 Objectives

- Prepare Cascade, its Members and water users for a potential water shortage, thereby allowing for adequate planning and coordination.
- Support distribution system management actions by Cascade Members that can help to forestall or minimize the need for more stringent demand or supply management actions.

4.1.2 Triggers

- Notice from SPU that they have activated the Advisory Stage of their WSCP and that Cascade is requested to do the same; and
- An action of the Cascade Board authorizing activation of Cascade's advisory stage.

4.1.3 Theme of Public Messages

- Cascade's public messaging will be consistent with SPU's messaging during the shortage event. The 2006 SPU WSCP provides the following description for this stage: "Potential exists for lower than normal supply; conditions may return to normal, or later on we may need to reduce consumption. Continue to use water wisely to help ensure sufficient supply for people and fish. We'll keep you informed."

Table 1: Four Stages of Curtailment

	Advisory	Voluntary	Mandatory	Emergency
Theme of Public Messages from SPU	A shortage may occur soon; get ready.	A shortage has occurred. We are requesting voluntary curtailment to reduce demand by x percent.	A severe shortage has occurred. Mandatory curtailment is necessary and specific uses of water are restricted.	An emergency shortage has occurred. Mandatory curtailment is necessary and public health and safety uses are the priority.
Cascade Communication Actions	• Inform Members they are required to activate their Advisory Stage (see exemptions). • Establish a regular communication mechanism with Members. • Request Cascade Members carry out supply-side management actions. • Participate on SPU's Water Shortage Advisory Group. • Assist Members to acquire and distribute public information materials.	• Inform Members they are required to activate their Voluntary Stage. • Request Cascade Members report to Cascade regarding supply-side management actions. For Members that have independent supply, this may include relying more heavily on these supplies. • Request Cascade Members communicate with their largest customers. • Communicate regularly with Cascade Members. • Communicate with the Washington State Department of Health. • Participate on SPU's Water Shortage Advisory Group. • Assist Cascade Members to acquire and distribute public information materials.	• Inform Cascade Members that they are required to activate their Mandatory Stage, including enforcement as appropriate. • Gather information from SPU on water quality or pressure problems, and communicate these to Members. • Continue communication actions from the Voluntary Stage, with modifications as appropriate for the Mandatory Stage.	• Inform Cascade Members that they are required to activate their Emergency Stage, including enforcement as appropriate. • Continue and intensify communication actions from the Mandatory Stage. • For Members that have independent supply, request they rely as much as possible on these supplies. • Alert Members of particular operational problems that may occur with system-wide reduced water consumption. • Assist Cascade Members to define and communicate exemptions for public health and safety.
Cascade Operating Actions	• Initiate preparation for Voluntary Stage.	• Assess revenue implications and remedies. • Initiate preparation for Mandatory Stage.	• Continue operating actions from the Voluntary Stage • Initiate preparation for Emergency Stage. • If necessary consider enforcement actions against any non-complying Member.	• Continue operating actions from Mandatory Stage. • Make staff resources available to Cascade Members. • Coordinate volunteers on behalf of Members.

4.1.4 Communication Actions

- Once the Advisory Stage has been activated by Cascade, inform Cascade Members that they are required to activate their Advisory Stage (or equivalent actions per each Member's individual SMP). This will not apply to Cascade Members exempted per Section 3.3 of this SMP.
- Establish a regular communication mechanism to keep Cascade Members and the Cascade Board informed regarding stages of curtailment; water supply conditions; actions taken by Cascade Members and others in the region; and information that should be communicated to the public, local parks departments, large customers, landscape industry professionals and others.
- Request Cascade Members carry out supply-side management actions they will take during the Advisory Stage to reduce use of water for local water distribution system operations, and compile information on the actions taken. For Members that have independent supply, this may include relying more heavily on these supplies where feasible, to reduce pressure on the Cascade regional supply.
- If requested by SPU, participate on SPU's Water Shortage Advisory Group to help develop public information messages and materials and to provide input on Cascade Member actions.
- Assist Cascade Members acquire and distribute public information materials as needed. This may include materials from SPU or other sources, as appropriate. Post information on Cascade's web site regarding the Advisory Stage.

4.1.5 Operating Actions

- Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs and communications strategies. Assist Members plan specific actions for the Voluntary Stage, including distribution system actions by the Member and voluntary water use curtailment actions Members can suggest to their end-use customers if the Voluntary Stage is activated.

4.2 Voluntary Stage

If supply conditions worsen, the plan moves to the Voluntary Stage which relies on voluntary cooperation and support of customers to meet target consumption goals. During this stage, specific voluntary actions are suggested for residential and commercial customers.

4.2.1 Objectives

- Encourage Members to take distribution system management actions to further stretch available supply.
- Encourage customer voluntary actions to maintain or reduce demand to meet target consumption levels.

- Forestall or minimize need for later more stringent demand or supply management actions.
- Maintain drinking water quality at acceptable levels throughout the shortage.

4.2.2 Triggers

- Notice from SPU that they have activated the Voluntary Stage of their WSCP and that Cascade is requested to do the same; and
- Action by Cascade's Executive Committee can authorize a change in curtailment level to the Voluntary Stage. (Alternatively the Board may authorize the Voluntary Stage as Cascade's initial response to a shortage).

4.2.3 Theme of Public Messages

- Cascade's public messaging will be consistent with SPU's messaging during the shortage event. The 2006 SPU WSCP provides the following description for this stage: "Regional water demands need to be reduced by *x* percent [the level will be determined in consultation with SPU]. Customers are responsible for determining how they will meet that goal. We are relying on support and cooperation of all water users to stretch the available water supply. If everyone cooperates we may avoid imposing more stringent restrictions. In addition to meeting essential water needs of customers, meeting the needs of fish habitat and other environmental concerns is a priority."

4.2.4 Communication Actions

- Once the Voluntary Stage has been activated by Cascade, inform Cascade Members that they are required to activate their Voluntary Stage (or equivalent actions per each Member's individual SMP). This will not apply to Cascade Members exempted per Section 3.3 of this SMP.
- Request Cascade Members report to Cascade regarding supply-side management actions they will take during the Voluntary Stage. For Members that have independent supply, this may include relying more heavily on these supplies where feasible, to reduce pressure on the Cascade regional supply.
- Request Cascade Members communicate with their largest customers to request percentage reductions.
- Communicate regularly with Cascade Members regarding information that should be communicated to the public, local parks departments, large customers, landscape industry professionals and others. At the voluntary stage, this will include specific recommendations on how customers can reduce water consumption, including links to the *savingwater.org* website or equivalent information resources.
- Communicate with the Washington State Department of Health regarding actions being taken by Cascade and its Members.

- If requested by SPU, participate on SPU's Water Shortage Advisory Group to help develop public information messages and materials and to provide input on Cascade Member actions.
- Assist Cascade Members acquire and distribute public information materials as needed. Review information from SPU, including materials in the WSCP, regarding actions customers can take to reduce their water consumption. As appropriate, post information for Cascade Members and their customers on Cascade's web site regarding the Voluntary Stage. Appendix B provides examples of water saving actions customers can take.

4.2.5 Operating Actions

- Assess revenue implications and potential remedies and report to the Cascade Board.
- Initiate planning and preparation for Mandatory Stage actions, including an assessment of potential staffing impacts, training needs and communications strategies. Assist Cascade Members identify mandatory restrictions that may apply during the Mandatory Stage, if it is needed.

4.3 Mandatory Stage

If the voluntary stage does not result in the demand reduction needed, or supply conditions worsen, the Mandatory Stage would be implemented. This stage prohibits or limits certain water actions. Cascade will rely on its Members to enforce mandatory actions, using techniques as appropriate to each service area or jurisdiction.

4.3.1 Objectives

- Achieve targeted goals for reducing consumption, by restricting certain water uses. Goals will be determined in consultation with SPU, based on the characteristics and severity of the water shortage.
- Ensure that adequate water supply will be available for the duration of the supply shortage.
- Minimize the disruption to customers' lives and businesses while meeting target consumption goals.
- Maintain drinking water quality at acceptable levels throughout the shortage.
- Promote equity among Cascade Members in responding to the supply shortage.

4.3.2 Triggers

- Notice from SPU that they have activated the Mandatory Stage of their WSCP and that Cascade is requested to do the same; and
- Action by Cascade's Executive Committee can authorize a change in curtailment level to the Mandatory Stage. (Alternatively the Board may authorize the Mandatory Stage as Cascade's initial response to a shortage).

4.3.3 Theme of Public Messages

- Cascade's public messaging will be consistent with SPU's messaging during the shortage event. The 2006 SPU WSCP provides the following description for this stage: "It is necessary to impose mandatory restrictions to reduce demand because the voluntary approach has not resulted in the necessary savings [*or* conditions have continued to get worse and even more savings are needed]. We are continuing to rely on the support and cooperation of the public to comply with these restrictions, but need the certainty and predictability of restricting certain water uses in order to ensure that throughout the duration of this shortage an adequate supply of water is maintained for public health and safety."

4.3.4 Communication Actions

- Once the Mandatory Stage has been activated by Cascade, inform Cascade Members that they are required to activate their Mandatory Stage (or equivalent actions per each Member's individual SMP). This will not apply to Cascade Members exempted per Section 3.3 of this SMP. Enforcement actions may be needed in the Mandatory Stage. Cascade expects each Member to enforce restrictions in a manner suitable to the local service area or to work with other local governments having enforcement powers to do so.
- Gather information from SPU regarding any water quality or water pressure problems, if any, that are identified or that may possibly occur at the mandatory stage, and communicate these to Cascade Members management, operations staff and public affairs staff.
- Continue communication actions from the Voluntary Stage, with modifications as appropriate for the Mandatory Stage (as determined in consultation with SPU and Cascade Members).

4.3.5 Operating Actions

- Continue operating actions from the Voluntary Stage, and:
- Initiate planning and preparation for Emergency Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies. Assist Members plan specific actions that may be needed if the Emergency Stage is activated.
- If necessary the Board will consider enforcement actions against any Members who do not comply with Mandatory Stage actions, as allowed under the Cascade Interlocal Agreement.

4.4 Emergency Stage

At this stage Cascade and its Members recognize that a critical water situation exists and that, without additional significant curtailment actions a shortage of water for public health and safety is imminent. This would be used as the last stage of a progressive drought or similar situation, or to address an immediate crisis such as a disruption to water sources, treatment or

transmission facilities. This type of situation has never occurred in Cascade or SPU history, but could occur during a very severe drought or under emergency conditions such as a major earthquake that ruptures transmission pipelines.

4.4.1 Objectives

- Strive to meet the water use goals established for this stage, recognizing that customers' lives and businesses may be significantly impacted in order to achieve necessary water savings. Goals will be determined in consultation with SPU, based on the characteristics and severity of the water shortage.
- Promote equity among Cascade Members in responding to the supply shortage.

4.4.2 Triggers

- Notice from SPU that they have activated the Emergency Stage of their WSCP and that Cascade is requested to do the same; and
- If Cascade's SMP has already been activated, action by Cascade's Executive Committee can authorize a change in curtailment level to the Emergency Stage. (Alternatively the Board may authorize the Emergency Stage as Cascade's initial response to a shortage; or the CEO may authorize the Emergency Stage if there is an emergency that requires immediate action to prevent risks to public health and safety. See Section 3.1.).

4.4.3 Theme of Public Messages

- Cascade's public messaging will be consistent with SPU's messaging during the shortage event. The 2006 SPU WSCP provides the following description for this stage: "We are in an emergency water supply situation and need the immediate assistance of the public to achieve necessary water savings. We are imposing additional water restrictions to achieve the savings because the mandatory approach has not resulted in sufficient savings [*or* conditions have continued to get worse], and we need to ensure water will be available for public health and safety throughout this shortage."

4.4.4 Communication Actions

- Once the Emergency Stage has been activated by Cascade, inform Cascade Members that they are required to activate their Emergency Stage (or equivalent actions per each Member's individual SMP). This will not apply to Cascade Members exempted per Section 3.3 of this SMP. Enforcement actions may be needed in the Emergency Stage. Cascade anticipates each Member will enforce restrictions in a manner suitable to the local service area or will work with other local governments having enforcement powers to do so.
- Continue and intensify communication actions from the Mandatory Stage, with modifications as appropriate for the Emergency Stage (as determined in consultation with SPU and Cascade Members). This includes, but is not limited to, Cascade's

role in supporting effective communications between individual Cascade Members and SPU.

- For Members that have independent supply, request they rely as much as possible on these supplies, to reduce pressure on the Cascade regional supply.
- Alert Members of particular operational problems that may occur with system-wide reduced water consumption, and communicate these to Cascade Members management, operations staff and public affairs staff and on the Cascade website. These could include, for example, taste and odor problems; and reduced pressures in Member distribution systems.
- Assist Cascade Members to define and communicate exemptions for medical facilities and other facilities having key responsibilities for public health and safety.

4.4.5 Operating Actions

- Continue to monitor staffing impacts, training needs and communications strategies and make adjustments where feasible to enhance effectiveness of the regional water shortage response.
- If feasible and applicable, make staff resources available to Cascade Members to assist them in the water shortage response. This may include temporary reassignment of Cascade staff; and/or outsourcing of specialized functions or additional staffing resources that could provide assistance to Cascade Members.
- If volunteer services are available and deemed valuable to the water shortage response, and if desired by the Members, Cascade will coordinate volunteers on behalf of its Members.
- If necessary the Board will consider enforcement actions against any Members who do not comply with Emergency Stage actions, as allowed under the Cascade Interlocal Agreement.

5.0 Communications During Water Shortages

In the event of a water shortage that requires this SMP to be activated, Cascade will coordinate closely with its Members and SPU regarding public communications. It is anticipated that SPU will take the lead on communications involving regional media such as major radio, television and newspaper outlets. Members will have the primary responsibility for communicating directly with their own customers and local communities. Cascade will coordinate communications among Members and SPU and will assist its Members issue consistent and effective communications to the communities that they serve.

Appendix A

Cascade Interlocal Contract Section 7.3 (Shortages and Emergencies)

Section 7.3 Shortages and Emergency.

Section 7.3.1 Shortages. Members must respond to water shortages in a collective, shared fashion under a Cascade shortage management plan adopted by the Board. Resources must be shared in a manner that reduces the risk of severe shortages to each Member. Cascade's shortage management plan may include without limitation, a definition and classification of shortages, a shortage contingency plan including mandatory programmatic actions among all Members in the event of shortages, allocation of authority for determining and responding to shortages, and a communications and outreach program for the public. Members shall not be required to implement Cascade's shortage management plan in areas not served by the Supply System.

In the event of shortages, Cascade shall reduce or halt Interruptible Supply before invoking the Shortage Management Plan with respect to all Members with a Full Supply Commitment. However, the Board may, by 65% Dual Majority Vote, continue service in the amounts it deems appropriate to one or more Members receiving Interruptible Supply.

The Board may require that Members failing to comply with mandatory shortage management programs implemented under Cascade's shortage management plan assume a disproportionate reduction in supply or pay penalty charges, or both.

In the event of a Cascade-wide water shortage, members with Independent Supply may, without penalty decline to participate in the shortage management program for that shortage by foregoing all supply from Cascade for the duration of the emergency or shortage.

To avoid shortages resulting from emergencies or the inability to develop sufficient supplies, the Board may, by 65% Dual Majority Vote, establish moratoria on connections or additional commitments for future water services by the Members. A moratorium may be discontinued by a Dual Majority Vote of the Board.

Section 7.3.2 Emergency. The Board shall include in Cascade's shortage management plan policies and procedures for addressing short-term disruptions of water supply, transmission or water quality, and it may delegate to the General Manager authority to address such disruptions according to such policies and procedures.

Appendix B

Actions that Can Reduce Water Usage by Distribution Systems and Customers

POSSIBLE ADVISORY STAGE WATER CONSERVATION TIPS FOR CUSTOMERS (Adapted from SPU 2006 WSCP)

Conserve Inside

For most households, the vast majority of water is used indoors. Taking conservation actions and installing efficient fixtures help reduce your water use year-round. There are also ways to conserve water in outdoor uses and at work. Below are suggested actions:

- Fix leaking faucets and toilets.
- Wash only full loads in the dishwasher and clothes washer.
- Minimize faucet use when brushing your teeth, shaving and washing dishes.
- Don't pre-rinse dishes unless you need to. Most new dishwashers don't require pre-rinsing.
- Save lukewarm water for watering plants, etc. while you wait for hot water in kitchens and showers.
- If you are buying a new toilet, look for a WaterSense model.
- If you are buying a new washing machine, purchase a high-efficiency model. WashWise rebates may be available for qualified machines.

Conserve Outside

Make the most of the water you will use in the spring and summer:

- Aerate lawns in the spring to better absorb water.
- Mulch planting beds to decrease evaporation.
- Select the right plants for the right place – contact SPU or see our website for information.
- Tune-up and improve your irrigation system – rebates may be available.
- Wash your cars at locations that recycle their water.

Note: For more information on home water conservation tips for inside and out, visit www.savingwater.org or call 684-7283 (684-SAVE)

Conserve at Work

Businesses and institutions can reduce water use and lower utility costs by adopting conservation practices and replacing inefficient equipment or operations.

- Check for leaks.
- Use a broom, instead of a hose, to routinely clean driveways and sidewalks
- Turn off water-using equipment when not in use, including dishwashers, garbage disposals, and food troughs.
- Upgrade equipment efficiency – rebates may be available.
- Increase employee awareness of water conservation.

POSSIBLE VOLUNTARY STAGE CUSTOMER WATER SAVING ACTIONS
(Adapted from SPU 2006 WSCP)

The following voluntary actions are being requested of all customers:

SET A GOAL: Such as use 10% less water
Most customers can easily save 10% by choosing several items from the menu of water saving actions below. If you routinely do outdoor watering, select those actions first. Set a goal to reduce your water use by 10% from the amount you used during the same billing period last year. Most utility bills contain your water consumption for each billing period. Much of the 10% can probably be achieved through conservation actions that are wise to do all the time. If that is not sufficient, then the special curtailment actions listed here can be implemented during the duration of the supply problem.

REDUCE OUTDOOR WATER USE

Conservation Actions:
- Avoid **watering** between 10 AM and 7 PM to reduce evaporation.
- **Stop obvious water waste** such as gutter flooding, sidewalk and street watering, and fix leaks.
- **Never leave a hose running,** always use a shut-off nozzle.
- **Use a broom** rather than a hose or pressure washer to clean sidewalks and driveways.

Curtailment Actions:
- **Reduce lawn watering** (twice a week or less if possible).
- **Let your lawn go dormant**. Customers who choose to not water their lawns should water deeply once each rainless month to keep grass roots alive. To avoid runoff when you water, if the water puddles, cycle your sprinkler on and off until water is absorbed.
- **Refrain from filling** empty pools and hot tubs.
- **Turn off water features** and fountains.
- **Wash vehicles only at car washes that recycle their water.**

REDUCE INDOOR WATER USE

Conservation Actions:
- **Install a water efficient WaterSense toilet.** These toilets have proven to perform well and give long-term water savings. Replacing a frequently used old toilet with a new efficient toilet can save most households in utility bills. Check www.savingwater.org for WaterSense toilet models.
- **Install a high-efficiency clothes washer**. New washers are typically one-third more water efficient than old washers.
- **Wash only full loads in the clothes washer and dishwasher,** or choose an appropriate load-size setting for the number of items in the washer.
- **Turn off the tap** while brushing your teeth, hand-washing dishes or shaving.
- **Fix leaky faucets and toilets**. Put several drops of food coloring in your toilet tank. After 20 minutes, if you have color in the bowl, you have a slow leak that over time can amount to a lot of water.

• **Install an efficient showerhead.** New showerheads work well and use much less water than old high-flow models.
• **Install an efficient faucet aerator.** Replace your older bathroom faucet nozzle (aerator) with one that uses one gallon per minute or less.

Curtailment Actions:
• **Spend one minute less in the shower.** Try to limit showers to five minutes or less.
• **Flush your toilet less often.** Toilet flushing is the largest water use inside the home. As the saying goes, "If it's yellow, let it mellow."

REDUCE WATER USE AT WORK
There are a wide variety of opportunities for businesses and agencies to reduce their water use and operating expenses.

Conservation Actions:
• **Check cooling towers.** Cooling towers - and the ways that they regulate water use – represent real opportunities for improving water efficiency.
• **Check for and fix leaks.** Toilet and urinal leaks are very common. Investigate obvious or suspected leaks.
• **Use a broom,** instead of a hose or pressure washer, to routinely clean driveways and sidewalks.
• **Turn off water-using equipment** when not in use, including open hoses, dishwashers, garbage disposals, and food troughs.
• **Check air conditioners, refrigerators, and ice machines.** If your company's air conditioners or refrigerators use water-cooled condensers, investigate air-cooled equipment for possible efficiencies. Rebates are available. Visit **www.savingwater.org.**
• **Install water-efficient toilets, urinals and faucets** in public and employee restrooms. Replacing old toilets, urinals, and faucet aerators with efficient ones can produce substantial savings. Rebates are available. Visit **www.savingwater.org.**
• **Reuse process water.** Water used in industrial and manufacturing processes should be reused as often as possible. Rebates are available. Visit **www.savingwater.org.**
• Hospitality businesses can offer guests the option of clean linens each day.
• **Increase employee awareness of water conservation** through management memos or newsletter messages. Install signs that encourage water conservation in restrooms or work areas where water is used. For additional work-related conservation tips, call (206) 343-8505**.**

Curtailment Actions:
• **Reduce outdoor watering** (twice a week or less if possible). Rebates are available for smart irrigation technologies. Visit **www.savingwater.org.**
• **Minimize vehicle washing**, defer or use a water recycling car wash.
• **Turn off** decorative water fountains.
• **Serve water only on request** at restaurants. Avoid thawing with running water.

For home water conservation tips, visit www.savingwater.org
or call (206) 684-7283 (684-SAVE)

APPENDIX D

Reclaimed Water Opportunities

Reclaimed Water

Chapter 5 of the current TSP discusses Cascade's current outlook on current and potential future uses of reclaimed water in the Cascade service area. This appendix provides additional background information, drawn from Cascade's prior (2004) plan. While some of the specific sites for potential use of reclaimed water may have changed in the interim, the overall opportunities for reclaimed water remain similar at this time.

Reclaimed water is defined by Chapter 90.46 RCW as "effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater."

Reclaimed water can be used for activities such as irrigation to aid water suppliers in meeting the needs of their customers by reducing the demands upon high-quality potable water supplies, especially during peak use times. The use of reclaimed water may also benefit the environment by decreasing the need for withdrawals from streams and groundwater, recharging aquifers that are in hydraulic continuity with streams, and potentially directly augmenting streamflows.

Sources of Reclaimed Water

Municipal wastewater treatment plants are the typical source of reclaimed water. The majority of water customers served by Cascade Members receive wholesale wastewater conveyance and treatment services provided by King County Department of Natural Resources and Parks, Wastewater Treatment Division (King County WTD). At this time King County WTD represents the sole potential generator of reclaimed water for use by Cascade Members. There are three categories of reclaimed water sources owned and operated by King County WTD, as described below.

South Treatment Plant

The South Treatment Plant, located in Renton (see Figure 6.1), is in close proximity to Tukwila and Skyway, and is therefore considered a logical source of reclaimed water supply for Cascade.

The South Treatment Plant's current design capacity for treating wastewater is 115 MGD on an average daily basis. Present flows average approximately 80 MGD. A planned expansion will increase plant capacity to 135 MGD by 2029.

A portion of the South Treatment Plant flows is currently treated to allow for reuse. One of Cascade's Members, the City of Tukwila, has been using Class A reclaimed water from this source since 1998. A supply line extends from the treatment plant to Fort Dent Park in Tukwila. The reclaimed water is used primarily for irrigation of ballfields at the park, as well as a few minor uses such as street sweeping. A delivery system has also been installed to the Foster Golf Links site for future use.

Brightwater

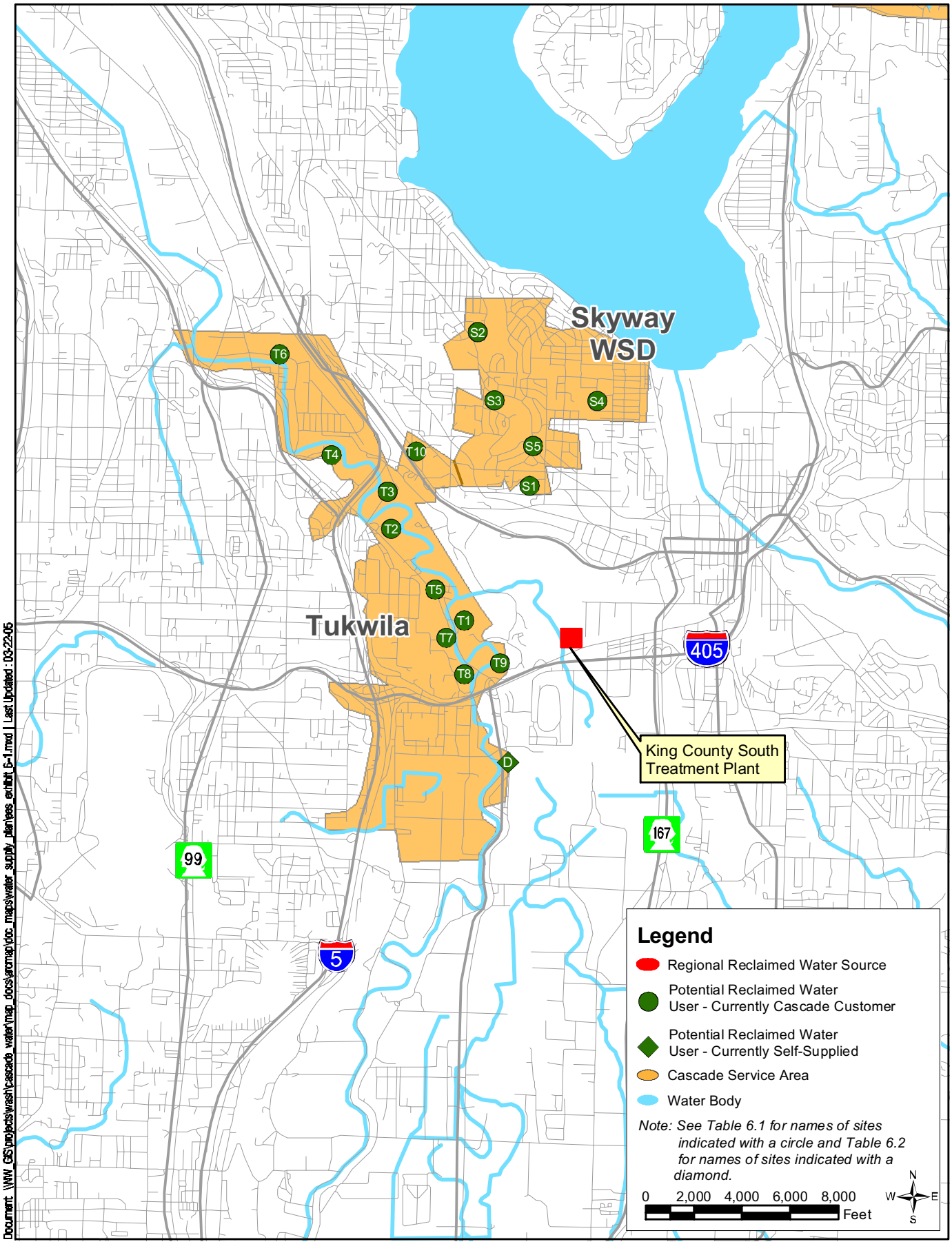
King County WTD recently developed the Brightwater Regional Treatment System, located in Snohomish County northeast of Woodinville (see Figure 6.2). Treatment plant start-up and operations began in September 2011, with the system scheduled to be completed in 2012.

The treatment capacity of Brightwater is anticipated to be 36 MGD, on an average daily basis. Plant expansions will increase capacity to 54 MGD by 2040.

A key feature of the Brightwater project is the planned additional treatment for a portion of the facility's flows, allowing for reuse at the plant site and throughout a sizeable service area. It is anticipated that approximately 10 MGD of reclaimed water will be available from the Brightwater facility. It is anticipated that this supply will be made available to the area west of the facility (along the Brightwater effluent corridor, which runs along the King/Snohomish County line to Puget Sound) and to the south (potentially into the Sammamish Valley). The area south of Brightwater includes the northern end of Cascade's service area.

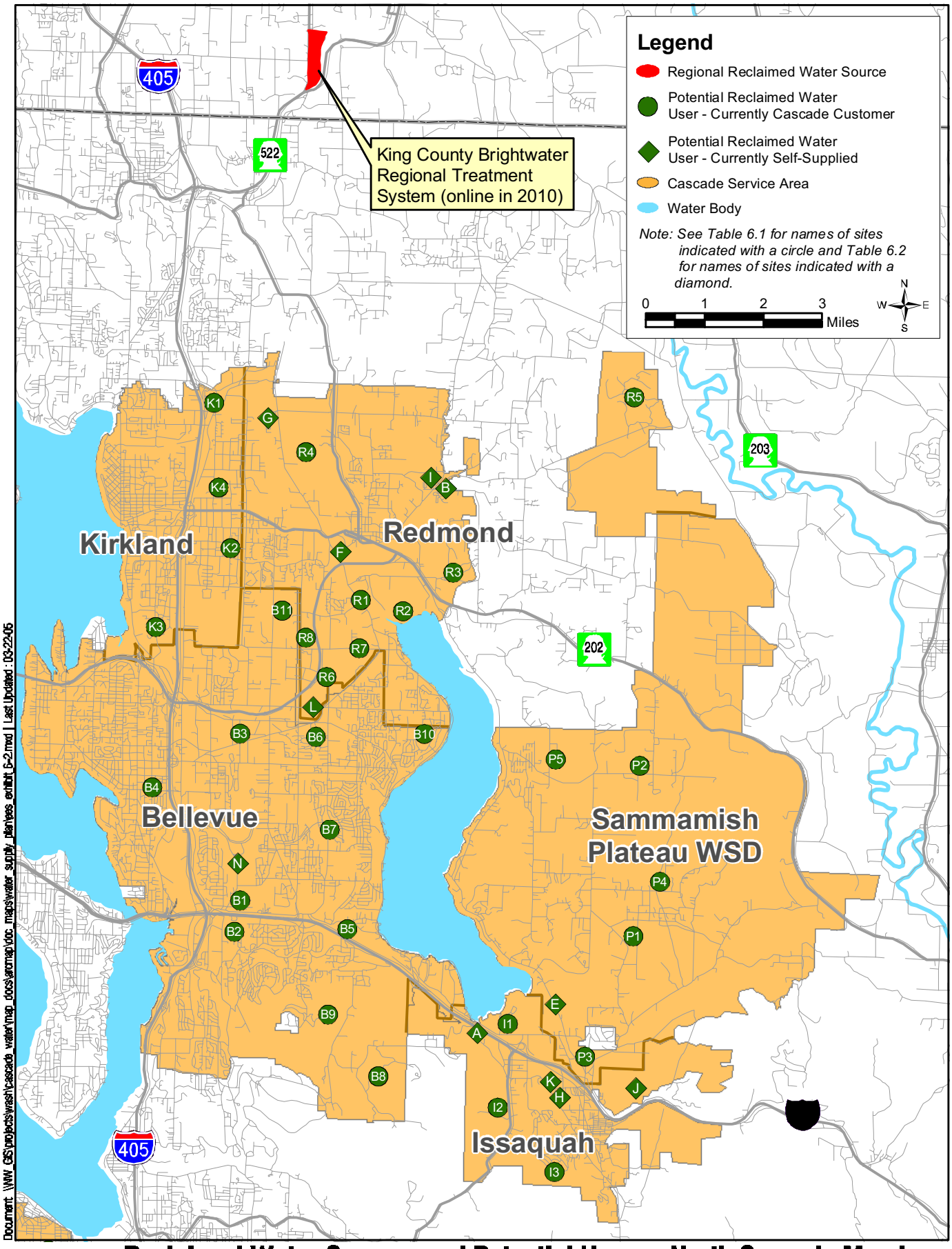
Satellite Facilities

King County WTD's South Treatment Plant and Brightwater Regional Treatment System are the two identified regional sources of reclaimed water supply. However, there is a potential for development of smaller, satellite reuse facilities designed to serve a more local need. King County has expressed a desire to explore the possibilities of constructing one or more satellite treatment plants in cooperation with local communities and/or water purveyors. One Cascade Member that has also shown interest in this concept is Covington Water District. Throughout 2007-2009, the District and the County jointly examined the feasibility of implementing a reuse system utilizing a satellite treatment facility. However, such a concept was determined to not be cost-effective for the near-term, and thus has not been advanced further.



Reclaimed Water Sources and Potential Users - Tukwila and Skyway WSD

FIGURE 6.1



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Reclaimed Water Sources and Potential Users - North Cascade Members

FIGURE 6.2

Applications of Reclaimed Water

Water utility planning includes evaluating the cost-effectiveness of various supply options. The feasibility of new sources of supply is partially based on the cost of developing such supplies and examining how these costs compare to existing supplies. Implementation of a water reuse program must also be viewed through this utility management lens when evaluating the feasibility of reuse versus other sources of supply. From this perspective of cost and feasibility, there are two broad categories of reuse programs: 1) service to existing water-using facilities and retrofit of existing systems; and 2) service to new development.

For a utility serving a highly developed area (i.e., a service area that is at or near buildout), a water reuse program will be almost exclusively of the first type, with service to existing customers. While there may be customers for whom the use of reclaimed water seems logical, as they use large quantities of water for non-potable purposes, the cost of delivery may be so great as to make it infeasible. Costs include the extension of water reuse pipelines to such customers and retrofits to the customer's plumbing, which can sometimes be quite extensive.

Many times, a reuse program is more feasible for those utilities that anticipate serving new development. Feasibility increases when provision of reclaimed water can be included in the early planning stages of both the future customer's onsite plumbing and the utility's infrastructure improvements. Early planning and coordination of such activities drastically reduces costs and will make reuse a more feasible option for a utility.

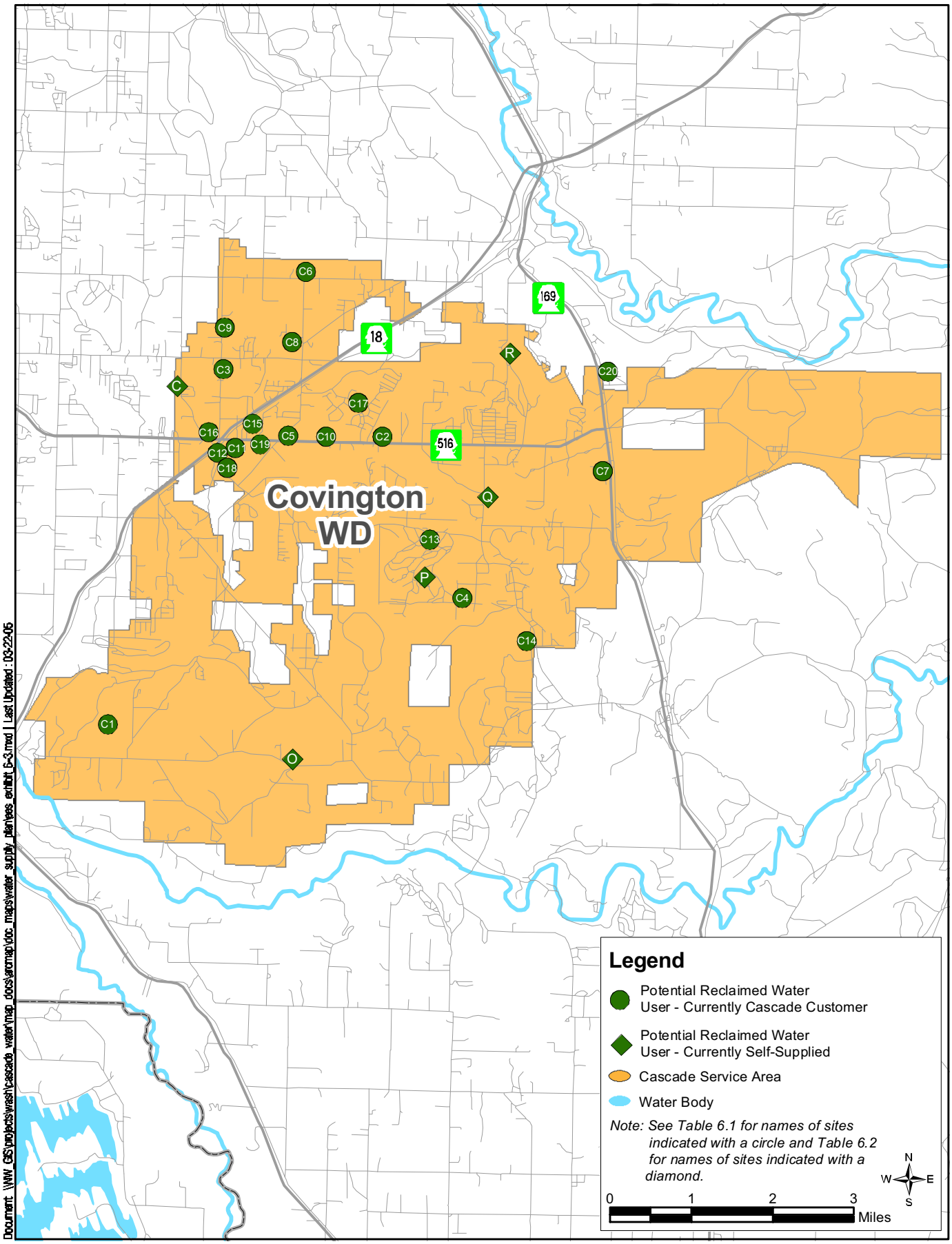
Cascade Members represent a blend of the above opportunities. This section identifies known and potential future applications of reclaimed water by existing Cascade customers. The primary applications of reclaimed water considered in this review are landscape irrigation and non-potable industrial use, as these constitute the largest components of municipal potable water demand that may be replaced by reclaimed water. Other, minor uses of reclaimed water are discussed where specifically identified by Cascade Members.

Application of reclaimed water service to new development is not specifically assessed, as it is challenging to estimate appropriate quantities of demand. However, new developments may also present opportunities for using reclaimed water.

This review is based primarily upon information provided by Cascade Members during preparation of Cascade's 2004 Transmission and Supply Plan, and supplemented by data contained in previous reuse marketing studies conducted by King County. Cascade Members were interviewed and asked to describe their water reuse planning activities, if any. This included identifying any reuse activities through 2004 as well as known planned opportunities or projects at that time. Furthermore, the Members were also asked to provide account information for their top ten largest water customers (i.e., historical usage). From these lists, those accounts were identified that represent irrigation or industrial uses suitable for consideration of reclaimed water. These represent the primary reuse opportunities that exist for Cascade over the next twenty years.

The information provided by the Members was then compared against previous studies performed by King County, in which potential reclaimed water application sites were identified. Where additional opportunities were identified, these are included.

Table 6.1 provides a summary of water demand information obtained for each identified site. Figure 6.1 through Figure 6.3 provide the location for each site specifically listed in the table. For further details of this review, see Chapter 6 of Cascade's 2004 TSP.



Reclaimed Water Sources and Potential Users - Covington WD

FIGURE 6.3

Table 6.1 Summary of Existing Sites with Potential for Reclaimed Water Application [1]

Customer	Map Key (see Fig 6.1-6.3)	2003 Total Consumption (ccf)[2]	2003 Total Consumption (gal)[3]	2003 Average Day Demand (gpd)[4]	2003 Peak Season Demand (gpd)[5]
Bellevue					
Bellevue Community College	B1	4,571	3,419,108	9,367	28,025
Bentall Capital/Five Newport	B2	10,040	7,509,920	20,575	61,557
Foothill Commons Apts.	B3	4,062	3,038,376	8,324	24,905
Double Tree Inn	B4	5,251	3,927,748	10,761	32,195
Boeing Computer Services	B5	5,145	3,848,460	10,544	31,545
Central Park East Apts.	B6	5,332	3,988,336	10,927	32,691
Colony Woods Apts.	B7	6,223	4,654,804	12,753	38,154
Montreux-Glacier Ridge	B8	14,413	10,780,924	29,537	88,368
Overlook at Lakemont	B9	4,023	3,009,204	8,244	24,666
Tam O'Shanter Golf Course	B10	10,066	7,529,368	20,628	61,716
Bellevue Municipal Golf Course[10]	B11	N/A	N/A	N/A	61,716
Subtotal - Bellevue		69,126	51,5076,248	141,661	485,538
Covington					
Washington National	C1	72,024	53,873,952	147,600	441,590
Cedar Heights Jr. High	C2	9,876	7,387,248	20,239	60,551
Kentwood High School	C3	5,968	4,464,064	12,230	36,591
Kentlake High School	C4	5,124	3,832,752	10,501	31,416
Covington Medical Park	C5	4,704	3,518,592	9,640	28,841
Tahoma school district #4	C6	3,554	2,658,392	7,283	21,790
Glacier Park Elementary	C7	3,336	2,495,328	6,837	20,454
Crestwood Elementary	C8	3,289	2,460,172	6,740	20,165
Mattson Jr. High	C9	2,922	2,185,656	5,988	17,915
Jenkins Creek Elementary	C10	2,480	1,855,040	5,082	15,205
Covington Retail Assoc.	C11	2,474	1,850,552	5,070	15,168
Chevron - Carwash	C12	2,242	1,677,016	4,595	4,595
Remington Homeowners Assoc.	C13	1,861	1,392,028	3,814	11,410
Sawyer Woods Elementary	C14	1,771	1,324,708	3,629	10,858
Covington Apartments LLC	C15	1,632	1,220,736	3,344	10,006
King County Library System	C16	1,511	1,130,228	3,097	9,264
Cedar Valley Elementary	C17	1,416	1,059,168	2,902	8,682
Fred Meyer	C18	1,337	1,000,076	2,740	8,197
Covington Square N.E.	C19	1,075	804,100	2,203	6,591
Rock Creek Elementary	C20	1,064	795,872	2,180	6,524
Subtotal - Covington		129,660	96,985,680	265,714	785,813
Issaquah					
Port Blakely Communities	I1	13,716	10,259,568	28,108	84,095
Talus Residential Property	I2	4,645	3,474,460	9,519	28,479
Darigold	I3	50,000	37,400,000	102,466	102,466
Subtotal - Issaquah		68,361	51,134,028	140,093	215,040
Kirkland					
Lake Washington Technical College	K1	3,682	2,754,136	7,546	22,575
Rose Hill Car Wash	K2	3,657	2,735,436	7,494	7,494
Carillon Properties	K3	14,194	10,617,112	29,088	87,026
Costco	K4	5,725	4,282,300	11,732	35,101
Subtotal - Kirkland		27,258	20,388,984	55,860	152,196
Redmond					
Marymoor Park	R1	ND	ND	ND	1,100,000
TTM Technologies	R2	49,834	37,275,832	102,126	305,540
Genie Industries	R3	27,631	20,667,988	56,625	169,410
Willows Run Golf Course[9]	R4	NA	NA	NA	320,000
Trilogy Golf Course	R5	45,165	33,783,420	92,557	276,913
Honeywell International	R6	23,492	17,572,016	48,143	144,033
Microsoft	R7	284,811	213,038,628	583,667	1,746,218
Nintendo	R8	10,982	8,214,536	22,506	67,332
Subtotal - Redmond		441,915	330,552,420	905,623	4,129,446

Table 6.1 Summary of Existing Sites with Potential for Reclaimed Water Application [1] (cont.)

Customer	Map Key (see Fig 6.1-6.3)	2003 Total Consumption (ccf) [2]	2003 Total Consumption (gal) [3]	2003 Average Day Demand (gpd) [4]	2003 Peak Season Demand (gpd) [5]
Sammamish Plateau					
Issaquah School District, Skyline	P1	5,316	3,976,368	10,894	32,593
Inglewood Junior High	P2	5,289	3,956,172	10,839	32,428
Timbers 3169, Simpson Housing	P3	4,644	3,473,712	9,517	28,473
Beaver Lake Ballfields	P4	4,238	3,170,024	8,685	25,984
East Sammamish Park	P5	3,318	2,481,864	6,800	20,343
Subtotal - Sammamish Plateau		22,805	17,058,140	46,735	139,821
Skyway					
King County Parks	S1	2,371	1,773,508	4,859	14,537
The Lakeshore	S2	2,290	1,712,920	4,693	14,040
Campbell Hill Elementary	S3	1,822	1,362,856	3,734	11,171
Dimmitt Middle School	S4	1,698	1,270,104	3,480	10,411
Bryn Mawr Elementary	S5	1,051	786,148	2,154	6,444
Subtotal - Skyway		9,232	6,905,536	18,919	56,603
Tukwila					
Fort Dent Park (6)	T1	ND	ND	ND	20,000
Foster Golf Links (7)	T2	ND	ND	ND	100,000
Seattle Rendering Plant (8)	T3	ND	ND	ND	60,000
Jorgesen Forge	T4	8,927	6,677,396	18,294	54,733
Boeing PSAM 12-0380	T5	19,770	14,787,960	40,515	121,213
Boeing PSAM 12-0370	T6	18,148	13,574,704	37,191	111,268
Fairway Center Office Park	T7	ND	ND	ND	ND
A.K. Pacific Erect Inc.	T8	ND	ND	ND	ND
Eriks West	T9	ND	ND	ND	ND
Towne and Country Suites	T10	ND	ND	ND	ND
Subtotal - Tukwila		46,845	35,040,060	96,000	467,214

Notes:

ND = No Data Provided or Available; NA = Not Applicable

1. These sites represent either planned opportunities (where specifically noted) or potential opportunities based on analysis of the largest current irrigation and industrial water customers for each purveyor.
2. From Cascade Member billing records, except where noted.
3. Converted from ccf to gpd.
4. Annual amount divided by 365 days per year.
5. Converted from annual amount to average day demand during peak season. The following assumptions are made:

   Irrigation sites - Peak season use only. Peak season assumed to be 122 days (4 months) long.

   Industrial sites - Annual use divided by 365 days (full year).
6. Currently served customer.
7. Tukwila plans to provide reclaimed water to the golf course by 2010. The use of reclaimed water by the golf course will help offset demand from its water right on the Green River. As this will not reduce Tukwila's potable water demand, the amount associated with the golf course is not included in the reclaimed water demand forecast presented in Table 6.3.
8. Tukwila plans to provide reclaimed water to the rendering plant by 2010.
9. Willows Run Golf Course obtains some water from Redmond, though a majority of irrigation water used is obtained from its own Sammamish River supply.

   The peak season demand shown here is obtained from the Brightwater Final Environmental Impact Statement – Appendix 3-D, Reclaimed Water Technology Review and Evaluation of Potential Water Reuse Opportunities (September 2003).
10. Bellevue Municipal Golf Course obtains irrigation from a City-owned well that has a 100 gpm instantaneous water. No meter records were available for review. Therefore, peak season demand is assumed to be equal to that of Tam O'Shanter Golf Course, for purposes of this analysis

Potential Opportunities with Self-Supplied Water Users

A review of self-supplied water users located within Cascade Members' service areas was also conducted for the 2004 TSP to determine if there are large irrigation or industrial water uses not

presently served by Cascade that might benefit from use of reclaimed water. This is of interest to King County because of the possibility of reducing well withdrawals that might have local impacts on nearby streams. There may be an opportunity for Cascade Members to convey and deliver reclaimed water to new customers currently obtaining water from their own sources of supply.

To investigate the reclaimed water potential associated with self-supplied water users, an analysis of water right information was performed. Data contained within the Department of Ecology's Water Rights Application Tracking System (WRATS) database were reviewed for the areas served by Cascade Members. Only those irrigation and industrial water rights translating to potential water uses of 50,000 gpd or greater were considered. For landscape irrigation, this translates to water rights with instantaneous quantities greater than 100 gallons per minute (gpm) for groundwater rights and 0.23 cubic feet per second (cfs) for surface water rights, assuming maximum daily pumping/diversion times of 8 hours. In terms of industrial water rights, which are typically exercised year-round, this translates to an annual water right quantity of 56 acre-feet or greater.

Based upon the above criteria, the water rights review revealed that there are 41 records associated with irrigation water rights having points of diversion/withdrawal within Cascade Members' service areas. Thirty of these are surface water rights, with an associated total instantaneous quantity of 17.77 cfs. The remaining 11 rights are groundwater rights with an associated total instantaneous quantity of 4,112 gpm. In addition, there are water rights of 4.0 cfs and 160 gpm associated with a golf course located outside of, but adjacent to, the service area boundary of the Sammamish Plateau Water and Sewer District.

The review also indicated that there are 14 commercial/industrial water rights located within the area of interest. One of these is a surface water right for 5.2 cfs, while the others are groundwater rights with an associated total instantaneous quantity of 5,820 gpm.

For clarity purposes, only the largest of the identified self-supplied users are depicted on Figure 6.1. This includes surface water rights greater than 1.0 cfs, and groundwater rights greater than 500 gpm. Also included are four golf courses located within the Covington service area. Although these sites did not meet the criteria described above for mapping, they are included because they may become pertinent to the satellite reuse program that Covington is considering.

Table 6.2 provides information regarding those sites depicted on Figures 6.1 to 6.3.

Table 6.2 Summary of Largest Currently Self-Supplied Water Users Located Within Cascade Member Service Areas

Surface Water Rights [1]		
Map Key (see Fig 6.1-6.3)	**Name of Water Right Holder**	**Qi (cfs)** [2]
A	King County Dept. of Natural Resources	5.2
B	Private Landowner (irrigation)	1.1
C	Private Landowner (irrigation)	1.0
D	Private Landowner (irrigation)	1.0
E	Private Landowner (irrigation)	1.0
F	Dickey Farms, Inc.	1.0
G	Private Landowner (irrigation)	1.0
Groundwater Rights [1]		

Map Key (see Figure 6.1-6.3)	Name of Water Right Holder	Qi (gpm) [2]
H	Consolidated Dairy	1,100
I	Cadman Gravel Co.	1,000
J	Lakeside Gravel	1,500
K	Issaquah Creamery	500
L	United Control Corp.	1,000
M	Willows Run Golf Course [3]	715
N	Sunset Hills Memorial Park	500
Self-Supplied Golf Courses Located within Covington Service Area [4]		
Map Key (see Figure 6.3)	**Name of Golf Course**	**Qi (gpm)**
O	Jade Green	N/A
P	Druids Glen	N/A
Q	Elk Run	N/A
R	Lake Wilderness	N/A

Notes:

1. Based on analysis of water right information, as obtained from Department of Ecology's Water Rights Application Tracking System (WRATS), November 2004.
2. Qi = Maximum allowed withdrawal on an instantaneous basis. Only those water rights having Qi greater than or equal to 1.0 cfs (for surface water) or 500 gpm (for groundwater) are shown.
3. This site is shown on Figure 6.1 as item R4 (see Table 6.1), as the site also receives water from Redmond.
4. Information provided by Covington.

APPENDIX E

Demand Forecast

CASCADE WATER ALLIANCE

Water Demand Forecast

Task 600

FINAL DRAFT

December 18, 2009

CDM

In association with

HDR R·W·BECK

Cascade Water Alliance
Water Demand Forecast

Task 600

Final Draft

December 18, 2009

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HDR

Table of Contents

1.0 Background

The purpose of this document is to summarize the methodology, data assumptions and results of a comprehensive water demand forecast for the Cascade Water Alliance (Cascade).

The objective of this analysis was to forecast total water demand for the forecast period 2010 to 2060 for the combined utilities of Cascade. The water demand forecast is designed to serve as a basis for supply and infrastructure decision making, as well as financial planning. In addition, the water demand forecast model will estimate and communicate effects from major sources of uncertainty to assist Cascade decision-makers understand both the upside and downside risks in source and infrastructure planning.

A water demand forecast model (demand model) was estimated based on water billing and production data, demographic and socioeconomic data, weather, and water conservation for the eight utilities within the Cascade service area:

- City of Bellevue
- Covington Water District
- City of Issaquah
- City of Kirkland
- City of Redmond
- Sammamish Plateau Water and Sewer District
- Skyway Water and Sewer District
- City of Tukwila

A comprehensive database was developed, and organized into monthly time series (across historical years 1994 to 2008) and cross sectional (across utilities) data set. It should be noted that not all of the utilities had complete data from 1994 to 2008.

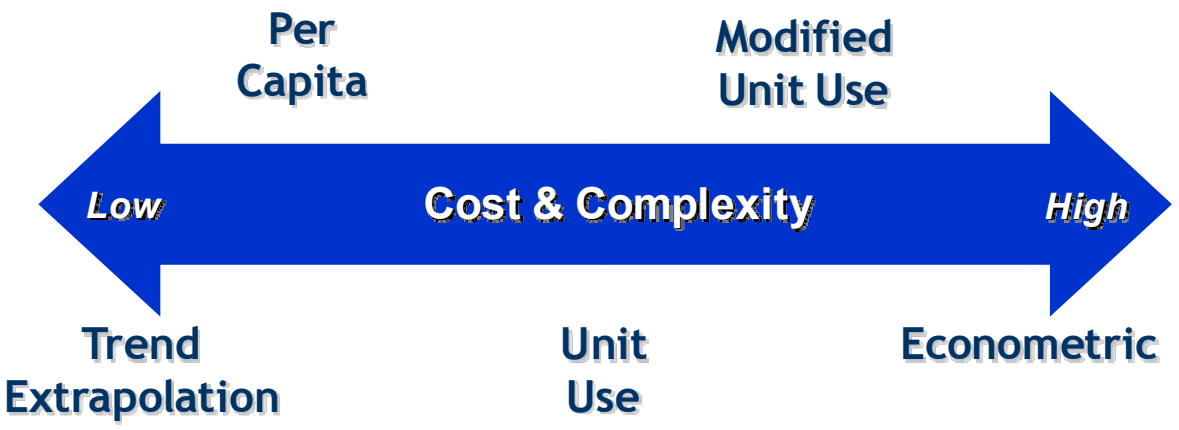
Section 2 reviews common water demand forecasting approaches and discusses the method employed for the Cascade demand model. Section 3 reviews the data used to develop the demand model and generate the water demand forecast. Section 4 presents the results of the statistical regression analyses, which serve as the basis for the demand model. Section 5 provides an overview of the water demand uncertainties, presents the demand forecast scenarios, and summarizes the demand forecast results.

2.0 Water Demand Forecasting Approach

2.1 Overview of Different Demand Forecasting Methods

Common approaches to forecasting water demands range from simple trend extrapolation to detailed econometric models (see Figure 1).

Figure 1. Common Water Demand Forecasting Approaches



The trend extrapolation method simply extends historical trends into the future. The advantage to this method is it is not time consuming to prepare and thus is very low cost to produce. The disadvantages are that it assumes the unlikely scenario that past trends carry into the future unchanged, it has no ability to "explain" water demands, and it cannot account for any changes in factors that influence demand, such as demographics or weather.

The per capita demand forecasting method assumes population is the primary driver in determining future demand. The approach takes historical total demand divided by population to get per capita use and multiplies it by the projected population to calculate future demand. The advantage of this methodology is it is simple to understand and is relatively low cost to produce. The disadvantages are that demand does not always mirror population growth and demographic, socioeconomic, and factors other than population are not accounted for.

A unit use methodology is more costly and complex than the two previous approaches. It is similar to the per capita method, but instead of a single population driver it uses multiple drivers to generate sector water demands (e.g., single-family, multifamily and non-residential). The unit use method involves dividing each sector's water demand by the appropriate drivers (e.g. housing or employment) to calculate a per unit water demand value. Next, the unit use values are multiplied by the projected future number of units to derive a future unit use demand. The primary advantage of the unit use

methodology is that it allows for demand in each sector to be projected independently. The primary disadvantage is that important influencing factors such as weather, income, and price of water are not incorporated into the demand forecast.

A modified unit use methodology, such as the one used for the **Central Puget Sound Water Supply Forum's *2009 Regional Water Supply Outlook (2009 Outlook)***, applies factors from other empirical studies of water demands to adjust or modify the unit use rates over time to account for weather, income and price of water impacts.

As decisions regarding development of new water supplies and infrastructure become more complex and costly, many utilities across the country are seeing value in moving towards more sophisticated approaches for forecasting water demands. These econometric methods start with empirical statistical analysis of historical water demands and the factors known to influence water use. Then they use Monte Carlo simulation of key variables in order to produce a statistical range in water demands, which can help decision makers understand uncertainty and the implications of their planning.

To determine the most effective water demand forecasting method, three primary factors should be examined. First, what are the goals and objectives of the forecast? To answer this question one must understand the information needed by the planners or decision-makers as well as the ramifications of the decisions. Second, is there adequate data availability? This requires understanding what data is available, its quality, and the models the data will support. Finally, what are the budget and resources available? In order to select the proper forecasting methodology the financial constraints as well as the project schedule must factor into the decision.

2.2 Recommended Water Demand Forecasting Method for Cascade

Based on the importance of the decisions being made by Cascade, the availability of data, and the fact that much of the information from key utilities had already been collected for the ***2009 Outlook***, CDM recommended that the econometric water demand approach with uncertainty analysis be used to develop the water demand forecast.

An econometric approach statistically correlates sector water demands with factors that influence those demands. The econometric model relies on regression analysis to compute coefficients or elasticities that describe how water use is influenced by a number of explanatory variables (such as weather, price of water, income, etc). For each explanatory variable, elasticity is statistically estimated. For example, a price elasticity of -0.10 implies that a ten percent increase in the real price of water will result in a one percent decrease in water demand.

The following is an example of an equation used to calculate sector water demand using an econometric approach:

$$E(y) = a + b_1x_1 + b_2x_2 + b_nx_n$$

Where:

E(y) = the expected value of dependent variable (y) as estimated by the function

a = intercept, or the value of (y) when x = 0

b = coefficient of x, or the change in y given a change in x

x = value of the independent variable

Based on the available data, two statistical models would be generated, one for combined residential (single-family and multifamily) and one for non-residential. The reason for combining single-family and multifamily into one combined model is because the utilities had very different definitions of what constituted multifamily. The independent variables would therefore be:

- Residential Water Use (gallons per household per day)
- Non Residential Water Use (gallons per employee per day)

The explanatory variables that the statistical model will find relationships to water use are:

- Weather (temperature and precipitation)
- Income
- Price of Water
- Mix of Single-Family and Multifamily Households
- Mix of Industrial (Manufacturing) Employment
- Monthly Binary Variables to Capture Seasonal Variability
- Passive Conservation (that which has occurred from state plumbing codes)
- Active Conservation (that which utilities have implemented)

3.0 Data Sources and Assumptions

A database was built containing data for monthly production, billing, maximum temperature, precipitation, the number of single-family households served, the number of multi-family households served, employment, median household income, employment mix, marginal price, passive conservation, and active conservation for each of the eight utilities from 1990 to 2008 where data was available.

3.1 Water Production and Billing Data

Water billing and production data availability was not uniform for all CWA members. Billing and production data was collected by HDR from a variety of sources, including a Cascade utility survey, Seattle Public Utilities, and the Cascade Water Alliance.

Water production data was organized according to the source of the water. Data for water purchases from the Cascade Water Alliance/Seattle Public Utilities dated back to 1990 for some utilities and monthly data was complete across all utilities, where applicable, for the years 2000 to 2008. One utility, Covington, did not directly purchase water from Cascade Water Alliance/Seattle Public Utilities from 1990 to 2008.

Water production data from independent supplies was available beginning in 1990 for some utilities and was complete for all applicable utilities from 1995 to 2008. Three utilities, Bellevue, Kirkland, and Tukwila, did not acquire any water from independent supply production during the period 1990 to 2008.

Water billing data varied among Cascade Members. Monthly billing data supplied by Seattle Public Utilities was the primary source of data from 1994 to 2003 for the following utilities: Bellevue, Kirkland, Redmond, Skyway, and Tukwila. Complete monthly billing data was available for all utilities from 2006 to 2008.

Cascade utilities utilize bi-monthly customer billing cycles which involve reading customer meters at approximately one-month-long time intervals that overlap with two consecutive calendar months. A data smoothing technique was therefore needed in order to generate monthly water consumption. The following formula was used to estimate the monthly consumption during a particular month (Q_N^S) based on bi-monthly billing data:

$Q_N^S = (0.25*Q_N^b)+(0.5*Q_{N+1}^S)+(0.25*Q_{N+2}^S)$

Where:

Q_N^S = estimate of water consumed during month N

Q_N^b= estimate of water billed during month N

3.2 Weather

Base year and the historical normal monthly values for average maximum temperature and precipitation are used in forecasting future water use. Two weather stations, SeaTac and Landsburg, where used to represent the Cascade region. SeaTac weather data dated back to 1949, while Landsburg data dated back to 1931. Figure 2 presents the long-term normal values for average maximum temperature for the two weather stations, while Figure 3 presents the long-term normal values for precipitation. Temperature between the two stations is nearly the same, while precipitation is significantly higher for Landsburg.

Figure 2. Long-Term Normal Average Maximum Temperature for Sea Tac and Landsburg Weather Stations

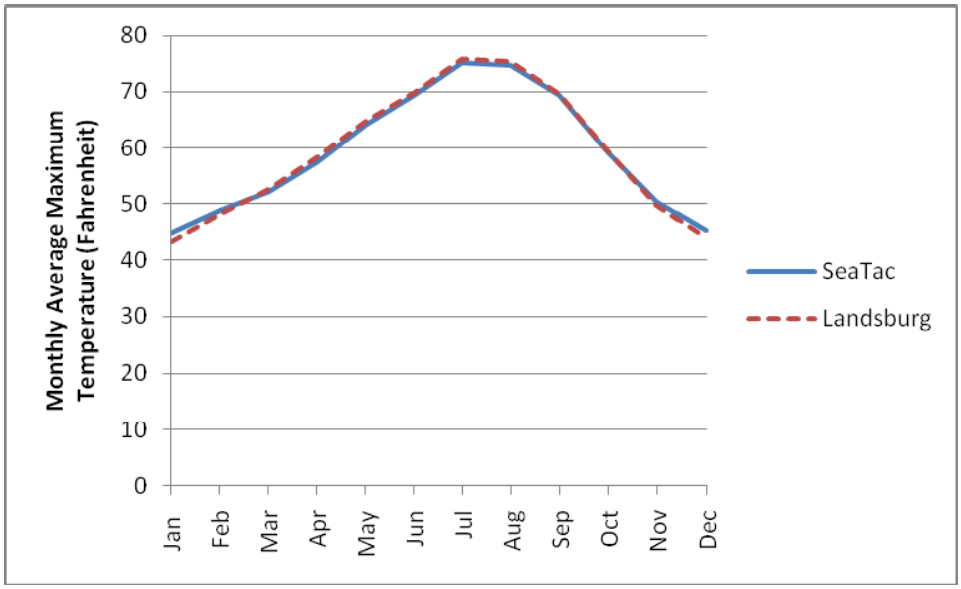
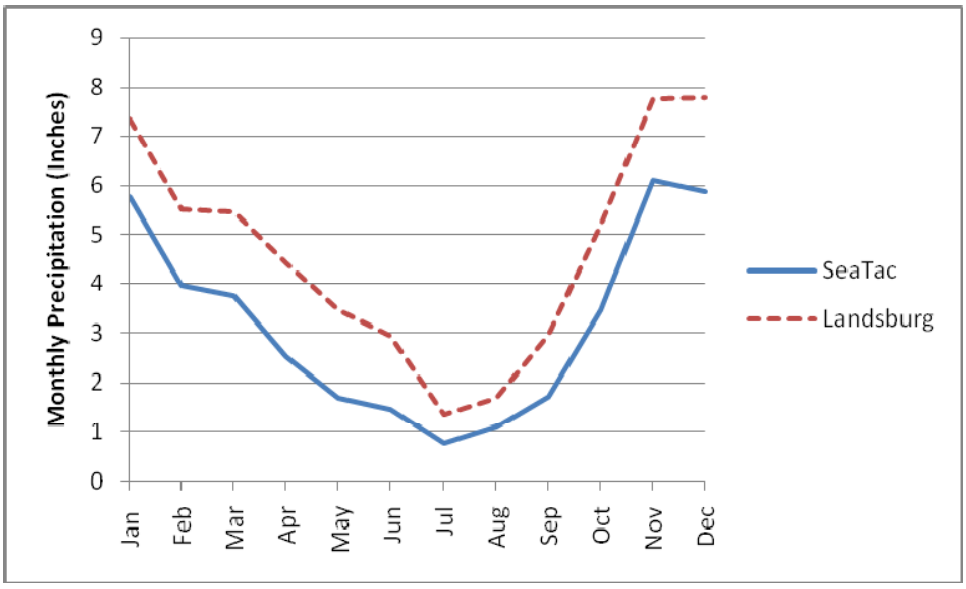


Figure 3. Long-Term Normal Precipitation for Sea Tac and Landsburg Weather Stations



Cascade utilities were assigned to a particular weather station based on geographic proximity to a station. Table 1 lists the assignment of utilities to weather stations.

Table 1 Cascade Utility Weather Station Assignments	
SeaTac Weather Station Utilities	**Landsburg Weather Station Utilities**
Bellevue	Covington
Kirkland	Issaquah
Redmond	Sammamish Plateau
Skyway	
Tukwila	

Temperature and precipitation are strong explanatory variables in predicting water use. Greater temperatures and lower precipitation results in greater water demands due to greater irrigation use and higher process water for industrial and commercial users.

3.3 Demographic and Socioeconomic Data

Demographic data used in the development a water use forecast for Cascade was obtained from the Puget Sound Regional Council (PSRC) from 2000 to 2040. PSRC produces historical and projected demographics at the Traffic Analysis Zone (TAZ) level. A TAZ is an area delimited by a state and/or local transportation official for tabulating traffic and planning related data. A TAZ typically consists of one or more census blocks, block groups, or census tracts. CDM aggregated TAZ level data to each of the Cascade utilities using GIS. Utility boundaries were overlaid against the TAZ boundaries, along with land use data, in order to determine which demographics corresponded to each of the eight Cascade utilities.

Because of the desire to produce a 50-year water demand forecast, CDM extended PSRC demographic projections from 2040 to 2060 using linear extrapolations. Table 2 presents the baseline projections of demographics for the Cascade service area.

Table 2 Baseline Projections of Demographics for Cascade						
		Households			Employment	
Year	Population	Total	Single Family	Multifamily	Total	Industrial
2007	357,059	144,481	96,144	48,337	338,152	35,695
2010	371,753	151,150	99,721	51,429	354,101	34,096
2020	423,808	178,798	113,220	65,578	414,296	29,886
2030	465,382	203,705	124,146	79,559	468,547	26,563
2040	507,661	229,508	135,666	93,842	511,342	24,322
2050	554,181	259,387	148,547	110,840	567,427	22,272
2060	605,408	294,074	162,979	131,095	620,523	20,865

Population

Although population as an independent variable is not used to predict water demands using the econometric approach, it is an important driver of other variables such as households and employment. The base year (2007) total population for the eight member utilities was 357,059. The utility with the largest population was Bellevue with 134,221 people, followed by Redmond with 54,811 people. Tukwila had the smallest population in 2007, at just over 7,000 people.

Population is projected to increase to over 605,000 by 2060, representing an average annual growth rate of 1.3 percent.

Households Served

The number of households served water by Cascade utilities is an important forecast driver for future residential water use. Total households are projected to increase from 144,418 in 2007 to just over 294,000 by 2060, representing an annual growth rate of 1.9 percent.

Because single-family homes use more water than multifamily homes, it was also important to track the growth between single-family and multifamily households. Single-family households are expected to increase at an annual rate of 1.3 percent, while multifamily households are expected to increase at an annual rate of 3.1 percent (almost double that of single-family).

Employment

Total employment is the forecast driver non-residential water use. Total employment in the Cascade service area in the base year (2007) is estimated to be 338,152 (or 94 percent of the total population). This does not mean that 94 percent of people living in the Cascade service area are employed. The Cascade service area is rich in employment opportunities, with many corporations and industry located here. People commute from Seattle, and from other counties such as Snohomish and Pierce, to work in Cascade's service area.

Employment is in the area is projected to increase to just over 620,000 by 2060, representing an annual growth rate of 1.5 percent. But because industrial establishments use more water than commercial/institutional establishment, it was important to track industrial employment as well. Due to the changing economy of the region and the loss of many heavy manufacturing, industrial employment is projected to decrease by 42 percent by 2060 from the current level of 36,000.

Income

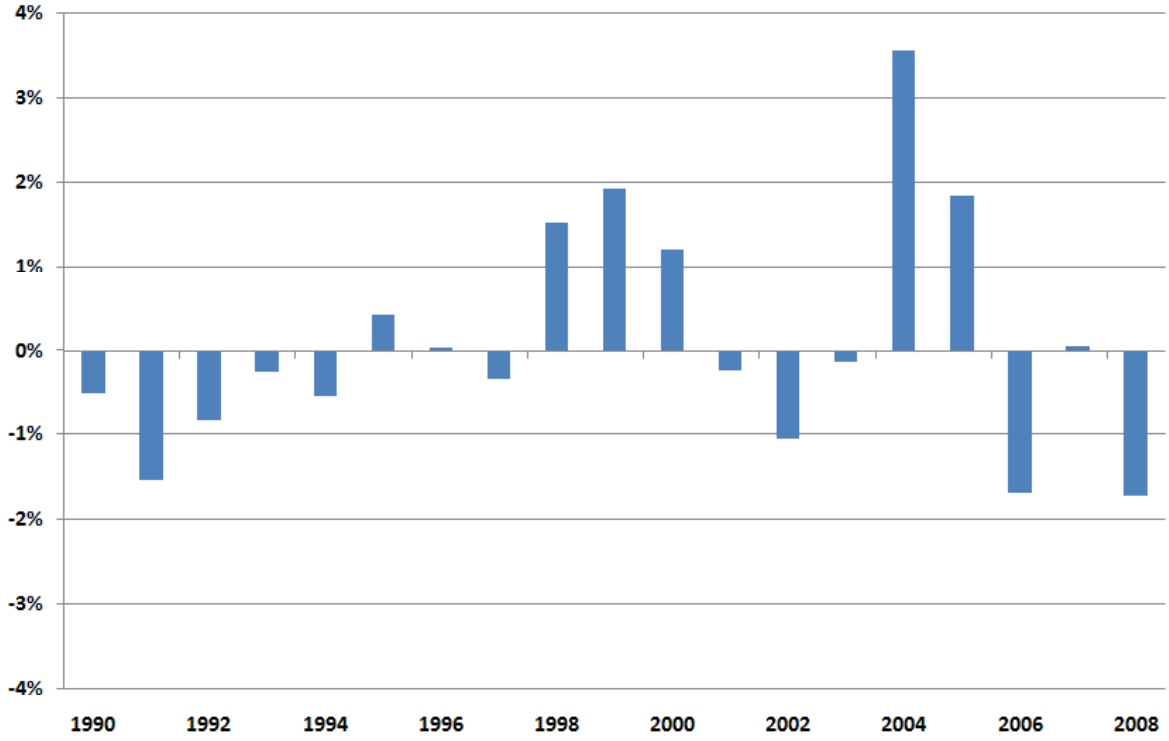
Household income is an important explanatory variable for predicting water demand. Empirical studies across the country for the last 20 years indicate as real (above inflation) incomes go up, so does residential water demand. Homes with greater

incomes tend to have bigger yards, irrigate more, have more water using fixtures and use those fixtures with greater frequency.

To generate household income for each of the eight utilities, CDM first used the historical PSRC household income data by quartile. Using this quartile data, CDM estimated the median household income for each utility in 1990 (adjusted to year 2000 dollars). This information was used to get an accurate spatial (across utility) representation of income.

To generate historical income growth from 1990 to 2008, CDM used the personal income data for King County generated by the Washington State Office of Financial Management. This data was adjusted to reflect real income in year 2000 dollars. The real growth rates in personal income were then applied to the 1990 household income by utility in order to get utility specific income data. Figure 4 shows the real income growth for the aggregate of the Cascade utilities from 1990 to 2008. From 1990 to 2000, real income grew by 3 percent, or just under 0.3 percent annually. This was considered to be a period of average economic growth according to the Office of Financial Management. From 2001 to 2008, real income only grew by 0.1 percent. This period was considered to be poor in terms of overall economic growth. Although population and employment continued to increase during this time, wages and the loss of manufacturing in the region produced stagnant income growth.

Figure 4. Annual Changes in Real Household Income for Cascade Service Area



Since no localized projections of personal or household income were available, CDM made baseline assumptions regarding real income growth into the future based on the historical income. From 2010 to 2020, the assumed real increase in income for the Cascade service area is 0.2 percent annually. After 2020, the assumed real increase in income will increase 0.4 percent annually by 2060.

Price of Water

The price of water at the margin is another explanatory variable in predicting both residential and non-residential water use. Empirical studies in the last 30 years indicate that as real marginal price increases, water use tends to decrease. The marginal price of water is determined by the commodity charge to the average customer for water and sewer service. It is an explanatory variable input into the database to forecast both residential and non-residential water demand. Each Cascade utility sets its own pricing structure with the marginal price of water based on the amount of water consumed per account. Pricing structures vary among Cascade utilities. Most have implemented block rate structures whereby the per unit price of water increases as water use increase. Some utilities also employ a higher per unit charges during the summer season as a way to conserve water during times of peak usage. One utility, Tukwila, implements neither a block rate structure, nor a summer season rate.

All Cascade utilities base their water pricing structures on the charge per hundred cubic feet (ccf) of water. To calculate the marginal price of water for a particular utility during a particular month, the water use factor (gallons per day per household/employee) was converted to hundred cubic feet per month.

For the purposes of this forecast the residential marginal price of water was determined using the mean water use factor for single family and multi-family household consumption. The mean single family water use factor was approximately 200 gallons per day (8.1 ccf per month). The mean multifamily water use factor was approximately 120 gallons per day (5 ccf per month). The non-residential marginal price was based on the per unit charge for the highest tier of use or the per unit charge in the absence of a tiered water pricing structure.

Marginal price data was converted to year 2000 dollars using the monthly Consumer Price Index (CPI). The real dollar amount, used to account for inflation, was calculated for the marginal price data and entered into the database for each utility for each month.

To calculate a residential marginal price for each utility, the single family and multi-family marginal price for each month was weighted by the number of single family and multifamily households respectively for each month and for each utility. Next, the base year marginal price was weighted by total households served across all utilities for each month to get an overall Cascade residential marginal price for each month. Finally, the twelve month baseline year marginal price average was calculated and used as the baseline year residential marginal price.

To project real increases in the marginal price of water, financial data and projected costs for Cascade were used. The demand model assumes a 1.4 annual percent increase in real marginal price for both the residential and non-residential sectors for the period 2007 to 2015. A 2 percent annual increase in marginal price is assumed from 2015 to 2025. A 1 percent annual increase in marginal price is assumed from 2025 to 2035. A 0.5 percent increase in marginal price is assumed from 2035 to 2050. The demand model assumes no real increases in price from 2050 to 2060.

3.4 Water Conservation

Passive Conservation

In 1992 Congress passed the Energy Policy Act of 1992 which, among other measures, set maximum flow rates for toilets, urinals, showerheads, and faucets sold in the United States. To estimate passive water conservation, the ratio of post 1992 households to total households was used. The theory is that newer homes will use less water than pre-1992 homes. By 2007, the percentage of post-1992 households was estimated to be 65 percent. Assuming remodeling rates and useful life of plumbing fixtures, it is estimated that 100 percent of households in Cascade's service area will be compliant with the 1992 plumbing codes by 2060.

Active Conservation

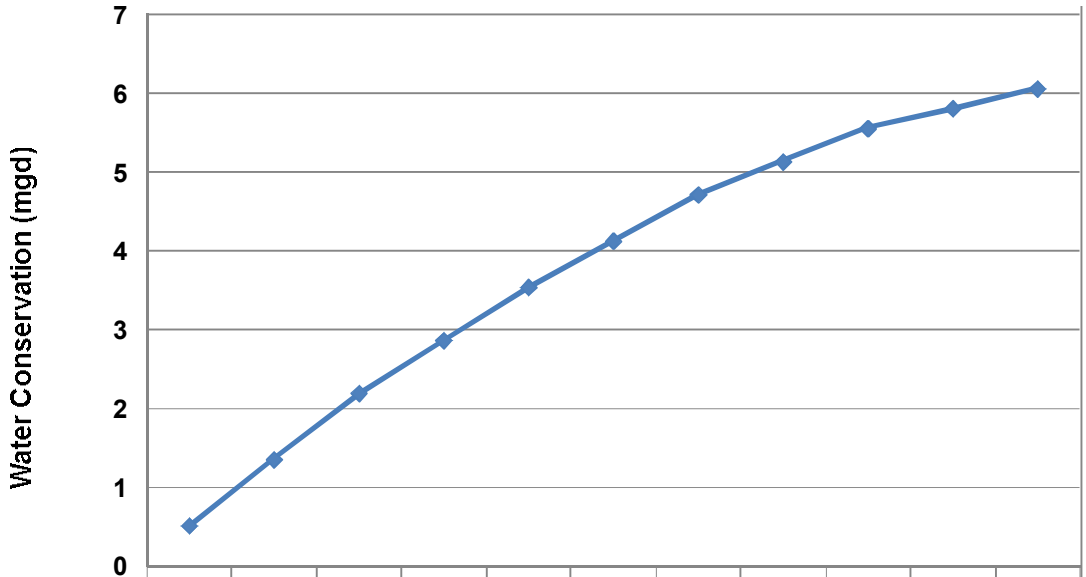
Active water conservation data was collected from individual utility water plans. For the water demand model, a variable called active conservation was created that reflected the number of residential and non-residential active conservation programs being implemented from 1994 to 2008.

Future levels of water conservation were based on active water conservation that Cascade is implementing currently (see Figure 5). This future active conservation is expected to increase from the current (2007) levels of 0.5 million gallons per day (mgd) to 6.1 mgd by 2060. This is considered in the demand forecast as a baseline level of active conservation. More aggressive conservation beyond these levels are evaluated as future water supply options for Cascade.

3.5 Non-Revenue Water

Non-revenue water is that which is not billed to water customers. It can represent water for fire protection, system flushing of mains, unaccounted water, and system losses. Non-revenue water was estimated by taking the difference between total water production and total water consumed (or billed). Using the utility data from 1994 to 2008, the weighted average non-revenue water was estimated to be 7.4 percent of total water production. This number is about average for utilities in the western United States. For forecast purposes, it is assumed that the non-revenue water will remain at 7.4 percent through 2060.

Figure 5. Projected Levels of Baseline Water Conservation for Cascade



	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Conservation (mgd)	0.5	1.3	2.2	2.9	3.5	4.1	4.7	5.1	5.6	5.8	6.1

4.0 Econometric Models for Cascade Forecast

To calculate the explanatory variable coefficients, a multivariate regression analysis was run using Statistics Analysis Software (SAS) to produce a model for both the residential and non-residential sectors. A log model was estimated to improve the overall fit of the data. In a log model, all variables represent the natural log of the raw data. The use of log variables is common practice in estimating econometric models.

The explanatory variable coefficients (or elasticities) derived from these statistical models will result in changes to per household and per employee water use rates over time. These modified use rates will then be multiplied by the number of projected households and employees (drivers) to determine the residential and non-residential water demands.

4.1 Residential Model

The baseline forecast utilizes a combined single family and multi-family residential model. The dependent variable for the model is the log of monthly residential household water use (gallons per home per day). Table 3 presents the estimated residential model, based on 924 observations derived from data from 8 member utilities. The model explains approximately 76 percent of the variation in water use among the residential water use observations.

Table 3 Residential Water Demand Statistical Regression Model				
Number of Observations				924
Adj. R-Square				0.765
Explanatory Variables	**Parameter Estimate**	**Standard Error**	**t Value**	**Pr >t**
Intercept	-0.6036	0.3654	-1.65	0.0989
January Indicator (0/1)	0.0342	0.0168	2.04	0.0421
February Indicator (0/1)	0.0274	0.0164	1.67	0.0957
April Indicator (0/1)	0.3964	0.0164	2.41	0.0160
May Indicator (0/1)	0.1154	0.0164	7.02	<.0001
June Indicator (0/1)	0.2675	0.0165	16.25	<.0001
July Indicator (0/1)	0.3776	0.0166	22.77	<.0001
August Indicator (0/1)	0.4335	0.0169	25.70	<.0001
September Indicator (0/1)	0.3254	0.0166	19.63	<.0001
October Indicator (0/1)	0.1708	0.0166	10.32	<.0001
November Indicator (0/1)	0.0415	0.0168	2.46	0.0140
Departure of log Precipitation from long-term	-0.0111	0.0058	-1.92	0.0546
Departure of log Maximum Temperature from	0.4506	0.1028	4.38	<0.001
log Percent Multifamily Households to Total	-0.1913	0.0095	-19.1	<.0001
log Median Household Income (year 2000 dollars)	0.4947	0.0339	14.59	<.0001
log Marginal Price of Water (year 2000 dollars)	-0.0404	0.0047	-8.67	<.0001
log Passive Conservation Indicator (% new homes	-0.0728	0.0386	-1.89	<.0594
log Active Residential Conservation (# of	-0.0309	0.0054	-5.75	<.0001

All of the variables in the model had the expected correct signs and were significant at the 10 percent level, with many of the variables significant at the one thousand of one percent level.

The weather components of the model include a monthly binary, the monthly precipitation departure from normal, and the monthly maximum temperature departure from normal. The monthly binary variables capture the effects of seasonality on residential water use. The binary variables for March and December were not significant and thus excluded from the model.

The demographic component of the residential model consists of a single variable, percent of total households that are classified as multifamily. This variable captures the effect of multi-family residential water use on the variation in total residential water use. The coefficient indicates that a one percent increase in the percent of multifamily households is estimated to produce a 0.19 percent decrease in residential water use.

The socioeconomic component of the model consists of two variables, median household income and marginal price. According to the model, median household income is the strongest indicator of the variation in residential water use. A one percent increase in median household income is estimated to lead to a 0.49 percent increase in residential water use. The marginal price variable is also a significant explanatory variable. The marginal price coefficient indicates that a one percent increase in price is estimated to produce a 0.04 percent decrease in residential water use.

The passive conservation indicator and the active conservation indicator are the two explanatory conservation variables in the residential model. Each of the two variables is statistically significant and both had the correct sign. A one percent increase in the passive conservation indicator is estimated to produce a 0.07 percent decrease in residential water use. A one percent increase in the active conservation indicator is estimated to produce a 0.03 percent decrease in residential water use.

4.2 Non-Residential Model

Table 4 presents the water demand model for the non-residential sector. The model is based on 910 observations and the four explanatory variables explain about 44 percent of the variation in water use among non-residential water use observations. All variables were significant and had the correct anticipated sign.

The socioeconomic component of the model is the marginal price variable. The model estimates show that a one percent increase in the non-residential marginal price of water is estimated to reduce non-residential water use by about 0.17 percent.

The demographic component of the model is the ratio of manufacturing employment to total employment. The manufacturing ratio is equal to the total number of manufacturing employees for a given month divided by the total number of employees for that month.

The model shows that a one percent increase in the manufacturing employment ratio is estimated to increase non-residential water use by almost 0.21 percent.

The observed maximum temperature is the explanatory weather variable in the non-residential model. The model shows a very strong relationship between maximum temperature and non-residential water use. The observed maximum temperature coefficient implies that a one percent increase in maximum temperature is estimated to produce a 1.4 percent increase in non-residential water use.

The conservation explanatory variable in the model is the count of active non-residential conservation programs. The model shows that a one percent increase in the number of active non-residential water conservation programs is estimated to produce a 0.05 percent decrease in the non-residential sector gallons per day.

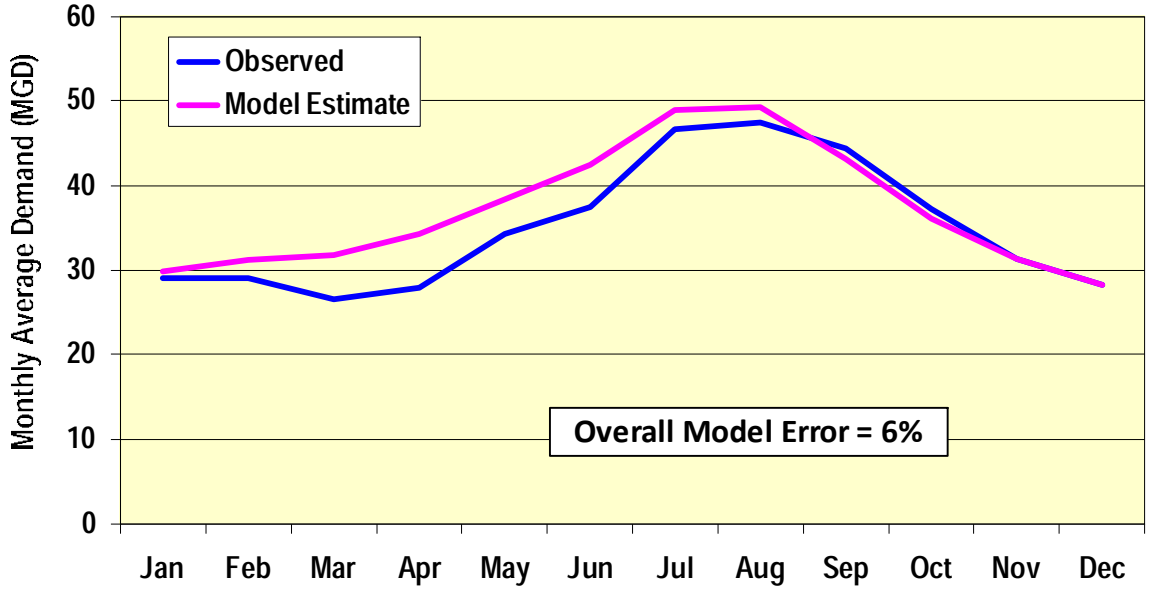
Table 4
Non-Residential Water Demand Model

Number of Observations				910
Adj. R-Square				0.4444
Explanatory Variables	**Parameter Estimate**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	-1.7232	0.2918	-5.91	<.0001
log Marginal Price of Water (year 2000 dollars)	-0.1757	0.0132	-13.27	<.0001
log Manufacturing Employment Ratio (% to total)	0.2147	0.0135	15.89	<.0001
log Maximum Temperature	1.4589	0.0715	20.41	<.0001
log Active Non-Residential Conservation (# of programs)	-0.0495	0.0180	-2.75	0.0060

4.3 Demand Model Verification

In order to test the overall accuracy of the combined residential and non-residential demand models, actual weather data and demographic data was input to the model for 2007. Then the results of the models were compared to actual water consumption for 2007. Figure 6 presents this comparison. As shown, the empirical demand models represent actual water consumption fairly well. Overall, the model error is approximately 6 percent.

Figure 6. Comparison of Demand Model Results to Actual Consumption for 2007



5.0 Water Demand Forecast

5.1 Uncertainty Approach and Assumptions

CDM developed a spreadsheet tool to forecast water demands, using the econometric models described in Section 4, along with projected demographic drivers and projected explanatory drivers. The software package called @Risk, which works in MS Excel, was utilized to produce probabilistic ranges in the demand forecast based on key uncertainties. For those variables that wish to be evaluated in terms of uncertainty, @Risk produces probability distribution function (PDF) using Monte Carlo simulation. Monte Carlo simulation involves random draws from either a predetermined range of data or estimated range of data using a selected distribution type (e.g., normal distribution, triangular, or skewed). @Risk also allows for correlations between certain variables to be estimated, which can impact the range of outputs. For example, temperature and precipitation are correlated (meaning when temperature increases, precipitation tends to decrease).

The variables that were included as part of the uncertainty analysis of water demand included:

1. Number of Households – Alternative PSRC demographic forecasts were used to establish lower and upper bound estimates, and @Risk was used to generate a normally distributed sample.

2. Total Employment – Alternative PSRC demographic forecasts were used to establish lower and upper bound estimates, and @Risk was used to generate a normally distributed sample.

3. Weather – Historical weather for the years 1949 to 2007 were used to generate a distribution of temperature and precipitation.

4. Price of Water – Upper and lower ranges around the baseline projection of marginal price of water were established by CDM, using professional judgment, and @Risk was used to generate a normally distributed sample.

5. Household Income – Upper and lower ranges around the baseline projection of household income were established by CDM, using professional judgment, and @Risk was used to generate a normally distributed sample.

Table 5 presents the projected ranges for these variables.

In addition, several alternative scenarios were tested as sensitivity in the water demand forecast:

Climate Change Scenario
In 2006, King County formed the Climate Change Technical Committee, made up of participants from King County, Seattle Public Utilities, Cascade Water Alliance, and other members. A technical report was generated that summarized a process used to select a represented sample from a dozen global circulation models and carbon emission scenarios. This sample of climate change was also used for the 2008 Regional Municipal Water Supply Outlook. The three represented climate change scenarios are:

a. GISS_ B1: “warm” regional climate change scenario with nearly the smallest increase in temperature, and nearly the largest decrease in precipitation

b. ECHAM5_A2: ”warmer” regional climate change scenario with mid-range increases in both temperature and precipitation

c. IPSL_A2: “warmest” regional climate change scenario with large increase in temperature, and nearly the largest increase in precipitation

@Risk was then used randomly select from these three climate change scenarios in order to produce future estimates of temperature and precipitation. Table 6 presents a summary of how July temperature and annual precipitation change as a result of potential climate change.

Table 5
Ranges in Demographic, Socioeconomic and Weather Data
Used for Uncertainty Analysis of Water Demand

	Number of Total Households			Total Employment		
Year	Min Value	Mean Value	Max Value	Min Value	Mean Value	Max Value
2010	148,183	151,638	155,091	349,125	354,060	358,994
2020	172,684	178,936	185,187	405,691	414,739	423,783
2030	192,548	203,242	213,931	449,985	468,082	486,172
2040	214,573	229,378	244,179	483,611	511,582	539,538
2050	237,776	259,161	280,542	525,696	561,888	598,073
2060	265,114	294,722	324,325	571,551	620,908	670,242

	Real Price of Water ($/HCF)			Real Household Income		
Year	Min Value	Mean Value	Max Value	Min Value	Mean Value	Max Value
2010	$2.44	$2.47	$2.50	$72,668	$72,997	$73,326
2020	$2.76	$2.92	$3.08	$73,462	$74,285	$75,107
2030	$3.15	$3.38	$3.61	$74,518	$76,163	$77,807
2040	$3.19	$3.65	$4.11	$75,517	$78,479	$81,439
2050	$3.17	$3.75	$4.33	$76,828	$81,270	$85,711
2060	$3.06	$3.75	$4.44	$77,743	$84,159	$90,573

	Average Monthly Max. Temperature (oF)			Monthly Precipitation (inches)		
Month	Min Value	Mean Value	Max Value	Min Value	Mean Value	Max Value
Jan	21.6	43.6	64.8	2.3	6.6	11.6
Feb	35.5	48.7	61.3	1.7	4.7	8.9
Mar	34.7	51.1	67.0	1.5	4.3	7.0
Apr	44.9	57.5	79.4	1.1	3.3	5.6
May	56.5	64.4	91.7	0.6	2.3	4.0
Jun	56.7	69.4	83.7	0.2	2.0	3.8
Jul	61.0	75.2	88.9	0.0	1.0	2.4
Aug	54.8	74.7	95.3	0.2	1.4	3.7
Sep	57.5	69.6	81.4	0.2	2.1	4.9
Oct	53.8	59.6	65.0	1.0	4.0	8.2
Nov	41.1	50.3	60.4	1.9	6.5	11.2
Dec	33.3	44.7	55.8	2.9	6.6	10.3
Ave/Total	46.0	59.1	74.6	13.7	44.8	81.5

Table 6
Projections of Temperature and Rainfall Based on Climate Change Scenarios

	Average Max. July Temperature (oF)			Mean Annual Precipitation (inches)		
Year	Low Scenario	Av. Scenario	High Scenario	Low Scenario	Av. Scenario	High Scenario
Current	75.2	75.2	75.2	44.8	44.8	44.8
2020	77.8	78.1	78.4	45.0	47.2	49.3
2040	78.7	79.0	79.5	45.3	47.8	50.2
2060	79.1	81.1	81.3	45.8	48.5	51.1

Regional Demand Contingency

One variable that Cascade wanted to test was regional demand contingency. This variable estimates the potential impact of additional demands for Cascade due to: (1) local supplies of water systems outside the eight Cascade members are compromised by contamination or regulatory actions; (2) Climate change leads to higher than expected demand throughout the region or reduced yield of existing regional or local supplies for water systems outside the eight Cascade members; or (3) growth in demand of local water systems not served by a regional supplier exceeds the capacity of local supplies. Any of these scenarios (or a combination of all three) could lead water systems in the region to request supplies from Cascade. This would represent an additional demand on top of the demands forecast by the econometric models discussed above. Therefore a demand contingency of 10 mgd was identified. The lower range of this regional demand contingency was set to 0 mgd, while the upper range was set at 20 mgd. A triangular distribution was assumed using @Risk to generate a sample. Table 7 presents the regional demand contingency.

Table 7
Regional Demand Contingency (mgd)

Year	Low Range	Average Range	High Range
2010	0.0	0.0	0.0
2020	0.0	0.0	0.0
2030	0.0	0.3	2.5
2040	0.0	3.5	8.7
2050	0.0	6.8	14.0
2060	0.0	10.0	20.0

5.2 Demand Forecast Scenarios and Results

Working closely with Cascade, CDM developed three demand forecasting scenarios:

1. No climate change and no regional contingency water demands
2. With climate change and no regional contingency water demands
3. With climate change and with regional contingency water demands

For each of these demand forecast scenarios, a range of water demand forecasts are produced by the @Risk model. Table 8 summarizes the mean (or average) value of water demands for the three scenarios.

Table 8
Mean Water Demand Forecast Results (mgd)

Demand Forecast Scenario	2010	2020	2030	2040	2050	2060
No climate change, no regional demand contingency (baseline)	40.33	43.01	47.87	52.18	57.98	65.60
With climate change, no regional demand contingency	41.16	44.13	49.35	54.05	60.31	68.87
With climate change, with regional demand contingency	41.18	44.14	49.69	57.62	67.13	78.87

Climate change alone adds approximately 3 mgd of water demand to the baseline forecast scenario by 2060, while regional contingency alone adds 10 mgd of water demand by 2060. Table 9 presents the full range of water demand forecasts. The 95% level represents the demand which is expected to be exceeded 95 percent of the time, while the 5% level represents the demand which is expected to be exceeded 5 percent of the time.

Table 9
Full Range of Water Demand Forecast Results (mgd)

	No Climate Change, No Regional Demand Contingency				
Year	min	95%	mean	5%	max
2010	37.75	39.29	40.33	41.39	43.49
2020	39.36	41.52	43.01	44.50	46.93
2030	42.51	45.52	47.87	50.23	53.69
2040	43.75	48.93	52.18	55.41	60.23
2050	46.42	53.39	57.98	62.58	69.72
2060	51.47	59.27	65.60	72.11	80.93

	With Climate Change, No Regional Demand Contingency				
Year	min	95%	mean	5%	max
2010	38.56	40.08	41.16	42.26	44.74
2020	40.20	42.62	44.13	45.67	48.06
2030	43.51	46.95	49.35	51.80	55.33
2040	45.43	50.71	54.05	57.41	62.28
2050	49.55	55.65	60.31	65.05	71.52
2060	53.55	62.25	68.87	75.57	85.26

	With Climate Change, With Regional Demand Contingency				
Year	min	95%	mean	5%	max
2010	38.67	40.10	41.18	42.28	44.74
2020	40.39	42.61	44.14	45.71	48.06
2030	44.34	47.25	49.69	52.13	55.33
2040	47.71	53.49	57.62	61.77	67.12
2050	52.84	60.58	67.13	73.75	81.76
2060	57.59	69.38	78.87	88.44	99.40

Figures 7 through 9 present the full range in water demand forecasts for the three scenarios. The shaded area in these figures represents the entire range of the forecast, while the 95% and 5% exceedance represent the demands that could be exceeded 95 percent of the time or 5 percent of the time, respectively. As shown, the 95% and 5% exceedance forecasts are much tighter than the full range (shaded area). This is due to the normal (or bell shaped) distribution that is assumed for the demand drivers and explanatory variables shown in Table 4. Normal distributions assume that the bulk of the outcomes are clustered closer to the mean, and that the tails of the distribution are less probable.

Figure 7. Demand Forecast: No Climate Change, No Regional Contingency

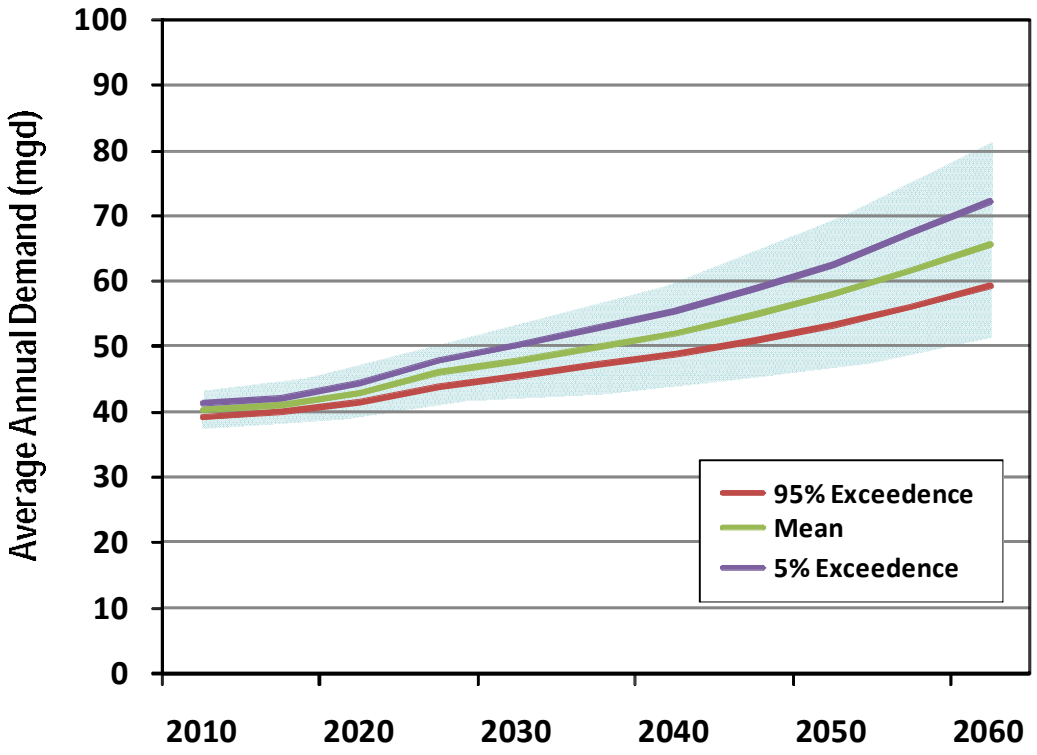


Figure 8. Demand Forecast: With Climate Change, No Regional Contingency

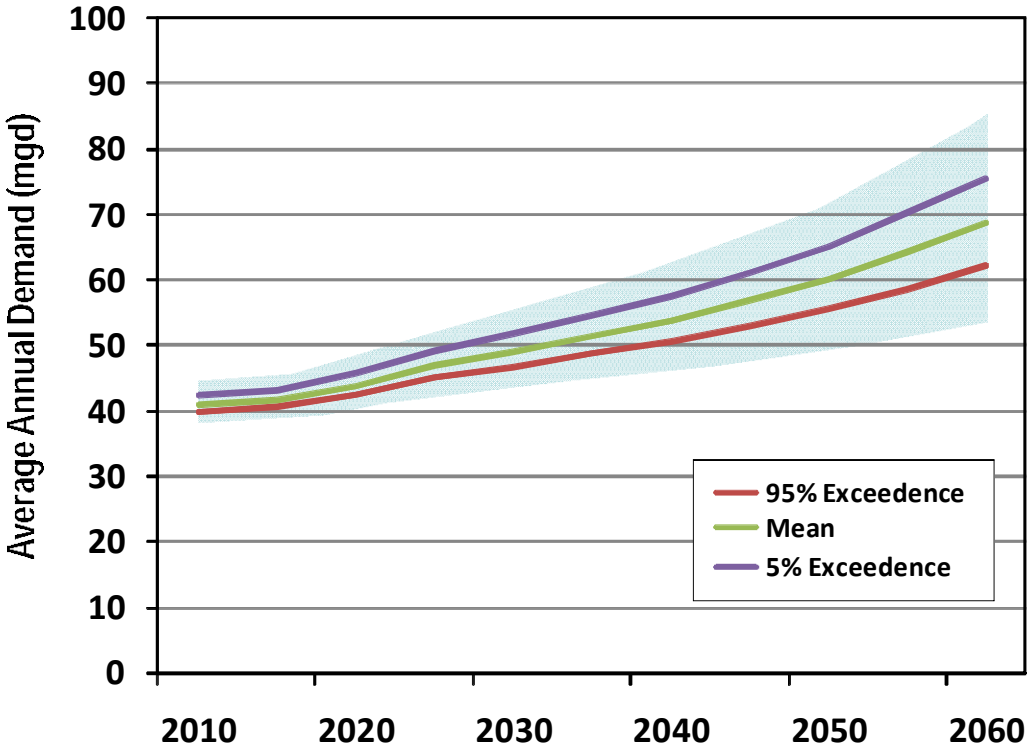
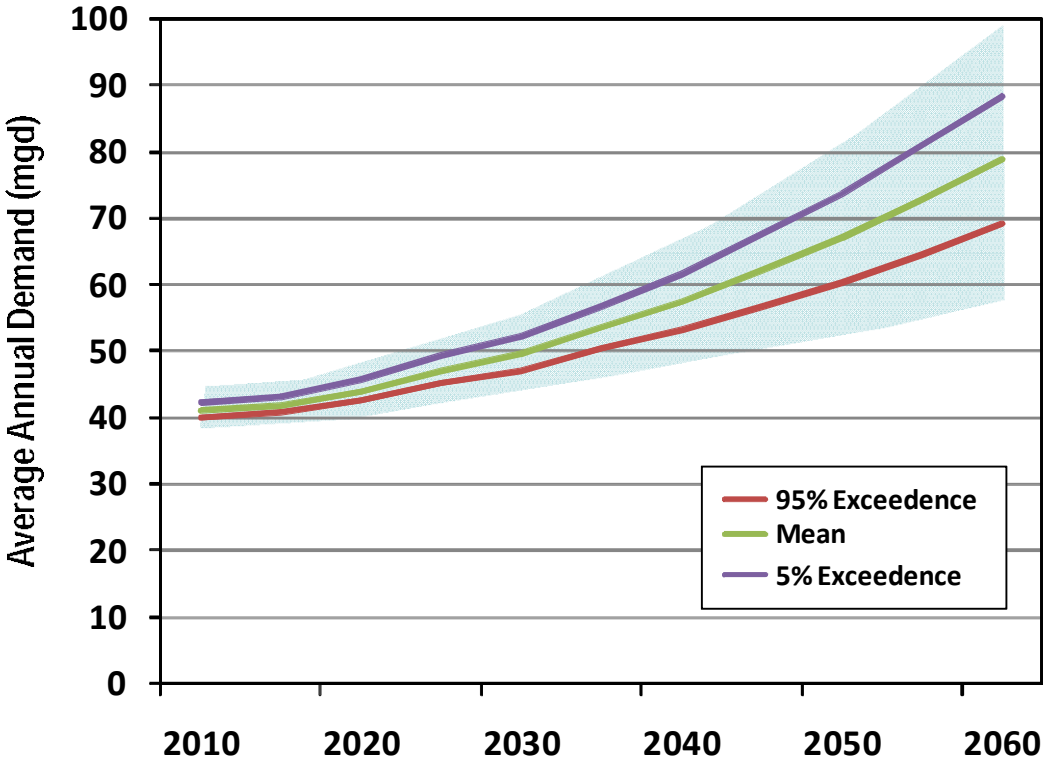


Figure 9. Demand Forecast: With Climate Change, With Regional Contingency



6.0 Conclusion

The comprehensive water demand forecast for Cascade indicates that the most likely range (90% confidence) without climate change or regional demand contingency is between 60 and 72 mgd by 2060. This range increases to 62 to 76 mgd by 2060 if climate change materializes as depicted in the three possible climate change models used in this study (note, there are approximately a dozen climate models vetted by the scientific community). When climate change and regional contingency are included, the most likely range in water demands is 69 to 88 mgd by 2060.

Also, it is important to understand that these statistical ranges in demand forecasts are based on a set of assumptions regarding data inputs. The range in data inputs may not reflect the entire possibility of outcomes. CDM relied on the best planning information available in setting these ranges, and only used professional judgment when planning information was not available. It is strongly recommended that these data inputs be revisited at least every 5 years in order to evaluate the short and long term trends of demographics, income and price of water. In addition, as future water conservation programs are implemented in the region, water usage may change (possibly dramatically). Therefore, Cascade should continue to monitor water demand trends in the service area.

Cascade Water Alliance
Revised Water Demand Forecast

October 18, 2010

1218 3rd Ave
Suite 1100
Seattle, WA 98101
(206) 336-4900

In association with

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Purpose

In December of 2009 a comprehensive water demand forecast was prepared for the Cascade Water Alliance (Cascade). The demand forecast utilized the latest demographic projections for the region developed by the Puget Sound Regional Council (PSRC) in 2006.

Water demands in Cascade's service area have been relatively flat for the past few years prompting the question that the demand forecast might be using overly optimistic assumptions regarding growth in the region, especially given the current economic recession.

As such, Cascade has requested that CDM and HDR re-examine the demand forecast and the associated demographic drivers to see what impact the current economic recession is having on the region's water use.

Approach

Given the urgency in needing this demand forecast re-assessment, a simplified approach for forecasting water demands was used based on the comprehensive analysis done back in December of 2009. This approach is as follows:

1. Revise projected households and employment projections based on reduced growth rates in earlier years to account for the economic recession

2. Utilize the unit use water factors for residential and non-residential sectors from the December 2009 demand forecast, which account for changes in price, income, mix of housing units and mix of employment

3. Apply the unit use water factors in step 2 to the revised projected demographics in step 1 to estimate the revised residential and non-residential water use

4. Apply the percent non-revenue water from the December 2009 forecast to the sub-total of residential and non-residential water use, then apply conservation from the December 2009 forecast in order to calculate the revised water demand forecast

Given the time urgency, the revised demand forecast will only be estimated for the baseline condition—meaning no probability analyses will be done. In other words, we are assuming no climate change, no variation in weather, no variation in price, income or demographics.

Revised Water Demand Forecast

Demographic Projections

Table 1 presents the PSRC demographic projections used in the December 2009 water demand forecast. These projections were based on PSRC's 2006 forecast model.

Table 1
Baseline Projections of Demographics for Cascade

		Households			Employment	
Year	Population	Total	Single Family	Multifamily	Total	Industrial
2007	357,059	144,481	96,144	48,337	338,152	35,695
2010	371,753	151,150	99,721	51,429	354,101	34,096
2020	423,808	178,798	113,220	65,578	414,296	29,886
2030	465,382	203,705	124,146	79,559	468,547	26,563
2040	507,661	229,508	135,666	93,842	511,342	24,322
2050	554,181	259,387	148,547	110,840	567,427	22,272
2060	605,408	294,074	162,979	131,095	620,523	20,865

Source: PSRC demographic projections (2006), used in Cascade's Water Demand Forecast (Dec. 2009)

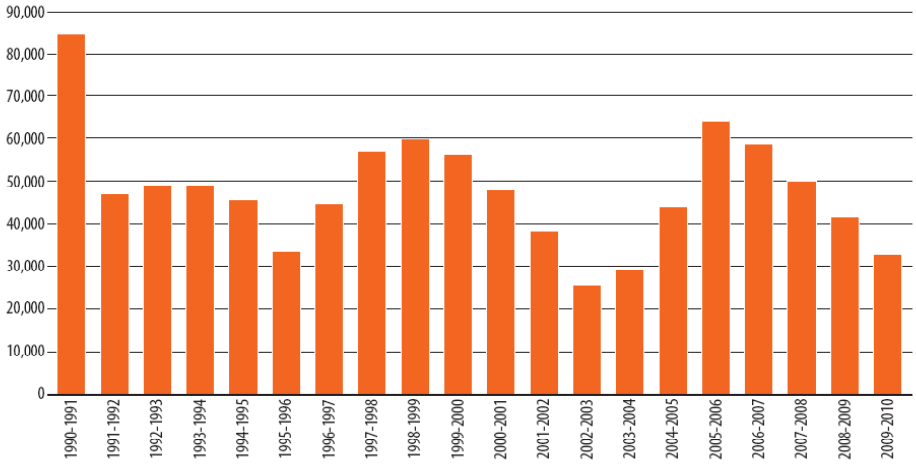
The average annual growth rates derived from these 2006 demographic projections are:

	2007-2020	2021-2060
Population	1.4%	1.1%
Housing	1.9%	1.6%
Employment	1.7%	1.2%

Two sources of recent data were used to compare the annual growth rates derived from Table 1 in order to determine the impact of the current economic recession on the region's growth: (1) a report on recent demographic trends from PSRC put out in September 2010 using recent Washington Office of Financial Management (OFM) population estimates; and (2) a revised forecast of equivalent residential units (ERUs) from Cascade's financial consultant, FCSG.

Figure 1 shows the overall annual population growth in the entire Puget Sound Region.

Figure 1. Annual Population Change in the Central Puget Sound



Source: U.S. Census Bureau, Washington State Office of Financial Management

As seen in this figure, annual population growth is half as much as it was in 2006 before the current economic recession. When King County is examined by itself, the annual growth rate from 2008 to 2010 averaged 1.3%, which is only 0.1% lower than PSRC's short-term demographic projections developed in 2006. The reason this difference is not larger given the significant drop in annual population growth shown in Figure 1, is because PSRC was showing much larger projected growth in Pierce and Snohomish Counties, both of which took significant hits in terms of recent growth due to the recession. This should be expected as King County is relatively built-out and has a stronger economic base in terms of employment.

However, Cascade's water demand forecast is not based on population, but on households and employment. And households and employment do not always follow the same trends in population, especially during economic recessions. During these economic downturns, people often stay with extended families or share housing as roommates rather than live alone. This results in greater persons per household, and fewer new homes. And higher unemployment during recessions translates into lower employment growth.

Since no updated housing and employment data existed at the time of this revised water demand forecast, another source of data was examined. Cascade's financial consultant FCSG has prepared an updated forecast of ERUs based on actual member data from 2005-2010. ERUs represent a combination of all new meters, residential and non-residential, converted to an equivalent residential meter size. Table 2 presents this data from 2005 to 2016.

Table 2
Equivalent Residential Units for Cascade

Member Utilities	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bellevue	63,107	64,353	64,622	65,169	65,519	66,142	66,281	66,461	66,662	66,873	67,114	67,388
Covington	14,036	14,904	16,243	16,578	17,141	17,276	17,325	17,396	17,516	17,959	18,475	19,060
Issaquah	9,117	10,105	10,119	10,514	10,961	11,012	11,137	11,219	11,289	11,337	11,393	11,456
Kirkland	17,000	17,299	17,558	17,712	17,773	17,847	17,936	18,157	18,182	18,208	18,234	18,260
Redmond	27,614	28,677	29,324	29,749	30,251	30,634	31,027	31,283	31,797	32,345	32,986	33,725
Sammamish Plateau	20,155	20,674	20,848	20,954	21,153	21,289	21,520	21,826	22,176	22,547	22,981	23,481
Skyway	3,761	3,773	3,782	3,790	3,800	3,800	3,805	3,812	3,820	3,828	3,838	3,849
Tukwila	8,459	8,473	8,503	8,538	8,567	8,577	8,593	8,615	8,639	8,665	8,694	8,727
Total	163,247	168,258	170,997	173,002	175,163	176,575	177,625	178,769	180,081	181,762	183,715	185,946
% Growth		3.1%	1.6%	1.2%	1.2%	0.8%	0.6%	0.6%	0.7%	0.9%	1.1%	1.2%

Source: FCSG, 2010

As this data represents both residential and non-residential meters, the annual growth rates from 2010 to 2016 were applied to the 2007 housing and employment data in Table 1 in order to obtain a revised demographic projection through 2020. Beyond 2020, the long-term annual growth rates from the 2006 PSRC demographic projections were used. Table 3 presents the revised demographic projections for housing and employment compared to the 2006 PSRC projections.

Table 3
Revised Demographic Projections for Cascade

	PSRC Projections (2006)		Revised Projections (2010)	
	Housing	Employment	Housing	Employment
2007	144,481	338,152	144,481	338,152
2010	151,150	354,101	149,302	349,434
2020	178,798	414,296	168,864	386,514
2030	203,705	468,547	193,918	440,216
2040	229,508	511,342	219,930	482,117
2050	259,387	567,427	250,299	537,684
2060	294,074	620,523	285,859	590,169

As shown in Table 3, by the year 2060, total housing units is approximately 8,200 lower for the revised demographic projections; while employment is approximately 30,300 lower.

Water Unit Use Factors

Table 4 presents the water unit use factors that were derived from Cascade's December 2010 water demand forecast for residential and non-residential sectors. The significant reduction in residential unit use from 2010 to 2020 is mainly attributed to the significant increases in water price, as projected by FCSG in the earlier years of the forecast. The decrease in non-residential unit use throughout the forecast period is

mainly due to the expected decline in heavy manufacturing employment, as projected by PSRC.

Table 4
Unit Use Water Factors for Cascade

Year	Residential (Gal/Home/Day)	Non Residential (Gal/Employee/Day)
2010	181.6	28.8
2020	172.6	26.3
2030	177.6	24.3
2040	177.6	23.1
2050	177.6	22.1
2060	177.6	21.1

Source: Derived from Cascade's water demand forecast (Dec. 2009)

Water Demand Forecast

Applying the unit use water factors (Table 4) to the revised demographic projections (Table 3), and then applying the 7.4% non-revenue water from the Cascade member survey results in a revised water demand forecast without conservation. The previous water conservation estimates from the December 2009 forecast was then subtracted in order to develop a revised water demand forecast with conservation (see Table 5).

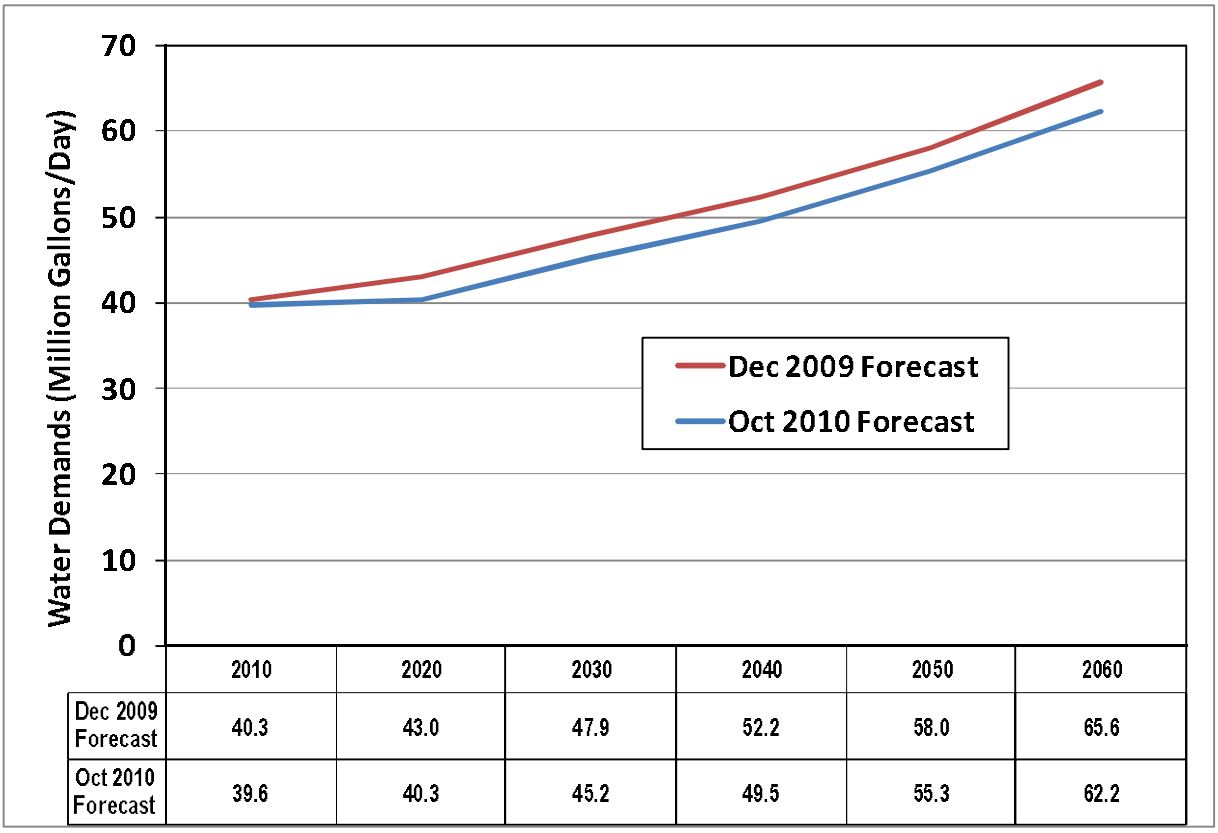
Table 5
Revised Water Demand Forecast for Cascade

	Without Conservation Forecast					
Year	Residential (mgd)	Non Residential (mgd)	Non Revenue (mgd)	Total (mgd)	Conservation (mgd)	Total with Conservation (mgd)
2010	27.1	10.1	3.0	40.1	0.5	39.6
2020	29.1	10.2	3.1	42.5	2.2	40.3
2030	34.4	10.7	3.6	48.7	3.5	45.2
2040	39.1	11.1	4.0	54.2	4.7	49.5
2050	44.5	11.9	4.5	60.8	5.6	55.3
2060	50.8	12.5	5.1	68.3	6.1	62.2

Figure 2 shows the comparison between the December 2009 (see Table 8 of that report) and October 2010 demand forecasts. The results indicate that water demands will continue to be relatively flat for the next 10 years if planned conservation is implemented successfully. Beyond 2020, water demands will increase by about 1.05 percent annually through 2060.

The difference between the December 2009 and October 2010 demand forecasts by 2060 is 3.4 mgd.

Figure 2. Comparison of Water Demand Forecasts for Cascade



	2010	2020	2030	2040	2050	2060
Dec 2009 Forecast	40.3	43.0	47.9	52.2	58.0	65.6
Oct 2010 Forecast	39.6	40.3	45.2	49.5	55.3	62.2

Memorandum
Cascade Transmission and Supply Plan

To: **TSP Project File (98140)**

From: **Andrew Graham**

Date: **November 28, 2011**

Title: **2010 Adjustments to Demand Forecast**

Forecasted water demands used in the Cascade Transmission and Supply Plan were developed in a stages from 2009 to 2010. These stages are summarized here as a record of the forecasting procedure.

2009 Demand Forecast

CDM prepared the initial demand forecast in 2010 using methods documented in the technical memorandum *Water Demand Forecast, Task 600* dated December 18, 2009. The memorandum includes forecasts with and without the effects of climate change. Monte Carlo techniques were used to generate a range of forecasts at the 95% (low forecast) and 5% (high forecast) certainty levels around the mean forecast. Based on past experience with forecasts rooted in Puget Sound Regional Council (PSRC) data, Cascade made a policy judgment to use only the lower portion of this range, from the 95% (low forecast) to the mean forecast, in its Transmission and Supply Plan.

2010 Updated Demand Forecast

Due to the "Great Recession" and related observations of a sharp decline in actual new connections, Cascade requested that the original forecast be adjusted to reflect actual demands in 2009 and revised growth expectations. CDM provided a revised forecast using methods documented in the technical memorandum *Revised Water Demand Forecast* dated October 18, 2010. The revised forecast was solely for the mean water demand curve (no uncertainty range), and did not include an adjustment for climate change. This approach was used in order to avoid the extensive work effort needed to generate a complete revised forecast with climate change and uncertainty included.

HDR performed rough calculations to generate an approximate range of demands from the 95% to mean; and including climate change. The procedure for doing this was as follows:

1.) The difference between the forecast with and without climate change from the 2009 technical memorandum was calculated for each decade of the forecast from 2010 to 2060.
2.) The climate change difference was reduced proportionately to reflect the lower mean forecast developed in 2010. For example if a demand value for a given decade in the 2010 forecast was 97% the level of the 2009 forecast, then the difference from climate change in that same year was also reduced to 97% of the original difference.

3.) The adjusted climate change value was added to the 2010 mean forecast, to yield a climate-change-adjusted 2010 mean forecast. See table below.

Year	Oct. 2010 Forecast w/o Climate Change (mgd)	Climate Change Adjustment	New Forecast with Climate Change		Dec. 2009 Forecast with Climate Change	2010 Reduction from Dec. '09 Forecast
2010	39.6	0.8	40.5		41.2	-0.7
2020	40.3	1.1	41.3		44.1	-2.8
2030	45.2	1.4	46.6		49.4	-2.7
2040	49.5	1.8	51.3		54.1	-2.8
2050	55.3	2.6	57.9		60.3	-2.4
2060	62.2	3.1	65.3		68.9	-3.6

4.) In order to provide a 95% demand curve (low forecast) for the revised 2010 forecast, HDR generated low values for each decade, proportional to the 2009 forecast. For example, for a given decade if the 2009 low climate-adjusted forecast was 92% of the mean climate-adjusted forecast, HDR applied this same ratio to the mean 2010 forecast in that same year.

APPENDIX F

Cascade Connections Group Summary Report

Cascade Water Connections Working Group

Summary Report

December 2010

TABLE OF CONTENTS

INTRODUCTION

Cascade completed its initial Transmission and Supply Plan (TSP) in 2004, outlining a program for Cascade to meet the future water supply needs of its members. As the name of the TSP implies, the plan includes an analysis of current and future water supply sources as well as the means for delivering those supplies. Over the course of five years, even though required by law, the need for an update of the TSP became increasingly apparent, as many factors evolved over that time. The desire for and benefits of greater regional collaboration also emerged. In that context, an updated TSP was initiated in 2009, along with the creation of a Working Group composed of regional stakeholders. The efforts of the group, named the Cascade Water Connections Working Group, are summarized in this report.

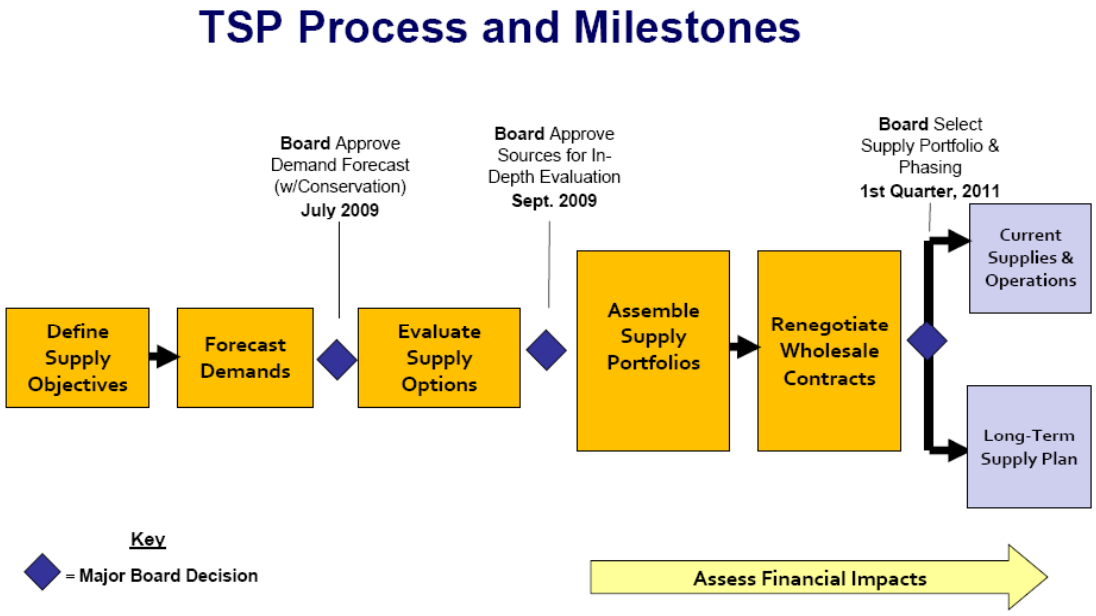
BACKGROUND

Development of Transmission and Supply Plan

The 2010 TSP is based on several explicit planning objectives. These objectives state that the 2010 Plan should:

- Consider a broad range of supply alternatives and project partnerships to identify a viable portfolio of water sources that can provide Cascade members with secure and reliable supplies through at least 2050
- Consider how investments in supply and infrastructure could serve other regional needs or improve the reliability of supply in the region
- Enable rates to be managed at acceptable levels over the short and long terms
- Provide flexibility to adjust to changing circumstances or new opportunities
- Recognize the declining nature of existing wholesale supply contracts
- Apply clear criteria and rationale for recommended actions and provide a sound basis for communication with all stakeholders in the region

A key feature of the TSP development process was a clearly stated set of milestones, with specific opportunities provided for the Working Group to provide its input at key decision points. A figure describing this approach appears below.



Water Demand Projections

A big part of developing a Transmission and Supply Plan is determining how much water demand one is trying to satisfy, and with what assurances, in the face of long-term planning uncertainties. In turn, a significant factor in projecting water demand is determining how much water can be conserved, now and in the future, in order to reduce demand. Other obvious factors include population growth, income growth, plumbing and development codes, the size and type of new dwellings being built in the region (e.g., single family versus multi family) and the rate of formation of new households.

Throughout the development of the TSP, new data continued to suggest that many of these factors were pointing towards both a temporary and permanent softening of water demand. At the same time, conservation goals were being achieved ahead of planned schedules. As a result, the water demand curve remained a dynamic target up until the final adoption of the TSP. Connections Working Group members were kept apprised of these factors throughout their meetings and presented with updated demand curves as they were developed.

Given the Connections Working Group's regional diversity, the group was helpful in reviewing and providing feedback on the appropriateness of reduced demand curves as well as strategies for meeting that demand. Key issues considered by the group included the timing of development of Lake Tapps as a resource, the ramifications of building transmission lines that would interconnect water resources and utilities in the region, and the relative contribution to the supply portfolio of smaller alternative water sources that have yet to be developed.

Another dynamic element were ongoing negotiations between Cascade and the water utilities owned by Seattle and Tacoma related to Cascade purchasing temporary and permanent water supplies from those utilities. Generally, the softening of water demand for those utilities meant more water was potentially available in the near term for sale to Cascade.

Taken together, all of these interrelated and dynamic factors presented a challenging environment in which the TSP was developed and the Connections Working Group was called upon to provide its insights and feedback. Fortunately, the design of the Working Group had three features that served Cascade and the Connections Working Group well throughout the process. The first feature was that meetings were scheduled as needed, based on the milestones in the TSP development process. Instead of meeting at regular but arbitrary intervals, the group met whenever there was sufficient progress in the developmental steps of the TSP's preparation to present new information and issues for the Working Group's consideration and input. The second feature, and a hallmark noted by all of the group's members, was the exceptional degree of transparency and disclosure by Cascade and its technical team throughout the process. There were no "off-limit" questions, and any backup data or documents that members of the group thought were relevant were promptly made available. Thus, whatever information or issues that the group wanted to "drill down" into was accommodated and incorporated into the group's

agenda. The third feature was Cascade's decision to use a neutral facilitator to conduct the meetings, develop agendas, prepare meeting summaries and generally administer the Working Group throughout the process. By using an independent facilitator, Cascade was able to demonstrate its commitment to the transparency of the process, the independence of the Working Group and its trust in the collective wisdom offered by the group. Because of the unique vantage point of the neutral facilitator, Appendix A contains a brief set of observations by the facilitator about the Working Group process.

FORMATION OF WORKING GROUP

Purpose and Objectives

The Cascade Water Connections Working Group was convened to assist the Cascade Water Alliance in evaluating the Transmission and Supply Plan (TSP) to ensure that community, stakeholder and purveyor values and input were included in the supply and demand planning process. The Cascade Water Alliance sought the valuable participation and feedback of the members of the Connections Working Group in this planning effort. Members of the Connections Working Group were asked to provide input to Cascade staff at various milestones in the TSP supply and demand planning process. Specifically, the working group members were requested to review the draft list of water supply and transmission projects developed by the consultant team and suggest modifications if appropriate; provide feedback on the consultant team's evaluation of water demands and supply options; and summarize discussions at the conclusion of the process in the form of a comprehensive, written report to be presented to the Cascade Board of Directors.

The Mission Statement and Principles of Participation that follow are the ones that were presented to the Connections Working Group at its formation. Where the process ultimately did not strictly follow this plan, it has been modified as noted.

Mission Statement

The mission of the Cascade Water Connections Working Group is to assist the Cascade Water Alliance staff in evaluating the Transmission and Supply Plan (TSP) and to ensure that community, stakeholder and purveyor values and input are included in the planning process.

Principles of Participation

Role of Committee Members
The Cascade Water Alliance (Cascade) is asking participants of the Cascade Water Connections to assist Cascade and its planning consultants to review components of the TSP during its development. Working group members are being asked to:

- Become knowledgeable about regional water issues, including water supply resources, transmission facilities and regional water needs.
- Become familiar with Cascade and its role in regional water planning and water supply.
- Become familiar with Cascade's member agencies and water districts and the services they provide.
- Provide input to Cascade staff at various milestones in the TSP supply and demand planning process. Specifically, it is requested that working group members:
    - Provide feedback to the consultant team's evaluation of water demands and supply options.

- Review the draft list of water supply and transmission projects developed by the consultant team and suggest modifications if appropriate.
- Finalize feedback and forward in a comprehensive report to the Cascade Board of Directors.

Representation
Participants are being sought based upon several qualities:

- Willingness to work cooperatively with other working group members.
- Commitment to consistently attend the working group meetings.
- Ability to present the perspective of an organization or constituency.

Working group members are encouraged to report back to his or her respective constituency, when appropriate, to inform them about the working group's discussions and the progress of the TSP development. Meeting minutes will be prepared to facilitate this effort. Cascade staff and consultants will be available to assist in this communication process, if desired.

Discussion Process
Working group members agree to abide by the following discussion process:

- All perspectives are valued.
- One person speaks at a time.
- The preferred deliberation process is collaborative problem solving.
- In cases of non-consensus, alternative perspectives will be documented.
- Working group members treat each other with respect.
- A neutral third-party of Katz & Associates, Inc. will facilitate the meetings.

Meeting Attendance
For the process to work effectively, full participation of members will be essential. Working group members are asked to commit to attend meetings consistently. If a working group member becomes unavailable to attend a meeting, he or she may send an alternate to monitor that meeting. The alternate should be briefed by the working group member regarding the status of prior discussions and decisions, and should be able to faithfully represent the perspectives of the member for which they are serving as an alternate**.** Active participation by the alternate is permissible if the alternate does not impede the progress of the working group.

Support
A neutral third-party facilitator of Katz & Associates, Inc. will conduct all working group meetings. The role of the facilitator is to ensure all perspectives are heard through a collaborative discussion process. Cascade staff and consultants will provide technical and logistical support, including making presentations, answering questions, coordinating meetings and documenting meeting content. Meeting discussions may be audio taped to aid in the preparation of meeting summaries.

Meeting Agendas
Working group participation in establishment of agendas and matters of discussion will be encouraged. Cascade staff and the facilitator will be responsible for preparing the agendas in collaboration with working group members. At the conclusion of each meeting, staff and working group members will recommend items for inclusion in the next agenda and any action items requiring additional research. Agendas will be distributed by e-mail in advance of each meeting.

Timeline
The draft TSP will need to be completed by September 2010, and finalized by December 2010 [The draft TSP is actually being completed in 2011]. The working group will meet to review information, provide input and suggested modifications, if any, prior to key milestone points in the TSP process. To ensure consistency during this schedule, it will be important for the working group to address items presented at each meeting as fully as possible. Lengthy discussions on items for which a majority consensus cannot be reached should be limited.

Work Product
The working group will be asked to summarize its discussions at the conclusion of this process in the form of a written report. The written report will be prepared by the facilitator, in collaboration with working group members. A draft summary report will be presented to the working group for review and comment. It is suggested the report document the following:

- The scope and content of the working group's discussion.
- Feedback to Cascade staff regarding specific input related to supply options and regional water and transmission issues.
- Individual opinions and observations that may not be reflected in the main body of the report.

The working group's feedback will be presented to the Cascade Board at the conclusion of the working group's deliberations. This feedback will be a part of the overall background, research and technical findings that staff provides to the Cascade Board for their consideration and ultimate policy decision.

Roster of Members

Twenty-nine individuals participated in the Working Group as representatives of regional water planners and regulators, government, regulatory agencies, Tribes, the business community, local planning groups/downtown associations, employers, environmental groups, developers, academia, good government interests, and ratepayers. The full roster of Cascade Water Connections Working Group members is presented in Table 1.

Table 1: Connections Working Group Roster of Members

Name	Organization
Walt Canter	East King County Regional Water Association
Andrew Dunn	Washington State Department of Ecology
Ryan Harris	King County - Roads
Steve Hirschey	King County DNRP
Mark Howe	Microsoft
Bob James	Washington State Department of Health
Michael Johnson	Redmond Chamber of Commerce
Joan Kersnar	Seattle Public Utilities
John Kirner	Tacoma Water
Leslie Lloyd	Bellevue Downtown Association
Ralph Mason	Lake Tapps Community Council
Tim McDowd	Kirkland Neighborhood
Linda McCrea	Tacoma Water
Dave Monthie	King County DNRP
Meg Moorehead	Seattle City Council Staff
Beth Mountsier	King County Council's Physical Environment Committee
Bob Pancoast	East King County Regional Water Association
Paul Reitenbach	King County DDES
Lydia Reynolds-Jones	King County - Roads
Anna Rising	Kirkland Neighborhood
Ron Sheadel	Cedar River Water & Sewer District
Denise Smith	League of Women Voters
Sharon Steinbis	Sammamish Community
Sheila Strehle	Seattle Public Utilities
Dr. Leon Stucki	Lake Tapps Community Council
Jeannie Summerhays	Washington State Department of Ecology
Skip Swenson	Cascade Land Conservancy
Sue VanRuff	Maple Valley Chamber of Commerce
Don Wright	South King County Regional Water Association

Schedule of Meetings

As mentioned in the Background section, both the TSP development process and the opportunities for the Working Group to provide its input were based on a step-by-step set of milestones (See Figure 1). Consequently, there were several Working Group meetings in the beginning of the process (latter half of 2009) as several milestones were being achieved in relatively rapid succession. In 2010, the technical effort to develop and refine alternative portfolios of supply options involved an intensive and time-consuming process of analysis and iterative development. This resulted in meetings that were still milestone driven but spaced much farther apart. The resulting schedule of meetings of the Working Group is shown in Table 2.

Table 2: Meeting Schedule

Mtg #	Date and Time	Location	Topic
1	Tuesday, June 30, 2009 8 a.m. to 12 p.m.	Bellevue City Hall, Room 1E-108	Introductions Overview of Cascade and background on regional water resources
2	Thursday, August 13, 2009 9 a.m. to 12 p.m.	Bellevue City Hall, Room 1E-108	Supply alternatives Screening criteria
3	Thursday, September 10, 2009 8 a.m. to 11:30 a.m.	Kirkland City Hall, Peter Kirk Room	Short list of supply alternatives
4	Friday, December 11, 2009 8 a.m. to 11:30 a.m.	Bellevue City Hall, Room 1E-108	Short list of supply alternatives (continued) SEPA process
5	Thursday, April 15, 2010 8 a.m. to 11:30 a.m.	Bellevue City Hall, Room 1E-108	Initial supply portfolio alternatives
6	Friday, November 12, 2010 8 a.m. to 11:30 a.m.	Bellevue City Hall, Room 1E-108	Final water demand projections and supply portfolio alternatives

SUMMARY OF MEETINGS

A total of six meetings of the Connections Working Group was held from June 2009 to November 2010. Figure X, which outlines the steps in the TSP's development, provided the framework for identifying the appropriate points in the process where the Working Group's insights and feedback were needed to evaluate and modify, at Cascade's discretion the work accomplished to that point and review the planning for the next step in the TSP. Below is a brief summary of each meeting's purpose and outcomes.

Meeting 1 – June 30, 2009
The purpose of the first meeting was to clarify the group's mission, present an overview of the Cascade Water Alliance for those who were unfamiliar, and provide background information on regional water resources and the steps that would be followed in preparing a Transmission and Supply Plan, including the initial development of a water demand forecast. The group had many questions about the assumptions used in developing a forecast and requested more details be provided about the demand forecast sensitivities, scope and data sources. Staff agreed to provide this information before the next meeting.

Meeting 2 – August 13, 2009
The second meeting delved more deeply into the methods for developing water demand forecasts, introduced the water supply options that would be evaluated in the TSP, and presented an initial ranking of those options based on evaluation criteria developed by the technical team. Working Group members requested more detailed information on the supply options and discussed the significance and weighting of the evaluation criteria. Following that discussion, the group was asked to participate in an exercise to develop its own weighting of the criteria, similar to the exercise that was used by the Cascade Board and staff to develop theirs. Cascade staff indicated the group's weighting of the criteria would be used to perform an evaluation and ranking of the supply options and then compared to Cascade's rankings at the next meeting.

Meeting 3 – September 10, 2009
The third meeting focused in more detail on how the Cascade water supply option rankings were determined and compared them to the rankings that were produced by applying the criteria weighting developed by the Connections Working Group. The group observed that while some minor shifts in the supply option rankings occurred depending in which weightings were used, the top ranked supply options remained at the top and the bottom ranked options remained at the bottom. The group was also presented with alternative ways of evaluating the supply options in which financial factors were reduced or removed. This analysis produced rankings similar to the other two. The group then considered staff recommendations for eliminating the lowest ranked supply options from further consideration. Since the practical effect of this screening process was only to eliminate from consideration a small number of projects at the very bottom of the list, the group concluded the resulting list of options for inclusion in the next phase of the TSP evaluation was appropriate.

Meeting 4 – December 11, 2009
At the fourth meeting, an updated and refined demand forecast was presented. The primary meeting topic was a presentation of five combinations of different supply options that had been developed as alternative portfolios designed to meet that demand. Each portfolio presented the supply options phased in over the 50-year TSP planning horizon to show how supply would increase over time to meet the upward slope of the demand curve. Variations included how much water might be negotiated in purchase agreements with Seattle and Tacoma, when or if Lake Tapps was brought on line as a resource, and the inclusion or exclusion of additional resources such as reclaimed water. Given that a financial analysis of the portfolios was still under development and no ranking of the portfolios had been performed, the group's discussion centered primarily on clarifying the differences between the portfolios and making suggestions regarding the phasing of supply options.

Meeting 5 – April 15, 2010
The group was provided with an updated status on the securing of water rights for Lake Tapps and the negotiations with Seattle and Tacoma for additional water purchases in the future, both of which figure prominently in the viability and characteristics of the various supply portfolios. The group was then presented with the three portfolio alternatives that had been selected for continued evaluation. All three of those portfolios included Lake Tapps as a source, but varied as to when it was assumed Lake Tapps would begin supplying water, ranging from 2030 to 2060. The portfolios were compared to each other in terms of their relative strengths, looking at their benefits, drawbacks, risks and financial impacts. Risk was evaluated in a number of contexts, including the potential for impacts from seismic events, climate change, construction challenges, and ability to adapt to evolving demands. Key differences among the portfolios in terms of risk were highlighted, along with the potential for mitigating those risks. The Working Group asked a number of questions about how the risks were evaluated and how uncertainty was handled for factors such as cost, competition for resources, climate change and how much water might be available from Tacoma and Seattle in the final analysis. Cascade staff indicated they would come back to the Working Group when factors such as these and the securing of water rights for Lake Tapps were closer to being concluded so that a more definitive analysis of cost and risk could be provided. In the meantime, the general conclusion was that the portfolios that secured more water from Tacoma and Seattle and assumed a later date for Lake Tapps to begin supplying water had the least risk.

Meeting 6 – November 12, 2010
For the final meeting of the Connections Working Group, the Cascade technical team recapped how all of the original TSP planning objectives had been met and presented the adopted demand forecast for the TSP based on the best and latest available data. They also presented their conclusion that not only are all three of the supply portfolios presented at the last meeting viable, but that by sharing regional supplies, risk is reduced and costs are deferred. The remaining steps in finalizing the TSP for adoption by the Cascade Board were outlined, including the Board selecting an approved supply portfolio and receiving a report about the work of the Connections Working Group. To that end, a proposed outline for the report was presented by the group's facilitator and accepted by

the group. The facilitator then prepared a Working Group Report based on that outline, which was reviewed and commented on by the Working Group. In terms of the group's conclusions, members volunteered a number of lessons learned that were particularly focused on the process used to involve them in the development of the TSP. These conclusions are summarized in the next section, along with observations from the neutral facilitator.

CONCLUSIONS

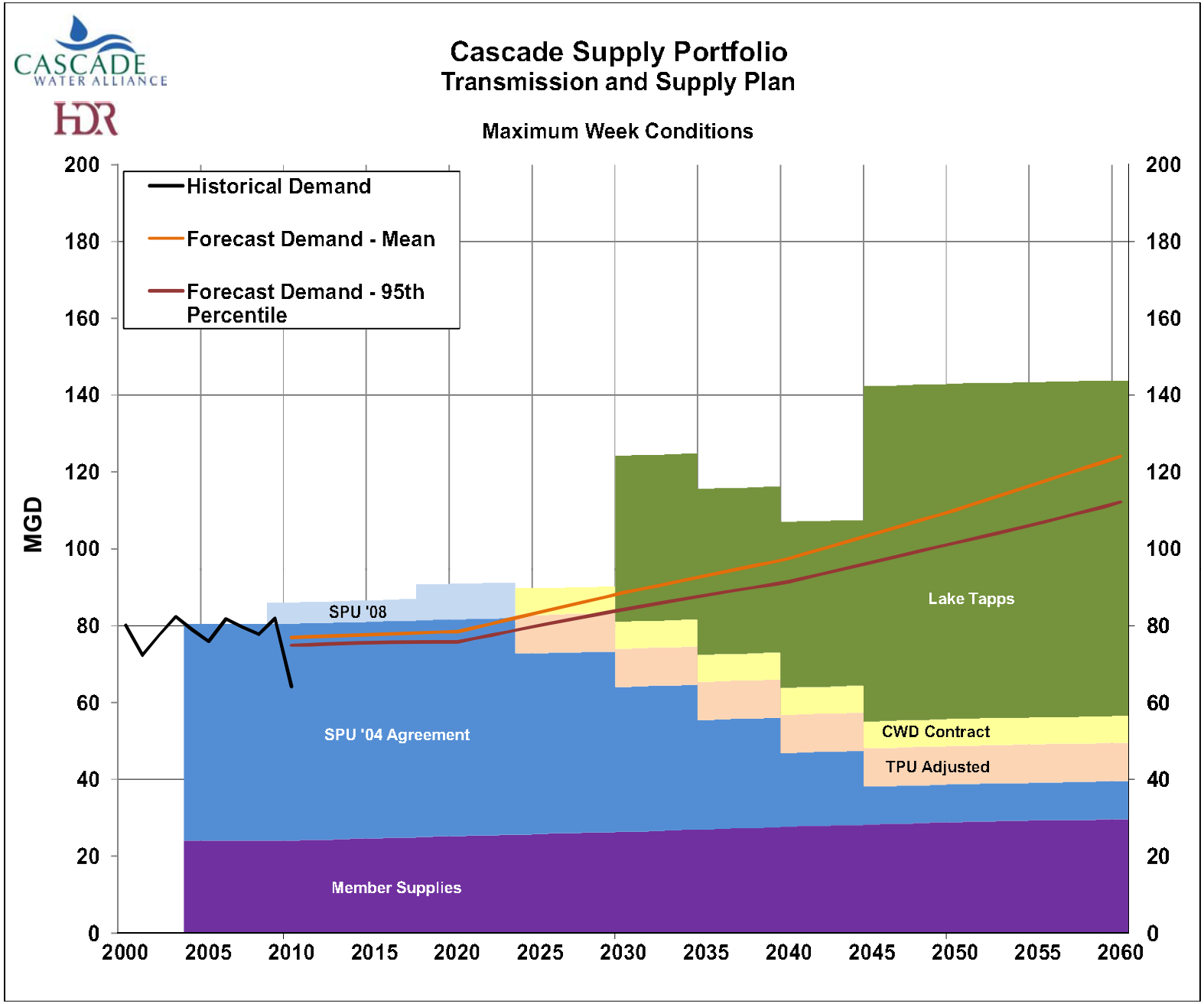
The purpose of the Connections Working Group, as reflected in its mission statement, was primarily to serve as a sounding board for the technical team as it developed the Transmission and Supply Plan. The Working Group's feedback was provided incrementally at each milestone of the Plan's development and helped steer the direction of the TSP as it proceeded. As such, the Working Group did not develop final recommendations per se. However, members vocalized throughout the process and punctuated at the last meeting their belief that the working group had been an effective tool for vetting the Plan's development in the region. Specific observations about the working group approach included the following:

- Useful to do again
- Good model
- Good transparency with presenting research and options
- Graphics in handouts and presentations were strong and informative
- Chuck Clarke and Lloyd Warren did not actively participate; sometimes it was confusing what their involvement was [Response: Mr. Clarke was debriefed after every meeting and was shown everything]
- Milestone based meeting schedule was effective
- Summary report will be helpful in capturing conclusions from group
- Group was used to identify any red flags
- First experience with an "affirmation committee," meaning the group was used to evaluate and provide feedback on the technical work of the team preparing the TSP.
- Cascade responded to a new environment; used regional approach and collaboration to be successful
- It was a useful exploration of a broad regional tool
- It was useful to bring people from diverse backgrounds together and put them in "Cascade's chair;" everyone came together in conclusion
- Excellent process in which all group members were invited to come and give input; good opportunity for the state to observe and participate as well
- Cascade responded well to dynamic shifts in planning context, opportunities and constraints
- Made overall planning process more complete

APPENDIX G

Preferred Supply Portfolio

Cascade Supply Portfolio
Maximum Week Conditions


Cascade Supply Portfolio
Transmission and Supply Plan
Maximum Week Conditions
CASCADE WATER ALLIANCE
HDR
MGD
Historical Demand
Forecast Demand - Mean
Forecast Demand - 95th Percentile
SPU '08
SPU '04 Agreement
Member Supplies
Lake Tapps
CWD Contract
TPU Adjusted
0
20
40
60
80
100
120
140
160
180
200
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
2060

Demand Components - Maximum Week (MGD)				Supply Surplus (Max Week)	
Year	Historical Demand (Actual)	Forecast Demand: Updated B Mean, with Peaking at 1.9 (Dec. 2010)	Forecast Demand: Updated B, Constructed 95%, peaking 1.9 (April 2011)	Mean Demand	95% Demand
2000	80.12				
2001	72.30				
2002	77.62				
2003	82.30				
2004	78.96			1.50	1.50
2005	75.90			4.56	4.56
2006	81.74			(1.28)	(1.28)
2007	79.74			0.72	0.72
2008	77.72			2.74	2.74
2009	81.90			4.14	4.14
2010	64.17	76.95	74.93	21.87	21.87
2011		77.10	75.07	9.06	11.08
2012		77.25	75.21	9.02	11.06
2013		77.41	75.36	8.99	11.04
2014		77.56	75.50	8.96	11.02
2015		77.71	75.64	8.93	11.00
2016		77.86	75.66	8.90	11.09
2017		78.01	75.69	8.86	11.19
2018		78.17	75.72	12.55	15.00
2019		78.32	75.75	12.52	15.09
2020		78.47	75.78	12.49	15.17
2021		79.48	76.65	11.58	14.41
2022		80.48	77.51	10.67	13.65
2023		81.49	78.37	9.77	12.89
2024		82.50	79.23	7.23	10.50
2025		83.51	80.09	6.33	9.74
2026		84.51	80.92	5.42	9.01
2027		85.52	81.75	4.51	8.28
2028		86.53	82.58	3.61	7.55
2029		87.53	83.41	2.70	6.82
2030		88.54	84.23	35.67	39.98
2031		89.43	84.98	34.92	39.37
2032		90.33	85.72	34.16	38.77
2033		91.22	86.46	33.41	38.16
2034		92.11	87.21	32.66	37.56
2035		93.01	87.95	22.60	27.66
2036		93.90	88.65	21.85	27.10
2037		94.79	89.35	21.10	26.54
2038		95.68	90.05	20.34	25.98
2039		96.58	90.75	19.59	25.42
2040		97.47	91.45	9.54	15.56
2041		98.72	92.44	8.40	14.69
2042		99.98	93.44	7.27	13.81
2043		101.23	94.43	6.14	12.94
2044		102.49	95.43	5.00	12.06
2045		103.74	96.42	38.64	45.96
2046		104.99	97.44	37.51	45.06
2047		106.25	98.46	36.38	44.17
2048		107.50	99.47	35.24	43.27
2049		108.76	100.49	34.11	42.37
2050		110.01	101.51	32.97	41.47
2051		111.42	102.51	31.65	40.55
2052		112.82	103.51	30.32	39.64
2053		114.23	104.51	29.00	38.71
2054		115.63	105.51	27.67	37.79
2055		117.04	106.51	26.34	36.87
2056		118.45	107.64	25.02	35.83
2057		119.85	108.76	23.69	34.78
2058		121.26	109.89	22.37	33.73
2059		122.66	111.02	21.04	32.69
2060		124.07	112.14	19.71	31.64

Supply Components - Maximum Week (MGD)							
Year	**Member Supplies**	**SPU Declining Block 2004**	**SPU Add'l 2008**	**TPU Total (Adjusted for 4-Cities)**	**Covington RWSS Surplus**	**Lake Tapps**	**Total Supply**
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--
2004	24.10	56.36	--	--	--	--	**80**
2005	24.10	56.36	--	--	--	--	**80**
2006	24.10	56.36	--	--	--	--	**80**
2007	24.10	56.36	--	--	--	--	**80**
2008	24.10	56.36	--	--	--	--	**80**
2009	24.10	56.36	5.58	--	--	--	**86**
2010	24.10	56.36	5.58	--	--	--	**86**
2011	24.22	56.36	5.58	--	--	--	**86**
2012	24.34	56.36	5.58	--	--	--	**86**
2013	24.46	56.36	5.58	--	--	--	**86**
2014	24.58	56.36	5.58	--	--	--	**87**
2015	24.70	56.36	5.58	--	--	--	**87**
2016	24.82	56.36	5.58	--	--	--	**87**
2017	24.94	56.36	5.58	--	--	--	**87**
2018	25.06	56.36	9.30	--	--	--	**91**
2019	25.18	56.36	9.30	--	--	--	**91**
2020	25.30	56.36	9.30	--	--	--	**91**
2021	25.40	56.36	9.30	--	--	--	**91**
2022	25.50	56.36	9.30	--	--	--	**91**
2023	25.60	56.36	9.30	--	--	--	**91**
2024	25.70	47.06	--	9.98	7.00	--	**90**
2025	25.80	47.06	--	9.98	7.00	--	**90**
2026	25.90	47.06	--	9.98	7.00	--	**90**
2027	26.00	47.06	--	9.98	7.00	--	**90**
2028	26.10	47.06	--	9.98	7.00	--	**90**
2029	26.20	47.06	--	9.98	7.00	--	**90**
2030	26.30	37.76	--	9.98	7.00	43.18	**124**
2031	26.44	37.76	--	9.98	7.00	43.18	**124**
2032	26.58	37.76	--	9.98	7.00	43.18	**124**
2033	26.72	37.76	--	9.98	7.00	43.18	**125**
2034	26.86	37.76	--	9.98	7.00	43.18	**125**
2035	27.00	28.46	--	9.98	7.00	43.18	**116**
2036	27.14	28.46	--	9.98	7.00	43.18	**116**
2037	27.28	28.46	--	9.98	7.00	43.18	**116**
2038	27.42	28.46	--	9.98	7.00	43.18	**116**
2039	27.56	28.46	--	9.98	7.00	43.18	**116**
2040	27.70	19.16	--	9.98	7.00	43.18	**107**
2041	27.82	19.16	--	9.98	7.00	43.18	**107**
2042	27.94	19.16	--	9.98	7.00	43.18	**107**
2043	28.06	19.16	--	9.98	7.00	43.18	**107**
2044	28.18	19.16	--	9.98	7.00	43.18	**107**
2045	28.30	9.86	--	9.98	7.00	87.25	**142**
2046	28.42	9.86	--	9.98	7.00	87.25	**143**
2047	28.54	9.86	--	9.98	7.00	87.25	**143**
2048	28.66	9.86	--	9.98	7.00	87.25	**143**
2049	28.78	9.86	--	9.98	7.00	87.25	**143**
2050	28.90	9.86	--	9.98	7.00	87.25	**143**
2051	28.98	9.86	--	9.98	7.00	87.25	**143**
2052	29.06	9.86	--	9.98	7.00	87.25	**143**
2053	29.14	9.86	--	9.98	7.00	87.25	**143**
2054	29.22	9.86	--	9.98	7.00	87.25	**143**
2055	29.30	9.86	--	9.98	7.00	87.25	**143**
2056	29.38	9.86	--	9.98	7.00	87.25	**143**
2057	29.46	9.86	--	9.98	7.00	87.25	**144**
2058	29.54	9.86	--	9.98	7.00	87.25	**144**
2059	29.62	9.86	--	9.98	7.00	87.25	**144**
2060	29.70	9.86	--	9.98	7.00	87.25	**144**

4-Cities Adjustments to TPU Supplies - Maximum Week					
Year	TPU contract Permanent	TPU Contract Reserved (converted to permanent)	TPU Total Contracted	4-Cities Allotment[1]	TPU Adjusted (TPU less 4-Cities)
2000	--	--	--	--	--
2001	--	--	--	--	--
2002	--	--	--	--	--
2003	--	--	--	--	--
2004	--	--	--	--	--
2005	--	--	--	--	--
2006	--	--	--	--	--
2007	--	--	--	--	--
2008	--	--	--	--	--
2009	--	--	--	--	--
2010	--	--	--	--	--
2011	--	--	--	--	--
2012	--	--	--	--	--
2013	--	--	--	--	--
2014	--	--	--	--	--
2015	--	--	--	--	--
2016	--	--	--	--	--
2017	--	--	--	--	--
2018	--	--	--	--	--
2019	--	--	--	--	--
2020	--	--	--	--	--
2021	--	--	--	--	--
2022	--	--	--	--	--
2023	--	--	--	--	--
2024	5.32	7.98	13.30	3.33	9.98
2025	5.32	7.98	13.30	3.33	9.98
2026	5.32	7.98	13.30	3.33	9.98
2027	5.32	7.98	13.30	3.33	9.98
2028	5.32	7.98	13.30	3.33	9.98
2029	5.32	7.98	13.30	3.33	9.98
2030	5.32	7.98	13.30	3.33	9.98
2031	5.32	7.98	13.30	3.33	9.98
2032	5.32	7.98	13.30	3.33	9.98
2033	5.32	7.98	13.30	3.33	9.98
2034	5.32	7.98	13.30	3.33	9.98
2035	5.32	7.98	13.30	3.33	9.98
2036	5.32	7.98	13.30	3.33	9.98
2037	5.32	7.98	13.30	3.33	9.98
2038	5.32	7.98	13.30	3.33	9.98
2039	5.32	7.98	13.30	3.33	9.98
2040	5.32	7.98	13.30	3.33	9.98
2041	5.32	7.98	13.30	3.33	9.98
2042	5.32	7.98	13.30	3.33	9.98
2043	5.32	7.98	13.30	3.33	9.98
2044	5.32	7.98	13.30	3.33	9.98
2045	5.32	7.98	13.30	3.33	9.98
2046	5.32	7.98	13.30	3.33	9.98
2047	5.32	7.98	13.30	3.33	9.98
2048	5.32	7.98	13.30	3.33	9.98
2049	5.32	7.98	13.30	3.33	9.98
2050	5.32	7.98	13.30	3.33	9.98
2051	5.32	7.98	13.30	3.33	9.98
2052	5.32	7.98	13.30	3.33	9.98
2053	5.32	7.98	13.30	3.33	9.98
2054	5.32	7.98	13.30	3.33	9.98
2055	5.32	7.98	13.30	3.33	9.98
2056	5.32	7.98	13.30	3.33	9.98
2057	5.32	7.98	13.30	3.33	9.98
2058	5.32	7.98	13.30	3.33	9.98
2059	5.32	7.98	13.30	3.33	9.98
2060	5.32	7.98	13.30	3.33	9.98

[1] Four cities quantity is 50% of allocated amounts, reflecting uncertainty in their future usage. Allocated amounts from letter dated Feb. 5, 2010 from Four Cities to Cascade (Clarke).

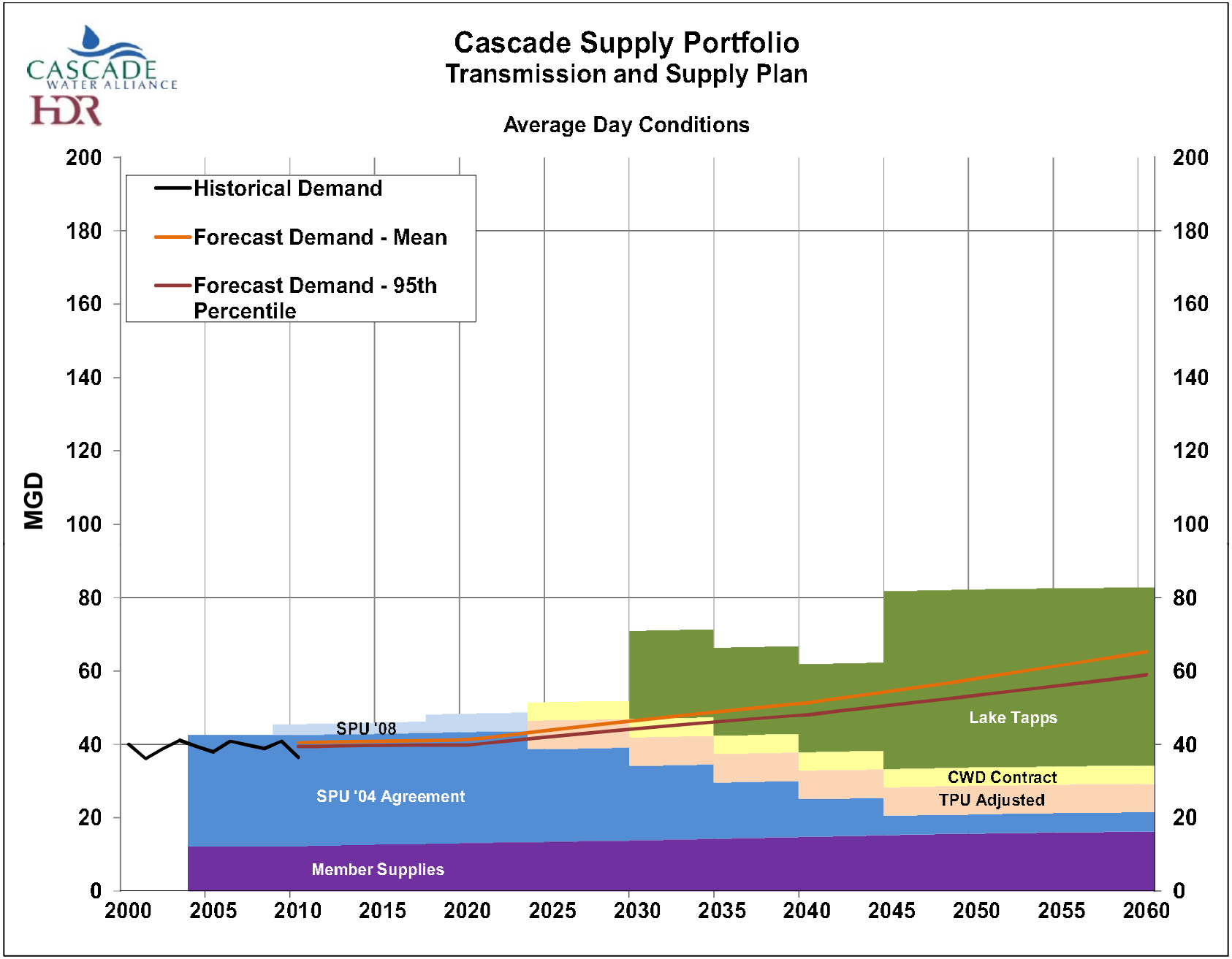
Member Independent Supply - Maximum Week (MGD)						
Year	**Issaquah**	**Covington**	**Redmond**	**SammPlat**	**Skyway**	**Total**
2000						
2001						
2002						
2003						
2004	3.33	7.80	3.51	8.89	0.57	24.10
2005	3.33	7.80	3.51	8.89	0.57	24.10
2006	3.33	7.80	3.51	8.89	0.57	24.10
2007	3.33	7.80	3.51	8.89	0.57	24.10
2008	3.33	7.80	3.51	8.89	0.57	24.10
2009	3.33	7.80	3.51	8.89	0.57	24.10
2010	3.33	7.80	3.51	8.89	0.57	24.10
2011	3.33	7.92	3.51	8.89	0.57	24.22
2012	3.33	8.04	3.51	8.89	0.57	24.34
2013	3.33	8.16	3.51	8.89	0.57	24.46
2014	3.33	8.28	3.51	8.89	0.57	24.58
2015	3.33	8.40	3.51	8.89	0.57	24.70
2016	3.33	8.52	3.51	8.89	0.57	24.82
2017	3.33	8.64	3.51	8.89	0.57	24.94
2018	3.33	8.76	3.51	8.89	0.57	25.06
2019	3.33	8.88	3.51	8.89	0.57	25.18
2020	3.33	9.00	3.51	8.89	0.57	25.30
2021	3.33	9.10	3.51	8.89	0.57	25.40
2022	3.33	9.20	3.51	8.89	0.57	25.50
2023	3.33	9.30	3.51	8.89	0.57	25.60
2024	3.33	9.40	3.51	8.89	0.57	25.70
2025	3.33	9.50	3.51	8.89	0.57	25.80
2026	3.33	9.60	3.51	8.89	0.57	25.90
2027	3.33	9.70	3.51	8.89	0.57	26.00
2028	3.33	9.80	3.51	8.89	0.57	26.10
2029	3.33	9.90	3.51	8.89	0.57	26.20
2030	3.33	10.00	3.51	8.89	0.57	26.30
2031	3.33	10.14	3.51	8.89	0.57	26.44
2032	3.33	10.28	3.51	8.89	0.57	26.58
2033	3.33	10.42	3.51	8.89	0.57	26.72
2034	3.33	10.56	3.51	8.89	0.57	26.86
2035	3.33	10.70	3.51	8.89	0.57	27.00
2036	3.33	10.84	3.51	8.89	0.57	27.14
2037	3.33	10.98	3.51	8.89	0.57	27.28
2038	3.33	11.12	3.51	8.89	0.57	27.42
2039	3.33	11.26	3.51	8.89	0.57	27.56
2040	3.33	11.40	3.51	8.89	0.57	27.70
2041	3.33	11.52	3.51	8.89	0.57	27.82
2042	3.33	11.64	3.51	8.89	0.57	27.94
2043	3.33	11.76	3.51	8.89	0.57	28.06
2044	3.33	11.88	3.51	8.89	0.57	28.18
2045	3.33	12.00	3.51	8.89	0.57	28.30
2046	3.33	12.12	3.51	8.89	0.57	28.42
2047	3.33	12.24	3.51	8.89	0.57	28.54
2048	3.33	12.36	3.51	8.89	0.57	28.66
2049	3.33	12.48	3.51	8.89	0.57	28.78
2050	3.33	12.60	3.51	8.89	0.57	28.90
2051	3.33	12.68	3.51	8.89	0.57	28.98
2052	3.33	12.76	3.51	8.89	0.57	29.06
2053	3.33	12.84	3.51	8.89	0.57	29.14
2054	3.33	12.92	3.51	8.89	0.57	29.22
2055	3.33	13.00	3.51	8.89	0.57	29.30
2056	3.33	13.08	3.51	8.89	0.57	29.38
2057	3.33	13.16	3.51	8.89	0.57	29.46
2058	3.33	13.24	3.51	8.89	0.57	29.54
2059	3.33	13.32	3.51	8.89	0.57	29.62
2060	3.33	13.40	3.51	8.89	0.57	29.70

Source: Cascade MemberWater Audits. Numbers were provided for 2008 and 2055 and interpolated for intervening years. Maximum week calculated as 90% of maximum day. Covington independent supply calculated as equal to projected demand in each year (see separate data on Covington surplus supply).

Covington Breakdown - Maximum Week (MGD)							
Year	Total Covington Demand	Covington Ground Water Supply	RWSS - Total Covington Share	Total Covington Supply	Covington's Surplus Supply	Cascade Contract for Covington Supply	Covington's Remaining Surplus
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--
2004	7.80	6.58	16.50	23.08	15.28	--	15.28
2005	7.80	6.58	16.50	23.08	15.28	--	15.28
2006	7.80	6.58	16.50	23.08	15.28	--	15.28
2007	7.80	6.58	16.50	23.08	15.28	--	15.28
2008	7.80	6.58	16.50	23.08	15.28	--	15.28
2009	7.80	6.58	16.50	23.08	15.28	--	15.28
2010	7.80	6.58	16.50	23.08	15.28	--	15.28
2011	7.92	6.58	16.50	23.08	15.16	--	15.16
2012	8.04	6.58	16.50	23.08	15.04	--	15.04
2013	8.16	6.58	16.50	23.08	14.92	--	14.92
2014	8.28	6.58	16.50	23.08	14.80	--	14.80
2015	8.40	6.58	16.50	23.08	14.68	--	14.68
2016	8.52	6.58	16.50	23.08	14.56	--	14.56
2017	8.64	6.58	16.50	23.08	14.44	--	14.44
2018	8.76	6.58	16.50	23.08	14.32	--	14.32
2019	8.88	6.58	16.50	23.08	14.20	--	14.20
2020	9.00	6.58	16.50	23.08	14.08	--	14.08
2021	9.10	6.58	16.50	23.08	13.98	--	13.98
2022	9.20	6.58	16.50	23.08	13.88	--	13.88
2023	9.30	6.58	16.50	23.08	13.78	--	13.78
2024	9.40	6.58	16.50	23.08	13.68	7.00	6.68
2025	9.50	6.58	16.50	23.08	13.58	7.00	6.58
2026	9.60	6.58	16.50	23.08	13.48	7.00	6.48
2027	9.70	6.58	16.50	23.08	13.38	7.00	6.38
2028	9.80	6.58	16.50	23.08	13.28	7.00	6.28
2029	9.90	6.58	16.50	23.08	13.18	7.00	6.18
2030	10.00	6.58	16.50	23.08	13.08	7.00	6.08
2031	10.14	6.58	16.50	23.08	12.94	7.00	5.94
2032	10.28	6.58	16.50	23.08	12.80	7.00	5.80
2033	10.42	6.58	16.50	23.08	12.66	7.00	5.66
2034	10.56	6.58	16.50	23.08	12.52	7.00	5.52
2035	10.70	6.58	16.50	23.08	12.38	7.00	5.38
2036	10.84	6.58	16.50	23.08	12.24	7.00	5.24
2037	10.98	6.58	16.50	23.08	12.10	7.00	5.10
2038	11.12	6.58	16.50	23.08	11.96	7.00	4.96
2039	11.26	6.58	16.50	23.08	11.82	7.00	4.82
2040	11.40	6.58	18.50	25.08	13.68	7.00	6.68
2041	11.52	6.58	18.50	25.08	13.56	7.00	6.56
2042	11.64	6.58	18.50	25.08	13.44	7.00	6.44
2043	11.76	6.58	18.50	25.08	13.32	7.00	6.32
2044	11.88	6.58	18.50	25.08	13.20	7.00	6.20
2045	12.00	6.58	18.50	25.08	13.08	7.00	6.08
2046	12.12	6.58	18.50	25.08	12.96	7.00	5.96
2047	12.24	6.58	18.50	25.08	12.84	7.00	5.84
2048	12.36	6.58	18.50	25.08	12.72	7.00	5.72
2049	12.48	6.58	18.50	25.08	12.60	7.00	5.60
2050	12.60	6.58	18.50	25.08	12.48	7.00	5.48
2051	12.68	6.58	18.50	25.08	12.40	7.00	5.40
2052	12.76	6.58	18.50	25.08	12.32	7.00	5.32
2053	12.84	6.58	18.50	25.08	12.24	7.00	5.24
2054	12.92	6.58	18.50	25.08	12.16	7.00	5.16
2055	13.00	6.58	18.50	25.08	12.08	7.00	5.08
2056	13.08	6.58	18.50	25.08	12.00	7.00	5.00
2057	13.16	6.58	18.50	25.08	11.92	7.00	4.92
2058	13.24	6.58	18.50	25.08	11.84	7.00	4.84
2059	13.32	6.58	18.50	25.08	11.76	7.00	4.76
2060	13.40	6.58	18.50	25.08	11.68	7.00	4.68

Sources: Demand from CWD Water Supply Strategic Plan, Nov. 2009 (MWD calculated from ADD using peaking factor of 2.0 from CWD's 2007 Water System Plan); Supply adapted from TPU email (McMeen to Maxfield) Dec. 2011. Cascade contract based on discussions in Dec. 2011.

Cascade Supply Portfolio
Average Annual Conditions


Cascade Supply Portfolio
Transmission and Supply Plan
Average Day Conditions
CASCADE WATER ALLIANCE
HDR
MGD
Historical Demand
Forecast Demand - Mean
Forecast Demand - 95th Percentile
SPU '08
SPU '04 Agreement
Member Supplies
Lake Tapps
CWD Contract
TPU Adjusted
0
20
40
60
80
100
120
140
160
180
200
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
2060

Demand Components - Average Annual (MGD)				Supply Surplus (Avg. Annual)	
Year	Historical Demand (Actual)	Forecast Demand: Updated B Mean, with Peaking at 1.9 (Dec. 2010)	Forecast Demand: Updated B, Constructed 95%, peaking 1.9 (April 2011)	Mean Demand	95% Demand
2000	40.06				
2001	36.15				
2002	38.81				
2003	41.15				
2004	39.48			3.01	3.01
2005	37.95			4.54	4.54
2006	40.87			1.62	1.62
2007	39.87			2.62	2.62
2008	38.86			3.63	3.63
2009	40.90			4.62	4.62
2010	36.50	40.50	39.44	9.04	9.04
2011		40.58	39.51	5.05	6.12
2012		40.66	39.59	5.06	6.13
2013		40.74	39.66	5.06	6.14
2014		40.82	39.74	5.07	6.15
2015		40.90	39.81	5.07	6.17
2016		40.98	39.82	5.08	6.24
2017		41.06	39.84	5.09	6.31
2018		41.14	39.85	7.09	8.38
2019		41.22	39.87	7.10	8.45
2020		41.30	39.89	7.11	8.52
2021		41.83	40.34	6.65	8.14
2022		42.36	40.79	6.20	7.77
2023		42.89	41.25	5.75	7.39
2024		43.42	41.70	8.02	9.74
2025		43.95	42.16	7.57	9.36
2026		44.48	42.59	7.11	9.00
2027		45.01	43.03	6.66	8.64
2028		45.54	43.46	6.21	8.28
2029		46.07	43.90	5.75	7.93
2030		46.60	44.33	24.30	26.57
2031		47.07	44.73	23.93	26.27
2032		47.54	45.12	23.55	25.98
2033		48.01	45.51	23.18	25.68
2034		48.48	45.90	22.81	25.39
2035		48.95	46.29	17.43	20.09
2036		49.42	46.66	17.06	19.82
2037		49.89	47.03	16.69	19.55
2038		50.36	47.39	16.31	19.28
2039		50.83	47.76	15.94	19.01
2040		51.30	48.13	10.56	13.73
2041		51.96	48.65	9.99	13.30
2042		52.62	49.18	9.42	12.86
2043		53.28	49.70	8.84	12.42
2044		53.94	50.22	8.27	11.99
2045		54.60	50.75	27.20	31.05
2046		55.26	51.28	26.62	30.60
2047		55.92	51.82	26.05	30.15
2048		56.58	52.35	25.48	29.70
2049		57.24	52.89	24.90	29.25
2050		57.90	53.43	24.33	28.80
2051		58.64	53.95	23.65	28.34
2052		59.38	54.48	22.98	27.88
2053		60.12	55.00	22.31	27.42
2054		60.86	55.53	21.63	26.96
2055		61.60	56.06	20.96	26.50
2056		62.34	56.65	20.26	25.95
2057		63.08	57.24	19.56	25.40
2058		63.82	57.84	18.86	24.84
2059		64.56	58.43	18.16	24.29
2060		65.30	59.02	17.46	23.74

Supply Components - Average Annual (MGD)							
Year	**Member Supplies**	**SPU Declining Block 2004**	**SPU Add'l 2008**	**TPU Total (Adjusted for 4-Cities)**	**Covington RWSS Surplus**	**Lake Tapps**	**Total Supply**
2000	--	--	--	--	--	--	**--**
2001	--	--	--	--	--	--	**--**
2002	--	--	--	--	--	--	**--**
2003	--	--	--	--	--	--	**--**
2004	12.19	30.30	--	--	--	--	**42**
2005	12.19	30.30	--	--	--	--	**42**
2006	12.19	30.30	--	--	--	--	**42**
2007	12.19	30.30	--	--	--	--	**42**
2008	12.19	30.30	--	--	--	--	**42**
2009	12.22	30.30	3.00	--	--	--	**46**
2010	12.24	30.30	3.00	--	--	--	**46**
2011	12.33	30.30	3.00	--	--	--	**46**
2012	12.42	30.30	3.00	--	--	--	**46**
2013	12.50	30.30	3.00	--	--	--	**46**
2014	12.59	30.30	3.00	--	--	--	**46**
2015	12.67	30.30	3.00	--	--	--	**46**
2016	12.76	30.30	3.00	--	--	--	**46**
2017	12.85	30.30	3.00	--	--	--	**46**
2018	12.93	30.30	5.00	--	--	--	**48**
2019	13.02	30.30	5.00	--	--	--	**48**
2020	13.11	30.30	5.00	--	--	--	**48**
2021	13.18	30.30	5.00	--	--	--	**48**
2022	13.26	30.30	5.00	--	--	--	**49**
2023	13.34	30.30	5.00	--	--	--	**49**
2024	13.41	25.30	--	7.73	5.00	--	**51**
2025	13.49	25.30	--	7.73	5.00	--	**52**
2026	13.56	25.30	--	7.73	5.00	--	**52**
2027	13.64	25.30	--	7.73	5.00	--	**52**
2028	13.72	25.30	--	7.73	5.00	--	**52**
2029	13.79	25.30	--	7.73	5.00	--	**52**
2030	13.87	20.30	--	7.73	5.00	24.00	**71**
2031	13.97	20.30	--	7.73	5.00	24.00	**71**
2032	14.06	20.30	--	7.73	5.00	24.00	**71**
2033	14.16	20.30	--	7.73	5.00	24.00	**71**
2034	14.26	20.30	--	7.73	5.00	24.00	**71**
2035	14.35	15.30	--	7.73	5.00	24.00	**66**
2036	14.45	15.30	--	7.73	5.00	24.00	**66**
2037	14.55	15.30	--	7.73	5.00	24.00	**67**
2038	14.64	15.30	--	7.73	5.00	24.00	**67**
2039	14.74	15.30	--	7.73	5.00	24.00	**67**
2040	14.83	10.30	--	7.73	5.00	24.00	**62**
2041	14.92	10.30	--	7.73	5.00	24.00	**62**
2042	15.01	10.30	--	7.73	5.00	24.00	**62**
2043	15.09	10.30	--	7.73	5.00	24.00	**62**
2044	15.18	10.30	--	7.73	5.00	24.00	**62**
2045	15.27	5.30	--	7.73	5.00	48.50	**82**
2046	15.35	5.30	--	7.73	5.00	48.50	**82**
2047	15.44	5.30	--	7.73	5.00	48.50	**82**
2048	15.53	5.30	--	7.73	5.00	48.50	**82**
2049	15.61	5.30	--	7.73	5.00	48.50	**82**
2050	15.70	5.30	--	7.73	5.00	48.50	**82**
2051	15.76	5.30	--	7.73	5.00	48.50	**82**
2052	15.83	5.30	--	7.73	5.00	48.50	**82**
2053	15.90	5.30	--	7.73	5.00	48.50	**82**
2054	15.96	5.30	--	7.73	5.00	48.50	**82**
2055	16.03	5.30	--	7.73	5.00	48.50	**83**
2056	16.07	5.30	--	7.73	5.00	48.50	**83**
2057	16.11	5.30	--	7.73	5.00	48.50	**83**
2058	16.15	5.30	--	7.73	5.00	48.50	**83**
2059	16.19	5.30	--	7.73	5.00	48.50	**83**
2060	16.23	5.30	--	7.73	5.00	48.50	**83**

4-Cities Adjustments to TPU Supplies - Average Annual					
Year	TPU Contract Permanent	TPU Contract Reserved (converted to permanent)	TPU Total Contracted	4-Cities Allotment[1]	TPU Adjusted (TPU less 4-Cities)
2000	--	--	--	--	--
2001	--	--	--	--	--
2002	--	--	--	--	--
2003	--	--	--	--	--
2004	--	--	--	--	--
2005	--	--	--	--	--
2006	--	--	--	--	--
2007	--	--	--	--	--
2008	--	--	--	--	--
2009	--	--	--	--	--
2010	--	--	--	--	--
2011	--	--	--	--	--
2012	--	--	--	--	--
2013	--	--	--	--	--
2014	--	--	--	--	--
2015	--	--	--	--	--
2016	--	--	--	--	--
2017	--	--	--	--	--
2018	--	--	--	--	--
2019	--	--	--	--	--
2020	--	--	--	--	--
2021	--	--	--	--	--
2022	--	--	--	--	--
2023	--	--	--	--	--
2024	4.00	6.00	10.00	2.27	7.73
2025	4.00	6.00	10.00	2.27	7.73
2026	4.00	6.00	10.00	2.27	7.73
2027	4.00	6.00	10.00	2.27	7.73
2028	4.00	6.00	10.00	2.27	7.73
2029	4.00	6.00	10.00	2.27	7.73
2030	4.00	6.00	10.00	2.27	7.73
2031	4.00	6.00	10.00	2.27	7.73
2032	4.00	6.00	10.00	2.27	7.73
2033	4.00	6.00	10.00	2.27	7.73
2034	4.00	6.00	10.00	2.27	7.73
2035	4.00	6.00	10.00	2.27	7.73
2036	4.00	6.00	10.00	2.27	7.73
2037	4.00	6.00	10.00	2.27	7.73
2038	4.00	6.00	10.00	2.27	7.73
2039	4.00	6.00	10.00	2.27	7.73
2040	4.00	6.00	10.00	2.27	7.73
2041	4.00	6.00	10.00	2.27	7.73
2042	4.00	6.00	10.00	2.27	7.73
2043	4.00	6.00	10.00	2.27	7.73
2044	4.00	6.00	10.00	2.27	7.73
2045	4.00	6.00	10.00	2.27	7.73
2046	4.00	6.00	10.00	2.27	7.73
2047	4.00	6.00	10.00	2.27	7.73
2048	4.00	6.00	10.00	2.27	7.73
2049	4.00	6.00	10.00	2.27	7.73
2050	4.00	6.00	10.00	2.27	7.73
2051	4.00	6.00	10.00	2.27	7.73
2052	4.00	6.00	10.00	2.27	7.73
2053	4.00	6.00	10.00	2.27	7.73
2054	4.00	6.00	10.00	2.27	7.73
2055	4.00	6.00	10.00	2.27	7.73
2056	4.00	6.00	10.00	2.27	7.73
2057	4.00	6.00	10.00	2.27	7.73
2058	4.00	6.00	10.00	2.27	7.73
2059	4.00	6.00	10.00	2.27	7.73
2060	4.00	6.00	10.00	2.27	7.73

[1] Four cities quantity is 50% of allocated amounts, reflecting uncertainty in their future usage. Allocated amounts from letter dated Feb. 5, 2010 from Four Cities to Cascade (Clarke).

Member Independent Supply - Average Annual (MGD)						
Year	**Issaquah**	**Covington**	**Redmond**	**SammPlat**	**Skyway**	**Total**
2000						
2001						
2002						
2003						
2004	1.35	3.90	2.20	4.50	0.24	12.19
2005	1.35	3.90	2.20	4.50	0.24	12.19
2006	1.35	3.90	2.20	4.50	0.24	12.19
2007	1.35	3.90	2.20	4.50	0.24	12.19
2008	1.35	3.90	2.20	4.50	0.24	12.19
2009	1.36	3.90	2.21	4.51	0.24	12.22
2010	1.37	3.90	2.22	4.52	0.24	12.24
2011	1.37	3.96	2.23	4.52	0.24	12.33
2012	1.38	4.02	2.23	4.53	0.25	12.42
2013	1.39	4.08	2.24	4.54	0.25	12.50
2014	1.40	4.14	2.25	4.55	0.25	12.59
2015	1.41	4.20	2.26	4.56	0.25	12.67
2016	1.42	4.26	2.27	4.57	0.25	12.76
2017	1.42	4.32	2.28	4.57	0.25	12.85
2018	1.43	4.38	2.29	4.58	0.25	12.93
2019	1.44	4.44	2.29	4.59	0.25	13.02
2020	1.45	4.50	2.30	4.60	0.26	13.11
2021	1.46	4.55	2.31	4.61	0.26	13.18
2022	1.47	4.60	2.32	4.62	0.26	13.26
2023	1.47	4.65	2.33	4.62	0.26	13.34
2024	1.48	4.70	2.34	4.63	0.26	13.41
2025	1.49	4.75	2.34	4.64	0.26	13.49
2026	1.50	4.80	2.35	4.65	0.26	13.56
2027	1.51	4.85	2.36	4.66	0.26	13.64
2028	1.52	4.90	2.37	4.67	0.27	13.72
2029	1.52	4.95	2.38	4.67	0.27	13.79
2030	1.53	5.00	2.39	4.68	0.27	13.87
2031	1.54	5.07	2.40	4.69	0.27	13.97
2032	1.55	5.14	2.40	4.70	0.27	14.06
2033	1.56	5.21	2.41	4.71	0.27	14.16
2034	1.57	5.28	2.42	4.72	0.27	14.26
2035	1.57	5.35	2.43	4.72	0.27	14.35
2036	1.58	5.42	2.44	4.73	0.28	14.45
2037	1.59	5.49	2.45	4.74	0.28	14.55
2038	1.60	5.56	2.46	4.75	0.28	14.64
2039	1.61	5.63	2.46	4.76	0.28	14.74
2040	1.62	5.70	2.47	4.77	0.28	14.83
2041	1.62	5.76	2.48	4.77	0.28	14.92
2042	1.63	5.82	2.49	4.78	0.28	15.01
2043	1.64	5.88	2.50	4.79	0.28	15.09
2044	1.65	5.94	2.51	4.80	0.29	15.18
2045	1.66	6.00	2.51	4.81	0.29	15.27
2046	1.67	6.06	2.52	4.82	0.29	15.35
2047	1.67	6.12	2.53	4.82	0.29	15.44
2048	1.68	6.18	2.54	4.83	0.29	15.53
2049	1.69	6.24	2.55	4.84	0.29	15.61
2050	1.70	6.30	2.56	4.85	0.29	15.70
2051	1.71	6.34	2.57	4.86	0.29	15.76
2052	1.72	6.38	2.57	4.87	0.30	15.83
2053	1.72	6.42	2.58	4.87	0.30	15.90
2054	1.73	6.46	2.59	4.88	0.30	15.96
2055	1.74	6.50	2.60	4.89	0.30	16.03
2056	1.74	6.54	2.60	4.89	0.30	16.07
2057	1.74	6.58	2.60	4.89	0.30	16.11
2058	1.74	6.62	2.60	4.89	0.30	16.15
2059	1.74	6.66	2.60	4.89	0.30	16.19
2060	1.74	6.70	2.60	4.89	0.30	16.23

Source: Cascade MemberWater Audits. Numbers were provided for 2008 and 2055 and interpolated for intervening years. Covington independent supply calculated as equal to projected demand in each year (see separate data on Covington surplus supply).

Covington Breakdown - Average Annual (MGD)							
Year	Total Covington Demand	Covington Ground Water Supply	RWSS - Total Covington Share	Total Covington Supply	Covington's Surplus Supply	Cascade Contract for Covington Supply	Covington's Remaining Surplus
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--
2004	3.90	3.67	12.56	16.23	12.33	--	12.33
2005	3.90	3.67	12.56	16.23	12.33	--	12.33
2006	3.90	3.67	12.56	16.23	12.33	--	12.33
2007	3.90	3.67	12.56	16.23	12.33	--	12.33
2008	3.90	3.67	12.56	16.23	12.33	--	12.33
2009	3.90	3.67	12.56	16.23	12.33	--	12.33
2010	3.90	3.67	12.56	16.23	12.33	--	12.33
2011	3.96	3.67	12.56	16.23	12.27	--	12.27
2012	4.02	3.67	12.56	16.23	12.21	--	12.21
2013	4.08	3.67	12.56	16.23	12.15	--	12.15
2014	4.14	3.67	12.56	16.23	12.09	--	12.09
2015	4.20	3.67	12.56	16.23	12.03	--	12.03
2016	4.26	3.67	12.56	16.23	11.97	--	11.97
2017	4.32	3.67	12.56	16.23	11.91	--	11.91
2018	4.38	3.67	12.56	16.23	11.85	--	11.85
2019	4.44	3.67	12.56	16.23	11.79	--	11.79
2020	4.50	3.67	12.56	16.23	11.73	--	11.73
2021	4.55	3.67	12.56	16.23	11.68	--	11.68
2022	4.60	3.67	12.56	16.23	11.63	--	11.63
2023	4.65	3.67	12.56	16.23	11.58	--	11.58
2024	4.70	3.67	12.56	16.23	11.53	5.00	6.53
2025	4.75	3.67	12.56	16.23	11.48	5.00	6.48
2026	4.80	3.67	12.56	16.23	11.43	5.00	6.43
2027	4.85	3.67	12.56	16.23	11.38	5.00	6.38
2028	4.90	3.67	12.56	16.23	11.33	5.00	6.33
2029	4.95	3.67	12.56	16.23	11.28	5.00	6.28
2030	5.00	3.67	12.56	16.23	11.23	5.00	6.23
2031	5.07	3.67	12.56	16.23	11.16	5.00	6.16
2032	5.14	3.67	12.56	16.23	11.09	5.00	6.09
2033	5.21	3.67	12.56	16.23	11.02	5.00	6.02
2034	5.28	3.67	12.56	16.23	10.95	5.00	5.95
2035	5.35	3.67	12.56	16.23	10.88	5.00	5.88
2036	5.42	3.67	12.56	16.23	10.81	5.00	5.81
2037	5.49	3.67	12.56	16.23	10.74	5.00	5.74
2038	5.56	3.67	12.56	16.23	10.67	5.00	5.67
2039	5.63	3.67	12.56	16.23	10.60	5.00	5.60
2040	5.70	3.67	12.56	16.23	10.53	5.00	5.53
2041	5.76	3.67	12.56	16.23	10.47	5.00	5.47
2042	5.82	3.67	12.56	16.23	10.41	5.00	5.41
2043	5.88	3.67	12.56	16.23	10.35	5.00	5.35
2044	5.94	3.67	12.56	16.23	10.29	5.00	5.29
2045	6.00	3.67	12.56	16.23	10.23	5.00	5.23
2046	6.06	3.67	12.56	16.23	10.17	5.00	5.17
2047	6.12	3.67	12.56	16.23	10.11	5.00	5.11
2048	6.18	3.67	12.56	16.23	10.05	5.00	5.05
2049	6.24	3.67	12.56	16.23	9.99	5.00	4.99
2050	6.30	3.67	12.56	16.23	9.93	5.00	4.93
2051	6.34	3.67	12.56	16.23	9.89	5.00	4.89
2052	6.38	3.67	12.56	16.23	9.85	5.00	4.85
2053	6.42	3.67	12.56	16.23	9.81	5.00	4.81
2054	6.46	3.67	12.56	16.23	9.77	5.00	4.77
2055	6.50	3.67	12.56	16.23	9.73	5.00	4.73
2056	6.54	3.67	12.56	16.23	9.69	5.00	4.69
2057	6.58	3.67	12.56	16.23	9.65	5.00	4.65
2058	6.62	3.67	12.56	16.23	9.61	5.00	4.61
2059	6.66	3.67	12.56	16.23	9.57	5.00	4.57
2060	6.70	3.67	12.56	16.23	9.53	5.00	4.53

Sources: Demand from CWD Water Supply Strategic Plan, Nov. 2009; Supply adapted from TPU email (McMeen to Maxfield) Dec. 2011.
Cascade contract based on discussions in Dec. 2011.

APPENDIX H

Tacoma Supply Agreement-10-2005

AGREEMENT FOR THE SALE OF WHOLESALE WATER

BETWEEN THE CITY OF TACOMA, DEPARTMENT OF PUBLIC UTILITIES, WATER DIVISION

AND

CASCADE WATER ALLIANCE

TABLE OF CONTENTS

This Agreement for the Sale of Wholesale Water ("Agreement") between the City of Tacoma, Department of Public Utilities, Water Division (Tacoma) and Cascade Water Alliance ("Cascade"), is made and entered into effective this 13th day of October, 2005 (Effective Date). Tacoma and Cascade are sometimes referred to herein in the singular as "Party" and in the plural as "Parties".

WHEREAS, Tacoma is a municipality organized and operating under the laws of the State of Washington; and

WHEREAS, Cascade is a public nonprofit corporation established by Interlocal Contract under the authority of Chapter 39.34 RCW, the Interlocal Cooperation Act, and incorporated under Chapter 24.03 to further the interests of its members with respect to water supply and to work cooperatively with other water supply entities; and

WHEREAS, Tacoma and Cascade have the responsibility to plan, design, construct and operate water supply facilities to meet the municipal, commercial and industrial water supply needs of their respective customers and member organizations; and

WHEREAS, Tacoma, which has nearly completed the construction of its Second Supply Project, expects to have the supply capacity, together with Tacoma's other water resources, to meet Tacoma's projected water supply needs for the next fifty years, in addition to meeting a portion of the water needs of Tacoma's project partners, Lakehaven Utility District, Covington Water District and the City of Kent; and

WHEREAS, Cascade is contracting for, and has plans to construct additional water supplies to supplement its existing water supplies to meet its immediate and long-term water supply needs; and

WHEREAS, Tacoma and Cascade are each seeking cost effective ways to utilize available regional capacity, and to plan for water resources to meet the full future water supply needs of their respective customers; and

WHEREAS, Cascade could make beneficial use of available supply in Tacoma's Second Supply Project both permanently and in the near term until such time as other water resources are available to meet the needs of Cascade and its member utilities; and

WHEREAS, Cascade wishes to purchase from Tacoma, and Tacoma wishes to sell to Cascade a supply of water both permanently and for a finite period of years.

NOW, THEREFORE, the Parties agree as follows.

1. DEFINITIONS

1.1 When used with initial capitalization in this Agreement, the following terms shall have the meanings set forth below.

1.1.1 "Due Date" means the date by which payment of any invoice issued pursuant to section 10 of this Agreement is due to Tacoma, which date shall be the close of business on the thirtieth (30th) day after an invoice is issued, provided, however, that if such thirtieth day falls on a Saturday, Sunday or legal holiday observed by Tacoma, the Due Date shall be extended until the close of business of the next regular business day of Tacoma.

1.1.2 "Effective Date" shall have the meaning given such term in section 3.

1.1.3 "Flow Control Valve" means the valve located in the vicinity of the Point(s) of Delivery for Cascade that controls the volume of water that is delivered to Cascade.

1.1.4 "Howard Hanson Dam Additional Storage Project" or "Storage Project" shall have the meaning given such term in the Project Agreement.

1.1.5 "Implementation Agreement" means a written agreement executed by the Superintendent of Tacoma Water and the General Manager of Cascade setting out the understandings of the Parties regarding the implementation and administration of this Agreement as set forth in section 2.

1.1.6 "Initial Delivery Date" means the date on which Tacoma actually commences delivery of wholesale water pursuant to the terms of this Agreement.

1.1.7 "Interest Rate" means for each day that it is applied a rate equal to one-three hundred and sixty-fifth (1/365) of the prime interest rate for preferred customers established from time to time by the Bank of America, or such other bank as may be designated by the Parties, plus three (3) percentage points.

1.1.8 "Interconnection Facilities" mean the facilities, other than the Wholesale Service Connection, that need to be constructed by Cascade to take delivery of wholesale water through the Wholesale Service Connection and convey such water to Cascade's transmission main.

1.1.9 "Isolation Valve" means a positive shut off valve that shall be

installed at the location in each water system that is used to accept or deliver water through the Wholesale Service Connection.

1.1.10 "Minimum Monthly Bill" shall have the meaning given such term in section 9.2.

1.1.11 "Operating Year" means any consecutive twelve (12) month period commencing on each July 1st, and ending on the following June 30th.

1.1.12 "Peak Season" means the period starting June 1 and ending September 31 during each year during the Term.

1.1.13 "Peaking Factor" means the factor set forth in section 6.3.

1.1.14 "Project Agreement" means the Second Supply Project Agreement between the City of Tacoma and the City of Kent, Covington Water District and Lakehaven Utility District.

1.1.15 "Project Operator" means Tacoma in its role as the party responsible for the operation and maintenance of the Tacoma Second Supply Project.

1.1.16 "Requested Initial Delivery Date" means the date designated by Cascade pursuant to section 5.2 for Tacoma to commence delivery of wholesale water pursuant to section 6 of this Agreement.

1.1.17 "Second Diversion Right or Permit and First Diversion Claim" means those water rights that authorize Tacoma to divert and use water from the Green River (together, the Diversion Rights).

1.1.18 "Surcharge Rate" means a rate equal to four times the highest wholesale water rate for sales to Cascade for the period of excess use.

1.1.19 "TMC" means the City of Tacoma 's Municipal Code.

1.1.20 "Uncontrollable Force" means any event or occurrence that is beyond the reasonable control of a Party and which by the exercise of due diligence and reasonable foresight such Party could not have reasonably been expected to avoid or remove, and includes but is not limited to flood, earthquake, storm, accident, fire, lightning and other natural catastrophes, epidemic, war, labor or material shortage, strike or labor dispute, acts of terrorism or sabotage, and also includes restraint by an order of a court of competent jurisdiction or by regulatory authorities against any action taken or not taken by a Party, after a good faith effort by such Party to obtain: (a)

relief from such order; or (b) any necessary authorizations or approvals from any governmental agency or regulatory authority.

1.1.21 "Wholesale Service Connection" means a physical connection between water mains of the Parties to this Agreement, at a specifically identified point or points, where water will be transferred from one Party's system to the facilities of the other Party.

1.1.22 "Wholesale Water Sales" means sales of water by Tacoma to entities that are not retail customers of Tacoma and which resell to end users the water that they purchase from Tacoma.

2. IMPLEMENTATION AGREEMENTS AND EXHIBITS TO THE AGREEMENT

2.1 The Superintendent of Tacoma Water and the General Manager of Cascade may, at their discretion, execute Implementation Agreements regarding the implementation or administration of this Agreement in a manner that does not affect the substantive rights of the parties under this Agreement.

2.2 The following exhibits, which are attached to this Agreement, are hereby made a part of and incorporated into this Agreement as if fully set forth herein:

Exhibit A - Map locating the Wholesale Service Connection, delivery meter and related facilities.
Exhibit B - Sample Weekly Operations Report
Exhibit C - Arbitration Procedures

The Superintendent of Tacoma Water and the General Manager of the Cascade are authorized to prepare Exhibits showing the Wholesale Service Connection and the location of the delivery meter upon the installation of those facilities and to adopt such Exhibits for purposes of this Agreement.

2.3 If and to the extent that there is a conflict between the terms set forth in an Implementation Agreement or in any of the foregoing Exhibits and those set forth in the body of this Agreement, the terms set forth in the body of this Agreement shall prevail.

3. EFFECTIVE DATE AND TERM OF THE AGREEMENT

3.1 This Agreement shall take effect when executed by the Parties, and shall remain in full force and effect until the date that Tacoma ceases making Wholesale Water Sales, unless terminated (in whole or in part) earlier in accordance with sections 11, 12 or 24 ("Term"). The Term of this Agreement may be extended by written agreement of the Parties.

3.2 All obligations incurred during the Term shall survive the termination or expiration of this Agreement.

4. SALE AND PURCHASE OF WHOLESALE WATER

4.1 For the Term of this Agreement, Tacoma agrees to sell and make available to Cascade, and Cascade agrees to accept delivery of and pay for quantities of wholesale water, all pursuant to the provisions of this Agreement.

4.2 The water sold by Tacoma to Cascade pursuant to this Agreement shall be water available from the Diversion Rights. The use made of such wholesale water shall be subject to the restrictions on the place of use applicable to the Diversion Rights, copies of which have been provided to Cascade by Tacoma.

5. COMMENCEMENT OF WHOLESALE WATER DELIVERIES

5.1 Tacoma shall stand ready to commence deliveries of the amounts of wholesale water set forth in section 6 not later than October 1, 2008. If the Howard Hanson Storage Project is not operational by October 1, 2012, then Tacoma may, based on Tacoma's forecast of its water supplies without the Howard Hanson Storage Project, reduce its obligation to sell water to Cascade under section 6.2 (including a reduction to zero deliveries) by providing written notice to Cascade of such reduction to its water deliveries not less than ninety (90) days prior to the date the adjusted deliveries will commence.

5.2 Except as provided in section 5.1 deliveries of wholesale water by Tacoma to Cascade pursuant to section 6 shall commence on the Requested Initial Delivery Date designated by Cascade by written notice provided to Tacoma not less than ninety (90) days prior to the Requested Initial Delivery Date, which date cannot occur prior to October 1, 2008.

6. WHOLESALE WATER SUPPLY

6.1 From the Initial Delivery Date until the date that Tacoma ceases making Wholesale Water Sales, Tacoma shall make available to Cascade at the Wholesale Service Connection wholesale water in the amount of four million gallons per day (4 MGD) at a uniform hourly delivery rate.

6.2 In addition to the wholesale water deliveries set forth in section 6.1, on and after the Initial Delivery Date, Tacoma shall make available to Cascade at the Wholesale Service Connection wholesale water in the following amounts:

6.2.1 From the Initial Delivery Date through December 31, 2026, six million gallons per day (6 MGD) at a uniform hourly delivery rate.

6.2.2 From January 1, 2027 through December 31, 2027, 4 million gallons per day (4 MGD) at a uniform hourly delivery rate.

6.2.3 From January 1, 2028 through December 31, 2028, three million gallons per day (3 MGD) at a uniform hourly delivery rate.

6.2.4 From January 1, 2029 through December 31, 2029, two million gallons per day (2 MGD) at a uniform hourly delivery rate.

6.2.5 From January 1, 2030 through December 31, 2030, one million gallons per day (1 MGD) at a uniform hourly delivery rate.

6.2.6 On and after January 1, 2031, Tacoma shall have no obligation to provide to Cascade and Cascade shall have no right to receive from Tacoma wholesale water deliveries pursuant to this section 6.2.

6.3 The wholesale water deliveries set forth in sections 6.1 and 6.2 may, as requested by Cascade, be increased during the Peak Season by a Peaking Factor of 1.33. For example, application of the Peaking Factor to the wholesale water deliveries set forth in section 6.1 would result in deliveries of 5.32 million gallons per day.

6.4 Cascade may request in writing that Tacoma investigate the feasibility of providing to Cascade wholesale water on a temporary basis in addition to the amounts set forth in sections 6.1 and 6.2. The written request from Cascade to Tacoma shall state with specificity the wholesale water amounts requested (including Peak Season deliveries), the requested commencement date and termination date of such deliveries. Upon receipt of such written request, Tacoma will review its water demand and supply forecasts expeditiously to determine if, in the sole judgment of Tacoma, it will have sufficient water supplies to fulfill the request for additional deliveries of wholesale water in whole or in part. In the event that Tacoma determines that it can fulfill, in whole or in part, the request of Cascade for additional deliveries of wholesale water, such additional deliveries shall be priced according to Tacoma's wholesale water rate, which additional supply shall be subject to the Surcharge Rate only if Cascade takes such temporary water in excess of the amounts which Tacoma has agreed to supply. Tacoma and Cascade shall, prior to the commencement of such additional deliveries, execute an agreement setting forth all of the terms and conditions applicable to such additional temporary deliveries.

7. WHOLESALE WATER QUALITY, DELIVERY PRESSURE AND METERING

7.1 The quality of wholesale water made available to Cascade pursuant to section 6 shall be in compliance with all applicable state and federal drinking water laws, regulations and standards, and at the pressures agreed to by the Parties.

7.2 The amounts of wholesale water made available to Cascade will be measured by a delivery meter located at or in the vicinity of the Wholesale Service Connection, as agreed to by the Parties.

8. WHOLESALE SERVICE CONNECTION AND INTERCONNECTION FACILITIES

8.1 All costs associated with the design and construction of the Wholesale Service Connection, including the water main, service pipe, automated remote valve shut off, meter(s), appurtenances and vaults, shall be the responsibility of Cascade. Tacoma shall be responsible for preparation of the design of the Wholesale Service Connection and for the cost of repair and maintenance of the Wholesale Service Connection up to and including the outlet of the meter. The meter(s) shall be located as close to the Wholesale Service Connection as possible. Tacoma will coordinate the design and construction of the Wholesale Service Connection with Cascade. All Wholesale Service Connections with Tacoma are required to have automated meter reading (AMR) installed on them. Cascade will be responsible for the costs of installing the phone connection for the AMR and the costs to install the equipment with the meter.

8.2 Cascade shall be responsible for designing, engineering, permitting, constructing and financing any and all Interconnection Facilities necessary for Cascade to accept delivery of the wholesale water made available by Tacoma pursuant to section 6.

8.3 Cascade will submit to Tacoma for review, revision and approval the designs, specifications and construction schedule for the Interconnection Facilities. Tacoma will not unreasonably delay its review of designs, specifications and construction schedules submitted to it by Cascade, and will not unreasonably withhold its approval of such designs, specifications and construction schedule.

8.4 Cascade will not commence construction of the Interconnection Facilities unless and until Cascade has received from Tacoma approved designs, specifications, and construction schedule (as such documents may be revised by Tacoma).

8.5 Cascade will construct and operate the Interconnection Facilities in a manner that is consistent with the provisions of all permits, regulatory approvals and agreements governing the construction and operation of the Second Supply Project.

8.6 Prior to the submission to Tacoma of designs, specifications and construction schedule for the Interconnection Facilities, Cascade and Tacoma will negotiate a mutually agreeable amount of compensation payable by Cascade to Tacoma for the use of any property, rights of way and for work performed by Tacoma staff and consultants in facilitating the construction of Interconnection Facilities, exclusive of the activities undertaken by Tacoma pursuant to section 8.3.

8.7 Cascade agrees that Tacoma owns the Isolation Valve directly off of the Tacoma system, piping from the Tacoma Isolation Valve to the meter, the meter vault and the meter and telemetry equipment, all as will be set forth on Exhibit A. Maintenance and operation costs for this equipment are the responsibility of Tacoma. Any capital costs related to this equipment, including upgrades or replacement and renewal are the responsibility of Cascade.

8.8 The Wholesale Service Connection shall be governed by the terms of this Agreement. No future Wholesale Service Connections shall be permissible without a subsequent and separate written agreement between the Parties. Neither Party shall be obligated to agree to or execute any agreement or permit with the other Party to construct additional Wholesale Service Connection(s).

9. PRICING OF WHOLESALE WATER

9.1 Commencing with the month in which deliveries of wholesale water to Cascade pursuant to section 6 begin, and for each month thereafter during the Term, Cascade will pay to Tacoma a monthly payment equal to the amount of wholesale water delivered in such month, as measured at the delivery meter, times the wholesale water service rate plus the readiness to serve charge as set forth in TMC Section 12.10.400 of the City of Tacoma Water Rates and Regulations (or the successor TMC Section), subject to Cascade's obligation to pay the Minimum Monthly Bill in accordance with section 9.2

9.2 Regardless of whether Cascade has or has not established a Requested Initial Delivery Date, Cascade shall for the period 2009 through 2026 pay not less than the Minimum Monthly Bill. The Minimum Monthly Bill shall be determined by multiplying the Minimum Daily Purchase Amount ("P") set forth below, times the number of days in each month ("D"), times the wholesale water service rate ("R"), (P x D x R = monthly minimum payment).

Calendar Year	Minimum Daily Purchase Amount (in MGD)
2009	2.0
2010	2.0
2011	2.0
2012	3.0
2013	3.0

2014	3.0
2015	4.0
2016	4.0
2017	4.0
2018	5.0
2019	5.0
2020	6.0
2021	6.0
2022	7.0
2023	7.0
2024	8.0
2025	8.0

Provided, however, after the Initial Delivery Date, whenever Tacoma declares a supply curtailment or cannot otherwise deliver the minimum water supply Cascade shall be billed only for the water actually delivered.

9.3 In the event that the sum of the Minimum Monthly Bills for a calendar year exceeds the sum of the payments made by Cascade during such calendar year pursuant to Section 9.1, then Tacoma will bill Cascade in February of the immediately following calendar year during the period of 2010 through 2026 the amount by which the sum of the Minimum Monthly Bills for such calendar year exceeded the payments made pursuant to Section 9.1 during such calendar year.

9.4 The water service rate and the readiness to serve charge may be periodically adjusted and shall be applicable as set forth in the rate schedule as adopted by the Public Utility Board and Tacoma City Council.

9.5 Cascade shall pay Tacoma System Development Charges ("SDCs") of $16,484,000 for water supplied pursuant to section 6.1 as follows:

9.5.1 Within one-hundred and twenty (120) days of the Effective Date, Cascade will pay Tacoma an initial payment of twenty percent (20%) of the SDCs or $3,296,800.

9.5.2 After such initial payment, the remaining balance of the SDCs will be paid in not more than ten (10) equal annual payments, with the first such payment due on the first anniversary of the Effective Date and thereafter on each successive anniversary until the SDCs are paid in full.

9.6. Cascade shall pay Tacoma a Capacity Reservation Fees ("CRFs") of $9,420,442 for water supplied pursuant to section 6.2 as follows:

9.6.1 Within one-hundred and twenty (120) days of the Effective Date, Cascade will pay Tacoma an initial payment of twenty percent (20%) of

the CRFs or $1,884,088.

9.6.2 After such initial payment, the remaining balance of the CRFs will be paid in not more than ten (10) equal annual payments, with the first such payment due on the first anniversary of the Effective Date and thereafter on each successive anniversary until paid in full.

9.7 In addition to the annual payments pursuant to sections 9.5 and 9.6, Cascade will on the same date pay Tacoma interest calculated on a monthly basis (the first day of every month) on the outstanding unpaid balance of the SDCs and CRFs calculated using the prime interest rate, as reported by the Wall Street Journal ten days before the date that the monthly interest calculation is made, minus two percent (2%). Cascade may, at its election, prepay all or any portion of the SDCs and/or CRFs outstanding balance, in which case the interest accrued to the date of such prepayment shall also be paid to Tacoma, and the remaining unpaid balance shall be paid in equal installments.

9.8 If Tacoma exercises its option pursuant to section 5.1 to reduce water deliveries under section 6.2, then the CRFs payable under section 9.6 will be reduced proportionately. For example, if the total deliveries under section 6.2 are reduced by Tacoma by twenty percent (20%), then the total amount of CRFs payable under section 9.5 will be reduced by twenty percent (20%). Such reduction will be accomplished by first eliminating any CRFs not yet paid by CWA, and then by Tacoma refunding to Cascade any CRFs (or portions thereof) already paid starting with the most recent CRFs payment made by Cascade until such proportionate reduction is achieved. Any such refunds shall include interest calculated from the date of payment to the date of the refund, at the interest rate described in section 9.7. Any such refund shall be paid by Tacoma to Cascade within ninety (90) days of the notice issued pursuant to section 5.1.

9.9 An interest component will be paid by Tacoma to Cascade on the CRF payments eliminated or refunded pursuant to section 9.8. For the CRFs (or portions thereof) that are eliminated or refunded pursuant to section 9.8, the interest component will be calculated from the Effective Date to the date the payment of any refund is due pursuant to section 9.8. Such interest component will be the sum of the annual interest calculated for each of the years that the amount refunded or eliminated was outstanding, using the interest rate for each such year charged Cascade by Tacoma pursuant to section 9.7.

10. PAYMENTS

10.1 Tacoma shall prepare and forward to Cascade in the first week of each month during the Term an invoice for the payment of amounts due pursuant to this Agreement for the preceding month. Each such invoice shall set forth the payment due from Cascade to Tacoma. In addition, during the first week of each February during the

2010 through 2026 period, when required pursuant to section 9.3, Tacoma shall prepare and forward to Cascade an invoice for any amounts due to Tacoma under section 9.3.

10.2 Cascade may request from Tacoma, and Tacoma shall promptly provide to Cascade, any documentation or other information that Cascade may reasonably require to understand the nature of the costs contained in any invoice issued pursuant to this section 10.

10.3 Payment of any and all invoices forwarded to Cascade by Tacoma pursuant to this section 10 shall be due and payable by Cascade on or before the Due Date, with payment to be made by wire transfer or such other means as agreed to by Tacoma and Cascade.

10.4 If full payment of any invoice is not received by Tacoma on or before the Due Date, such payment shall be considered past due, and the unpaid amount of such invoice shall accrue interest at the Interest Rate. Further, if an invoice or any portion thereof remains unpaid for a period of thirty (30) days after the Due Date, Tacoma may elect to suspend deliveries due to Cascade pursuant to section 6 until Cascade has paid all amounts due and owing, and any late payment charges due thereon.

10.5 If Cascade disputes all or any portion of an invoice issued by Tacoma pursuant to this section 10, Cascade shall pay such invoice in full, and shall indicate in writing to Tacoma the portions of the invoice that Cascade disputes and the reasons therefore. The Parties shall make a good faith effort to resolve such dispute. If such efforts are unsuccessful, either Cascade or Tacoma may seek resolution of the dispute pursuant to section 21.

10.6 If the resolution of any dispute over an invoice, whether by agreement of the Parties or by dispute resolution pursuant to section 21, results in the payment of money from Tacoma to Cascade, such payment shall include an interest payment for the period commencing with the date the disputed invoice was paid, and ending on the date the payment resolving the dispute is made to the Cascade, calculated using the Interest Rate.

10.7 Cascade hereby covenants and agrees that it shall establish, maintain and collect rates or charges for water and other services, facilities and commodities sold, furnished or supplied by it to its members which shall be adequate to provide revenues sufficient to enable Cascade to make the payments required to be made pursuant to the terms of this Agreement, and to pay all other charges and obligations payable from or constituting a charge or lien upon such revenues.

10.8 Payments by Cascade of SDCs, CRFs or of amounts under each invoice issued pursuant to this section 10 shall constitute an operating expense for water purchased by Cascade.

11. PLANNING AND COORDINATION

11.1 Cascade will develop a long-term supply plan and acquire additional water supplies to establish a firm supply for its members. Cascade shall provide to Tacoma a copy of such long-term supply plan, which plan shall also demonstrate that Cascade has planned for and has the ability to develop sufficient water supplies for its members to replace the wholesale water deliveries set forth in section 6.2 upon the expiration of such water delivery obligation under this Agreement. If Cascade cannot demonstrate by December 1, 2015 to the satisfaction of Tacoma that it will develop sufficient replacement water supplies to replace the water sale set forth in section 6.2, then the water delivery obligation set forth in section 6.2 may be terminated in whole or in part by Tacoma no sooner than January 1, 2016 by providing Cascade written notice of such termination six months prior to date of termination established by Tacoma in such written notice. In such event, the water delivery obligation of Tacoma to Cascade under this Agreement shall be limited to the delivery obligation set forth in sections 6.1 and 6.3.

11.2 In the event that Tacoma exercises it right to terminate its entire delivery obligation under section 6.2 pursuant to section 11.1, then Tacoma will make a payment to Cascade not later than sixty (60) days after the effective date of such termination. If such termination occurs in 2016, the payment from Tacoma to Cascade will be the sum of $4,148,111. If such termination occurs in any year subsequent to 2016, the payment due from Tacoma to Cascade shall be reduced by the amount of $415,000 for each year after 2016 that such termination occurs. If Tacoma only terminates its delivery obligation under section 6.2 in part, then the payment due from Tacoma to Cascade will be prorated to reflect the percentage of the total water deliveries under section 6.2 that were terminated pursuant to section 11.1. For example, if twenty percent (20%) of the total water delivery obligation under section 6.2 is terminated pursuant to section 11.1, then the payment due by Tacoma to Cascade will equal twenty percent (20%) of $4,146,111.

11.3 The Parties will seek to adopt conservation plans and to coordinate regional supply scheduling and other operational programs that promote efficient use of water supplies, facilities, financial and staff resources.

12. TERMINATION OF THE SECTION 6.2 WATER DELIVERIES

If after October 1, 2008 Tacoma has stood ready to serve water pursuant to Section 6 for a five year period, and during such period Cascade has not established a Requested Initial Delivery Date for the delivery amounts set out in section 6.2, then Tacoma may terminate its water delivery obligations under section 6.2 of this Agreement by providing Cascade written notice of such termination not less than one hundred eighty (180) days prior to the date of termination specified in such notice. In the event of such termination, Cascade shall not be obligated to make any further annual payments under section 9.6. The permanent supply purchased by Cascade under section 6.1 of this Agreement, and all payment obligations associated therewith, shall be unaffected by such termination.

13. WATER MANAGEMENT AND SCHEDULING

13.1 Not later than May 1 of each year during the Term prior to a year in which deliveries will be made pursuant to section 6, Cascade will submit to Tacoma a written draft operating plan for the next Operating Year. Each such draft operating plan will include, but not be limited to, the amount of Diversion Rights water that Cascade expects to receive pursuant to this Agreement in each week during the next Operating Year.

13.2 Scheduling Delivery of Wholesale Water within an Operating Year

13.2.1 Prior to 10:00 A.M. on any Thursday during each Operating Year, Cascade may submit to Tacoma, in the manner and in the form established by Tacoma, a schedule for wholesale water deliveries for the following seven (7) days. Such schedule shall contain at a minimum a uniform rate of water deliveries for each day of the schedule, and shall take effect on the day following the Thursday the schedule is submitted. Schedules so submitted shall remain in effect until replaced by a subsequent schedule submitted in accordance with this subsection 13.2.1. Tacoma shall take all reasonable actions required to ensure that the amount of wholesale water scheduled by Cascade is available to it.

13.2.2 Tacoma may revise schedules submitted pursuant to subsection 13.2.1, if and to the extent any such schedule calls for deliveries that are in excess of Cascade's rights under this Agreement or is inconsistent with Project operating constraints. Tacoma shall notify Cascade if its schedule is revised pursuant to this subsection 13.2.2. In the event that a change in circumstances necessitates a change to a schedule then in effect, Cascade may request a change to such schedule, and Tacoma shall take all reasonable actions to accommodate such schedule change.

13.3 As Project Operator, Tacoma reserves the right to revise schedules submitted by Cascade as Tacoma determines may be necessary to comply with permits, authorizations, regulations or orders applicable to the Project, or to deal with Uncontrollable Forces that affect the ability to fulfill such schedules. Tacoma will provide Cascade with as much notice as is practicable under the circumstances of any such revision, and Tacoma shall treat Cascade the same as other wholesale customers in making such revisions.

14. METER OWNERSHIP, CALIBRATION AND MAINTENANCE

14.1 The cost of installing the initial and any replacement delivery meter shall be borne by Cascade.

14.2 Tacoma shall be responsible for the calibration and testing of the delivery meter. No less frequently than once each year the delivery meter shall be tested for accuracy, and the results of such testing shall be made available to Cascade at no charge. The costs of the annual delivery meter test shall be billed to Cascade. In addition to the annual meter test, Cascade may test the delivery meter at any reasonable time and at Cascade's expense. The results of any additional delivery meter test shall be made available to Tacoma at no charge.

14.3 Tacoma shall establish the size and the flow range within which the delivery meter must operate. Should Tacoma determine that the delivery meter is operating outside the flow range so established, it shall notify Cascade in writing of such operation, and the size of the replacement meter needed to operate within the flow range. Tacoma shall provide Cascade an opportunity to discuss the problem with the existing delivery meter, and the need for the proposed replacement delivery meter. After providing such written notice, Tacoma may replace the faulty delivery meter and bill Cascade for the costs of procuring and installing such meter, and Cascade shall be obligated to pay such bill.

14.4 The Flow Control Valve for Cascade shall be owned by and shall be under the control of Cascade. Cascade shall be responsible for the operation and control of its Flow Control Valve. Upon reasonable notice to Cascade, Tacoma shall have the right to enter the meter and/or valve vault or vaults of Cascade for any reason related to this Agreement or the Project Agreement.

14.5 Tacoma shall have access to, but not control of, the control signals from each meter station, and access to the vault in which the delivery meter is located. The costs of equipment necessary to receive any such control signals shall be borne by Cascade.

15. WHOLESALE WATER DELIVERIES IN EXCESS OF SCHEDULES

15.1 Nothing in this Agreement shall prohibit Cascade from requesting, or Tacoma from agreeing to deliver, permanent wholesale water in excess of the limits set forth in section 6.

15.1.1 Such agreed upon deliveries will not be subject to the Surcharge Rate.

15.1.2 Unless otherwise agreed to by the Parties, such deliveries shall be priced in accordance with section 9.1; provided that additional permanent water shall be subject to a full SDC offset by a credit in the amount of any Capacity Reservation Fee paid for water supplied pursuant to section 6.2 converted to permanent supply.

15.2 Should Tacoma determine that Cascade is receiving deliveries of wholesale water at the Wholesale Service Connection in excess of its scheduled amounts, Tacoma shall notify Cascade of the excess deliveries, and Cascade shall promptly take the steps necessary to reduce its deliveries to amounts equal to its scheduled amounts, or to revise its schedules to reflect the level of deliveries it is receiving.

15.3 If Cascade has not taken action to revise its schedules or to reduce its deliveries to a level equal to its scheduled amounts within twenty-four hours of receiving notice from Tacoma pursuant to subsection 15.2, Tacoma may take any action it deems necessary to reduce the deliveries to a level equal to Cascade's scheduled amounts, and charge Cascade the Surcharge Rate for any excess deliveries made after the expiration of the twenty-four hour notice period.

16. SHARING WATER SHORTAGES

In the event there is a water shortage or drought that requires Tacoma to institute a water rationing or water use restriction program for Tacoma's retail customers, Tacoma will institute reductions to deliveries of wholesale water made pursuant to this Agreement that are comparable in magnitude and duration to those Tacoma imposes on its retail customers.

17. TITLE AND RISK OF LOSS

Title and risk of loss to wholesale water delivered by Tacoma to Cascade pursuant to section 6 of this Agreement will pass from Tacoma to Cascade when such wholesale water reaches that portion of the Interconnection Facilities owned by Cascade.

18. REGULATORY COMPLIANCE

Cascade understands and agrees that the operation of the Project, and the water available from the Diversion Rights is subject to permits, authorization, and the jurisdiction of regulatory agencies and courts with the authority to issue orders and regulations regarding the Project and the Diversion Rights water. Cascade understands and agrees that Tacoma as Project Operator must comply with all such valid permits, authorizations, orders and regulations, and that such valid permits, authorizations, orders and regulations may affect the ability of Tacoma to fulfill its wholesale water deliveries under this Agreement.

19. NO RIGHT OR CLAIM TO WATER

Cascade and each of its members agrees that they have only a contract right to wholesale water as set forth in section 6 of this Agreement, and further agrees they have no claim or right to a supply of water from Tacoma upon the expiration or termination of this Agreement on any basis whatsoever.

20. AUDITS AND ACCESS TO RECORDS

Upon reasonable prior notice to Tacoma, Cascade, or any consultant of Cascade, shall be given access during normal business hours to the books, records and accounts related to this Agreement in the possession of Tacoma at the location where such books, records and accounts are located. Tacoma shall not be obligated to collate, organize or analyze the information sought by Cascade or by Cascade's consultant. Cascade shall pay Tacoma its established rate for any documents reproduced for Cascade or its consultant.

21. DISPUTE RESOLUTION

21.1 Any and all disputes arising under this Agreement shall be resolved pursuant to this section 21.

21.2 The Parties shall make good faith efforts to resolve by informal discussion any dispute arising under this Agreement.

21.3 If at any time during the good faith efforts to resolve any dispute arising under this Agreement either of the Parties determines that such informal discussions will not result in a resolution of the issue(s) in dispute, such Party may initiate the dispute resolution process in accordance with Exhibit C. Any such dispute resolution process shall be conducted pursuant to the provisions of Exhibit C.

21.4 In the event that a Party moves to set aside or modify the final report of the referee in court, and that Party is not the prevailing party in the final disposition of the dispute through the judicial proceedings (including any appeals), then the moving Party will be obligated to pay all of the costs incurred by the other Party in the dispute resolution process (including any judicial proceedings), which costs shall include, but not be limited, to attorneys fees.

21.5 Pending resolution of any dispute, the Parties shall continue to fulfill their respective duties under this Agreement.

22. UNCONTROLLABLE FORCES

22.1 A Party shall not be in breach of this Agreement as a result of such Party's failure to perform its obligations under this Agreement, other than the obligation to pay money when due and owing, when such failure is due to an Uncontrollable Force, to the extent that such Party, despite the exercise of due diligence, is unable to remove such Uncontrollable Force. Nothing in this Agreement shall be construed to require any Party to prevent or settle any strike or labor dispute in order to obtain relief under this section 22.

22.2 Any Party subject to an Uncontrollable Force that may impair its performance under this Agreement shall notify the other Party as soon as practicable. Any

Party subject to an Uncontrollable Force shall be excused from performance under this Agreement only for the duration of and to the extent of the Uncontrollable Force. Any Party subject to an Uncontrollable Force shall take all reasonable actions to remove the Uncontrollable Force. Neither the occurrence of an Uncontrollable Force nor the provisions of this section 22 shall relieve any Party of its obligation to pay money when due under the terms of this Agreement.

22.3 Uncontrollable Force shall not relieve Cascade of its payment obligations hereunder, except that Cascade shall not be required to make payments pursuant to section 9.1 for more than 6 months after water deliveries from Tacoma cease, and Cascade's obligation to make payment under section 9.1 shall not be reinstated until monthly water deliveries from Tacoma re-commence.

23. NOTICES

23.1 All notices, requests, demands, waivers, consents and other communications required hereunder shall be in writing, and shall be delivered by one or more of the following means: (i) in person, (ii) by overnight delivery service, (iii) by first class mail with postage prepaid, (iv) by facsimile providing confirmation of completed transmission, or (v) by such other means as may be approved by the Parties. Service of any such notice, request, demand, waiver, consent or other communication shall be deemed to have been duly given and to have become effective upon receipt.

23.2 Any and all notices, demands, waivers, consents and other communications shall be forwarded to each of the Parties at the following addresses:

To Tacoma:
Water Superintendent
Tacoma Water
P. O. Box 11007
Tacoma, WA 98411

To Cascade:
Manager
Cascade Water Alliance
1400 112th Avenue S.E. – Suite 220
Bellevue, WA 98004

23.3 Either Party may change the address to which notices shall be sent by giving notice of such change in accordance with subsection 23.1.

24. DEFAULT OF OBLIGATION

24.1 If Cascade fails to make any payment in full when due under this Agreement for a period of ninety (90) days or more after the Due Date, Tacoma shall make written demand upon Cascade to make payment in full within ten (10) days of the

date of such written demand. If the failure to pay is not cured with the ten (10) day time period, Cascade shall be deemed to be in default.

24.2 In addition to the remedies provided in section 10, if Cascade has been in default of payment for a period of sixty (60) days or more, then Tacoma may terminate this Agreement by providing Cascade with written notice not less than six (6) months prior to the date of termination set forth in such written notice.

25. REPRESENTATIONS AND WARRANTIES

25.1 The Parties hereby represent and warrant to one another the following:

25.1.1 Each Party is duly authorized and validly existing under the laws of, and is authorized to exercise it powers, rights and privileges and is in good standing in, the State of Washington, and has full power and authority to carry on its business as presently conducted and execute this Agreement and perform the transactions on its part contemplated by this Agreement.

25.1.2 The execution, delivery and performance of this Agreement, and the consummation of the transactions contemplated hereby have been duly authorized by the appropriate board or council, and no other act or proceeding on the part of any Party is necessary to authorize this Agreement, or the transactions contemplated hereby.

25.1.3 The execution, delivery and performance by each of the Parties of this Agreement does not: (a) contravene any law; or (b) conflict with or result in a breach of or default under any material agreement or instrument to which any Party is a party or by which it is bound.

25.1.4 There are no actions, suits, claims or proceedings pending or, to the best of each Party's knowledge, threatened against either Party that is likely to impair the consummation or the transactions contemplated hereby.

25.1.5 This Agreement, when executed and delivered, will constitute a valid and binding obligation of each Party, and will be enforceable against each such Party in accordance with its terms.

26. ASSIGNMENT AND OTHER ARRANGEMENTS

The rights and obligations of this Agreement may not be sold, assigned or otherwise transferred in whole or in part by Cascade or Tacoma without the prior written consent of the other, which consent shall not be unreasonably withheld; provided that should Cascade dissolve, then Tacoma will extend to any individual member of Cascade,

or any combination thereof, the right to assume Cascade's rights and obligations under this Agreement.

27. WAIVERS

Except as otherwise provided herein or as agreed to by the Parties, no provision of this Agreement may be waived except as documented or confirmed in writing. Any waiver at any time by a Party of its rights with respect to a default under this Agreement or with any other matter arising in connection therewith, shall not be deemed a waiver with respect to any subsequent default or matter. Either Party may waive any notice or agree to accept a shorter notice than specified in this Agreement. Such waiver of notice or acceptance of shorter notice by a Party at any time regarding a notice shall not be considered a waiver with respect to any subsequent notice required by this Agreement.

28. AMENDMENTS

No change, amendment or modification of any provision of this Agreement shall be valid unless set forth in a written amendment to this Agreement signed by the Parties.

29. ENTIRE AGREEMENT

This Agreement sets forth the entire agreement of the Parties, and supersedes any and all prior agreements with respect to the subject matter of this Agreement. The rights and obligations of the Parties hereunder shall be subject to and shall be governed by this Agreement.

30. INTERPRETATION OF THE AGREEMENT

The Parties participated in the drafting of this Agreement. In interpreting this Agreement, no inference shall be drawn against either Party as the drafter of this Agreement. The headings used herein are for convenience of reference only, and shall not affect the meaning or interpretation of this Agreement.

31. GOVERNING LAW AND VENUE

This Agreement shall be governed by and construed in accordance with the laws of the State of Washington (regardless of the laws that might otherwise govern under applicable principles of conflicts of law of such state). Except in respect of a lawsuit or judicial action or proceeding commenced by a third party in another jurisdiction, the Parties (i) agree that any lawsuit, judicial action or proceeding arising out of or relating to this Agreement must be heard in the Superior Court of the State of Washington, in and for the County of Snohomish or Thurston, or the United States District Court for the Western District of Washington, (ii) waive any objection to the laying of venue of any such suit, action or proceeding, (iii) irrevocably submit to the jurisdiction of any such

court in any such lawsuit or judicial action or proceeding, and (iv) consent to service of process by mail in respect to any such lawsuit or judicial action or proceeding.

32. DUTY OF GOOD FAITH

The Parties agree that in taking actions or making determinations required or provided for under this Agreement, each Party shall act in fairness and in good faith.

33. COUNTERPARTS

This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have duly executed this Agreement on the date first above written.

City of Tacoma
Department of Public Utilities

By: _____

Title: Director of Utilities

Approved as form:

_____
Chief Assistant City Attorney

Cascade Water Alliance:

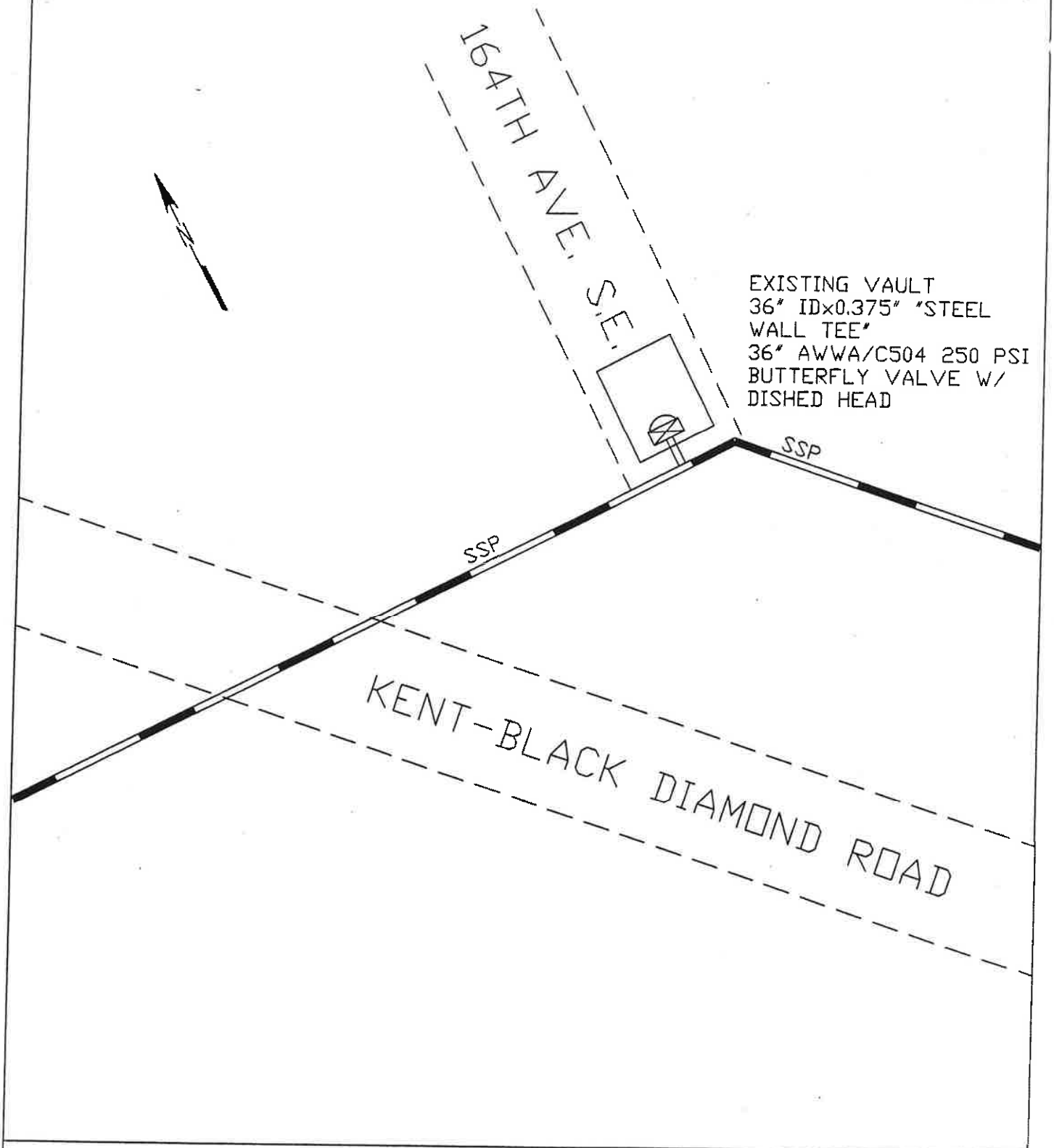
By: _____

Title: Chair

Approved as form:

_____

CONCEPTUAL WHOLESALE SERVICE CONNECTION TO CASCADE WATER ALLIANCE



DEPARTMENT OF PUBLIC UTILITIES – TACOMA WATER

Date 9/30/05 Project SSP W.O.	EXHIBIT 'A'	SCALE N.T.S.
Design PML Drawn SRL Digitize SRL Check	MANAGER	DRAWING

SAMPLE WEEKLY OPERATIONS REPORT

Exhibit 'B'

SSP Weekly 8 AM Operations Report — WEEK OF 12/26/2005 TO 1/1/2006

		Monday 29	Tuesday 30	Wednesday 31	Thursday 1	Friday 2	Saturday 3	Sunday 4
INSTANTANEOUS SOURCE DATA								
Howard Hanson Reservoir	-FEET							
Green River at Palmer	-CFS							
Limit at Palmer	-CFS							
Green River at Auburn	-CFS							
Limit at Auburn	-CFS							
Reservoir Inflow	-CFS							
Available 2nd Water Right Diversion	-MGD							
24 HOUR SOURCE DATA								
TOTAL DIVERSION	-MG							
1ST DIVERSION								
2ND DIVERSION								
HEADWORKS FLOW METER, P-1	-MG							
HEADWORKS FLOW METER, SSP	-MG							
NF WELLS	-MG							
WATER QUALITY DATA (P5 at Headworks)								
TURBIDITY (Max.) RIVER	-NTU							
FINISHED WATER	-NTU							
WATER TEMP. (Min.)	-F							
FLUORIDE (Ave.)	-mg/L							
CL RESIDUAL (Ave.)	-PPM							
UVT	%							
PH (Ave.)								
PARTICIPANT DELIVERY (previous day)								
TACOMA METER TOTAL	-MG							
ADJUSTED TOTAL	-MG							
SW356TH & 15 AVE SW	-MG							
WHOLESALE CUSTOMER METERS	-MG							
CASCADE WATER ALLIANCE	-MG							
KENT METER TOTAL	-MG							
ADJUSTED TOTAL	-MG							
217th Ave SE 288th ST	-MG							
124TH AVE SE & SE 296TH ST	-MG							
120TH AVE SE & SE 296TH ST	-MG							
COVINGTON WD METER TOTAL	-MG							
ADJUSTED TOTAL	-MG							
22048 SE 288th St.	-MG							
188TH AVE SE & SE 304TH ST	-MG							
148TH AVE SE & SE 296TH ST	-MG							
LAKEHAVEN UD METER TOTAL	-MG							
ADJUSTED TOTAL	-MG							
44th AVE. S. & 313th SST	-MG							
1ST WAY S & S 332ND ST	-MG							
SW356TH ST & 15TH AVE SW	-MG							
TOTAL OF ALL DELIVERY METERS	-MG							
DIFFERENCE FROM SSP METER	-MG							
% OF TOTAL								
TACOMA 2nd Div SHARE	-MG							
TACOMA O&M SHARE	-MG							
KENT 2nd div / O&M SHARE	-MG							
COVINGTON WD 2nd div / O&M SHAR	-MG							
LAKEHAVEN UD 2nd div / O&M SHARI	-MG							
PARTICIPANT SCHEDULES (previous day)								
TACOMA PROJECT	-MG							
TACOMA 1ST DIV	-MG							
KENT PROJECT	-MG							
KENT 1ST DIV	-MG							
COVINGTON WD PROJECT	-MG							
COVINGTON WD 1ST DIV	-MG							
LAKEHAVEN UD PROJECT	-MG							
LAKEHAVEN UD 1ST DIV	-MG							
SCHEDULE DEVIATIONS (previous day)								
TACOMA	-MG							
KENT	-MG							
COVINGTON WD	-MG							
AKEHAVEN UD	-MG							

Exhibit C – Dispute Resolution Procedures

The following procedures shall govern the resolution of any dispute arising under the Agreement between the Parties that cannot be resolved by good-faith negotiations between the Parties, unless the Parties mutually agree to use different procedures to resolve a specific dispute by executing a document setting forth such different procedures. The Parties agree that these dispute resolution procedures are intended to be used in conjunction with and governed by R.C.W 4.48, and both Parties hereby waive their right to a trial by jury for any dispute arising under this Agreement.

1. The Party that believes that continued good-faith negotiations will not produce a resolution of the issue(s) that is the subject of such negotiations will notify the other Party in writing that they are invoking the dispute resolution procedures of this Exhibit C.

2. Within twenty (20) days of the date of such notice invoking the dispute resolution procedures of this Exhibit C, the Parties shall meet and select an individual to recommend to the court as referee of the dispute resolution process in accordance with R.C.W. 4.48.020. The Parties shall select an individual who is qualified as a juror as provided by statute, competent as a juror between the Parties, a duly admitted and practicing attorney, and has experience presiding over civil litigation of contract disputes. The Parties will use the following procedure to select the recommended referee:

    2.1 Each Party will make a list of three individuals that are qualified pursuant to section 2 to serve as referee and exchange such list with the other Party. If the Parties agree upon a person from either list, or if both Parties list the same person, that person will be the recommended referee.

    2.2 If the Parties are unable to agree upon a referee after exchanging their respective lists, they will make a joint list setting forth all six candidates from the two lists.

3. Upon the selection of the recommended referee, or the creation of the joint list pursuant subsection 2.2, the Party that invoked the dispute resolution procedures shall file a complaint in the superior court of the appropriate county as set forth in section 31 of the Agreement, setting forth the issues(s) in dispute, and the other Party shall file an answer to such complaint. Not later than twenty (20) days after the filing of the answer, the Parties shall jointly file a motion, with the Agreement (including Exhibit C) attached, with the court requesting an order of reference that:

    3.1 Directs that the issue(s) raised by the complaint and answer be resolved pursuant to R.C.W. 4.48 by reference to a referee;

3.2 Appoints pursuant to R.C.W. 4.48.020 either the recommended referee selected by the Parties pursuant to 2.1, or a single referee from the joint list prepared pursuant to subsection 2.2; and

3.3 Directs the referee conduct the proceeding in accordance with the procedures set out in sections 4-10 of this Exhibit C.

4. In accordance with R.C.W 4.48.060, the Parties hereby waive their rights to discovery and cross-examination, and direct that the proceeding be conducted in the same manner as a motion for summary judgment as follows:

4.1 The Parties shall present their respective positions by written briefs and affidavits, and without testimonial evidence or cross-examination;

4.2 Oral argument will be conducted before the referee; and

4.3 The burdens of proof and persuasion that pertain in a civil trial shall apply, rather than those that apply to motions for summary judgment.

5. After appointment of the referee, the Parties shall endeavor in good faith toprepare for the referee a joint statement of facts and the questions to be decided in the proceeding. In the absence of an agreed to joint statement of facts and questions to be decided, each Party may include its own statement of facts and questions to be decided in its initial brief.

6. Within ninety (90) days after the submission of the joint statement of facts and questions to be decided, or within ninety (90) days after the appointment of the referee if the Parties cannot agree to a joint submission of facts and questions to be decided, each Party shall submit to the referee a one page statement of the proposed resolution and/or award it seeks for each of the issues in dispute, and its initial brief. The statement and initial brief (excluding any attached affidavits or evidentiary documents) shall not exceed fifty (50) 8 ½ x 11" double spaced pages with 1 ½ inch margins, number 12 point type face. The statement and initial brief shall be filed simultaneously by e-mail and regular mail with the referee and opposing Party.

7. Within thirty (30) days after the date the Parties filed their initial briefs, the Parties shall file their respective reply briefs with the referee and the opposing Party. The reply briefs (excluding any attached affidavits or evidentiary documents) shall not exceed twenty-five (25) 8 ½ x 11" double spaced pages with 1 ½ inch margins, number 12 point type face. The reply briefs shall be filed simultaneously by e-mail and regular mail with the referee and opposing Party.

8. After the reply briefs have been filed, if the referee deems that additional responses are needed, then the referee may request the Parties file a

supplemental brief only as to those specific matters or questions raised by the referee. Such supplemental briefs shall be limited to fifteen (15) 8 ½ x 11" double spaced pages with 1 ½ inch margins, number 12 point type face, and filed at such time as requested by the referee. Any such supplemental briefs shall be filed simultaneously by e-mail and regular mail upon the referee and opposing Party.

9. When all briefs have been filed, the referee will schedule oral argument on the issue(s) in dispute.

10. After the completion of oral argument, the referee will prepare his/her proposed report in accordance with R.C.W. 4.48.70 and shall provide a copy of the proposed report to the Parties, who shall have the right to suggest changes and modifications to the proposed report, all in accordance with R.C.W. 4.48.110. The referee will file the final report with the court within twenty (20) days of the completion of the process under R.C.W.4.48.110.

11. Either Party may move the court to modify or set aside, in whole or in part, the final report of the referee. If the court modifies or sets aside, in whole or in part, the final report of the referee and makes another reference, then this Exhibit C shall also apply to such reference.

12. Except as provided in section 21 of the Agreement, each Party shall be responsible for its own costs of the dispute resolution process (including any judicial proceedings), and the Parties shall each pay one-half of the other costs of the dispute resolution proceeding, including the fees of the referee. The fees of the referee shall be established in accordance with R.C.W. 4.48.100.

APPENDIX I

Lake Tapps Water Rights

File NR R2-29935
WR Doc ID 22232

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
RESERVOIR PERMIT

PRIORITY DATE
9/15/2000

WATER RIGHT NUMBER
R2-29935

MAILING ADDRESS
CASCADE WATER ALLIANCE
11400 SE 8TH ST STE 440
BELLEVUE WA 98004

SITE ADDRESS (IF DIFFERENT)

Purpose and Quantity

PURPOSE	STORAGE QUANTITY ADDITIVE	STORAGE QUANTITY NON-ADDITIVE	UNITS	ANNUAL QUANTITY (AF/YR) ADDITIVE	ANNUAL QUANTITY (AF/YR) NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal	46700		AF	46700		01/01 - 12/31

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	Lake Tapps	White River	10-Puyallup-White

Place of Use

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use for this water right is the combined service areas described in the most recent Water System Plans approved by the Washington State Department of Health for Cascade Water Alliance, City of Seattle and the City of Tacoma.

Location of Impounding Structure

Dike Number	Location	Washington ID Number
1	NW1/4NW1/4 S9, TWP20N R5E	WA418
2A	NE1/4SE1/4 S5, TWP20N R5E	WA419
2B	NW1/4SW1/4 S4, TWP20N R5E	WA420
3	NE1/4SW1/4 S4, TWP20N R5E	WA421
4	W1/2SE1/4 S4 & NW1/4NE1/4 S9, TWP20N R5E	WA296
4A*	N1/2NE1/4 S9, TWP20N R5E	WA296
5*	NE1/4NE1/4 S9, TWP20N R5E	WA422
6*	SW1/4NW1/4 S10, TWP20N R5E	WA423
7	SW1/4NW1/4 S10, TWP20N R5E	WA435
8	E1/2NW1/4 S10, TWP20N R5E	WA424

9	NE1/4NW1/4 S10, TWP20N R5E	WA425
10	NE1/4NW1/4 & NW1/4NE1/4 S10, TWP20N R5E	WA426
11*	W1/2NE1/4 & SE1/4NE1/4 S10, TWP20N R5E	WA427
12	SE1/4SE1/4 S10, TWP20N R5E	WA428
13	NW1/4SW1/4 S27, TWP20N R5E	WA429
14	NW1/4NE1/4 S26, TWP20N R5E	WA430
15	SE1/4NW1/4 & SW1/4NE1/4 S26, TWP20N R5E	WA431

Legal Subdivisions Of Lands In Which The Submerged Area Is To Be Located

Lake Tapps Reservoir, located in Sections 4, 5, 8, 9, 10, 14, 15, 16, 17, 21, 22, 23, 27 and 28, T. 19 N., R. 5 E.W.M.

Construction of Impounding Structure

HEIGHT OF DAM
Varies from 5 to 45 Feet

LENGTH ON TOP (ft)
Varies from 240 to 2870 feet

WIDTH ON TOP (ft)
Varies from 19 to 70 feet

SLOPE OF FRONT OR WATER SIDE (ft horizontal)
Varies from 2.1:1 to 5.5:1

SLOPE OF BACKSIDE (ft horizontal : one ft vertical)
Varies from 1.4:1 to 2:1

HEIGHT OF DAM ABOVE WATER LINE AT NOPL (ft)
Varies from 1.6 to 9.2 feet

TYPE OF DAM AND CONSTRUCTION MATERIALS

Earthen embankments originally constructed in 1910-1911. No new dam construction required.

LOCATION AND APPROXIMATE DIMENSIONS OF SPILLWAY INCLUDING CREST LENGTH
Not applicable

LOCATION, SIZE AND TYPE AND OUTLET VALVE AND OUTLET CONDUIT STRUCTURE

The outlet from Lake Tapps is located in the SW¼ NE¼ of Section 8, T. 20 N., R. 5 E.W.M. It consists of a 2,842-foot long, 12-foot-diameter concrete tunnel that leads to a concrete penstock forebay located in the SW¼ NE¼ of Section 7, T. 20 N., R. 5 E.W.M. The water then enters three steel penstocks, 8 feet in diameter, and 2,135 feet in length that delivers water to the powerhouse. Two of the three steel penstocks are tapped to provide water to a fourth 8-foot-diameter steel penstock that is 1,791 feet long. The powerhouse discharges to the tailrace. The tailrace is trapezoidal in cross-section with a base width of 34 feet and a containment height of 9 to 10 feet. The tailrace is concrete-lined for the first 45 feet and then timber-lined for the next 65 feet and the last 2,400 feet leading to the White River are unlined.

NUMBER OF ACRES SUBMERGED WHEN RESERVOIR IS FILLED TO NOPL
2700

MAXIMUM DEPTH (FEET) AT NOPL
90

APPROXIMATE AVERAGE DEPTH (FEET)
25

Development Schedule

BEGIN PROJECT
Started

COMPLETE PROJECT
Completed

PUT WATER TO FULL USE
December 31, 2060

This Permit Subject to Cancellation

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Lacey, Washington this 10th day of Dec, 2010

OK

Department of Ecology

By
Thomas Loranger, Section Manager

File NR S2-29920(A)
WR Doc ID 22232

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
WATER RIGHT PERMIT

PRIORITY DATE
6/20/2000

WATER RIGHT NUMBER
S2-29920(A)

MAILING ADDRESS
CASCADE WATER ALLIANCE
11400 SE 8TH ST STE 440
BELLEVUE WA 98004

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
1000	CFS	54300

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE ADDITIVE	WITHDRAWAL OR DIVERSION RATE NON-ADDITIVE	UNITS	ANNUAL QUANTITY (AF/YR) ADDITIVE	ANNUAL QUANTITY (AF/YR) NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal	1000		CFS			02/15 - 07/01[a]
Municipal	400		CFS			07/02 - 09/15[b]
Municipal	150		CFS			09/16 - 02/14[c]

REMARKS

a. From February 15 until Refill Date or July 1, whichever is earlier.

b. From Refill Date until September 15 or Fall Drawdown Date, whichever is later.

c. From the Fall Drawdown Date to February 15.

Diversion rates are further subject to refill schedule described Provision No. 2.

Ecology has issued two separate Reports of Examination corresponding to application S2-29920: one corresponds to the Lake Tapps Reservoir Water Rights and Supply Project [permit S2-29920(A)] and the other corresponds to the Regional Reserved Water Program [permit S2-29920(B)]. Water quantities from the two permits are additive. The two permits have the same priority date, but the permit for S2-29920(A) is superior in priority. Both of the permits are evaluated in one Investigator's Report.

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	White River	Puyallup River	10-Puyallup-White

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
WHITE RIVER DIVERSION DAM	0619021006	NA	19N	06E	02	NE	47.170344 Datum: NAD83/WGS84	-122.004333

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use for this water right is the combined service areas described in the most recent Water System Plans approved by the Washington State Department of Health for the Cascade Water Alliance, the City of Seattle and the City of Tacoma.

Proposed Works

Lake Tapps Water Rights and Supply Project

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
December 31, 2040	Within 15 Years of Begin Construction Date	December 31, 2060

The development schedule is as follows:

- Begin construction within 30 years of the issuance of the permits
- Complete construction within 15 years of the beginning of construction
- Achieve full beneficial use of the allocated quantities within 50 years of issuance of the permits.

The Begin Construction Date is the date when Permit Holder has received all necessary major permits for the construction of the water treatment plant and transmission system and commenced work on facilities considered to be significant permanent elements of the project or excavation for project foundations or pipelines.

The Completion of Construction Form may be filed after the water treatment plant is completed, tested and capable of treating the full capacity and a transmission system is available in accordance with Permit Holder's Water System Plan, including appropriate agreements to use other entities' transmission systems, sufficient to transport the full amount of water to the appropriate delivery points.

Permit Holder is advised that a notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the quantity of water allocated by this authorization, to the extent water is required, has been put to full beneficial use.

Provisions:

The Permit Holder must meet the provisions and conditions of this section. These provisions and conditions apply at permit issuance, except as noted in the individual condition.

1. Minimum Flow

The Permit Holder may divert water from the White River to Lake Tapps Reservoir, subject to the schedule of maximum diversion rates provided below in Condition 2, only if the diversion does not reduce the instream flow of the White River below the Minimum Flow established in Table 1.

Compliance with the Minimum Flows shown in Table 1. shall be measured at U.S. Geological Survey ("USGS") gage 12099200 – White River above Boise Creek at Buckley gage (referred to as the "Buckley Gage"), or other appropriate gage subject to review and approval by the Washington State Department of Ecology ("Ecology") in accordance with Condition 21.

The Permit Holder may divert up to 20 cfs of water from the headgate and through the fish screens when the flow is below the Minimum Flow, set out in Table 1. due to natural flow conditions.

Table 1. Minimum Flow

Time Period	Minimum Flow	Time Period	Minimum Flow
January 1-14	650 cfs	July 1-23	800 cfs
January 15-31	525 cfs	July 24-31	650 cfs
February 1-14	550 cfs	August 1-6	650 cfs
February 15-29	500 cfs	August 7-31	500 cfs
March 1-14	550 cfs	September 1-14	500 cfs
March 15-31	725 cfs	September 15-30	500 cfs
April 1-14	775 cfs	October 1-14	500 cfs
April 15-30	825 cfs	October 15-31	500 cfs
May 1-14	875 cfs	November 1-14	500 cfs
May 15-31	875 cfs	November 15-30	550 cfs
June 1-14	800 cfs	December 1-14	550 cfs
June 15-30	800 cfs	December 15-31	600 cfs

2. Schedule of Maximum Diversion Rates

If the instream flow of the White River at the Buckley Gage (or other appropriate gage subject to review and approval by Ecology in accordance with Condition 21) exceeds the Minimum Flow established in Condition 1, then the Permit Holder may divert water from the White River into Lake Tapps Reservoir in a manner consistent with the following schedule and amounts:

a) Beginning no earlier than February 15, and continuing until Lake Tapps Reservoir is refilled to Normal Full Pool (as defined in Condition 5), or until July 1, whichever is earlier ("Refill Date") water may be diverted from the White River in an amount not to exceed 1000 cfs;

b) Beginning on the Refill Date until September 15 or the subsequent date the Permit Holder commences drawing down the water level of Lake Tapps Reservoir, whichever is later ("Fall Drawdown Date"), water may be diverted from the White River in an amount not to exceed 400 cfs; and

c) Beginning on the Fall Drawdown Date until February 15 water may be diverted from the White River in an amount not to exceed 150 cfs.

3. Releases from Reservoir

The Permit Holder shall limit releases from Lake Tapps Reservoir into the tailrace canal to not more than 50 cfs, except when Lake Tapps Reservoir is being drawn down, in accordance with Condition 2.c above.

4. Ramping Rates

The diversion from the White River and the release from Lake Tapps Reservoir through the tailrace canal shall at all times be operated so that;

a) The ramping rate does not exceed one inch per hour (increase or decrease) as measured respectively at the Buckley Gage (or other appropriate gage subject to review and approval by Ecology in accordance with Condition 21) and USGS gage 12101100 – Lake Tapps Diversion at Dieringer; and

b) Between February 16 and June 15 of each year down ramping shall not be permitted between one hour before sunrise and one hour after sunset.

5. Recreational Lake Levels

The Permit Holder shall maintain lake levels in Lake Tapps Reservoir according to the schedule established below. "Normal Full Pool" is defined as a reservoir water level between 541.0 feet and 542.5 feet National Geodetic Vertical Datum 1929 ("NGVD 29") as measured at USGS gage 12101000 – Lake Tapps near Sumner.

a) The Permit Holder shall maintain Normal Full Pool from April 15 through September 30 of each year until 30 years of the issuance of the permit or Permit Holder's commencement of the use of Lake Tapps Reservoir for municipal water supply, whichever comes later.

b) Thereafter, the Permit Holder shall:
   i) Maintain Normal Full Pool from April 15 through September 15; and
   ii) Maintain Normal Full Pool from September 16 through September 30 of each year more than ninety percent (90%) of the time, measured by the number of days (i.e., no more than fifteen (15) days in a rolling ten (10) year period of time) below the lower parameter of the Normal Full Pool, starting with the first calendar year in which lake levels fall below the lower parameter of the Normal Full Pool.

c) The Permit Holder shall make reasonable efforts to maintain Normal Full Pool through October 31 in all years.

d) Within the above-described time periods, operational variances may be required due to forecasts or available precipitation, any necessary milfoil control, or the terms and conditions of this authorization or of applicable law.

The schedule of lake levels and the definition of Normal Full Pool may be modified. Permit Holder shall submit any proposal for modification to Ecology for review and approval in accordance with Condition 21. The proposal shall include documentation that Permit Holder has completed an appropriate consultation or negotiation process with stakeholders and other interested parties.

6. Protect Puyallup River Minimum Instream Flows in Spring

During projected minimum instream flow shortfalls at USGS gage 12101500 – Puyallup River at the Puyallup from February 15 through March 31 of each year, the Permit Holder shall reduce the quantity of flow diverted from the White River up to the amount of water actually being withdrawn from Lake Tapps Reservoir for municipal water supply purposes (i.e., up to a maximum annual quantity of 5,900 acre feet). The Permit Holder shall develop an operating protocol for diversions from the White River to Lake Tapps Reservoir, for review and approval by Ecology in accordance with Condition 21. The protocol shall incorporate appropriate stream flow gaging and modeled travel time to estimate when diversions should be reduced to provide additional flow at the Puyallup gage. This condition shall apply when water is first withdrawn from Lake Tapps Reservoir for municipal water supply purposes.

7. Minimization of Powerhouse Leakage

To the extent practical, the Permit Holder shall minimize leakage from the former White River Hydroelectric Project powerhouse beginning not later than when water is first withdrawn from Lake Tapps Reservoir for municipal water supply purposes. Within 5 years of permit issuance, the Permit Holder shall submit a plan for minimizing powerhouse leakage to Ecology for review and approval in accordance with Condition 21.

8. Streamflow Monitoring

Within two (2) years of the issuance of the permit, the Permit Holder shall submit to Ecology a plan to install, operate, maintain, and report from streamflow gages necessary to monitor the minimum flows and staff gages to monitor the ramping rates required by this permit. The plan shall include at a minimum gages at the following locations:

- Canal Diversion
- White River above Boise Creek at Buckley gage (or other appropriate gage subject to review and approval by Ecology in accordance with Condition 21)
- Tailrace Release
- Lake Tapps water surface elevation (on a daily basis)

The plan shall describe the method of collecting and recording the flow and ramping rate data, and include a provision for periodically providing that data to Ecology, Washington Department of Fish and Wildlife ("WDFW"), National Oceanic and Atmospheric Association National Marine Fisheries Service ("NOAA Fisheries"), U.S. Fish and Wildlife Service ("USFWS"), USGS, the Puyallup Tribe of Indians, and Muckleshoot Indian Tribe. The Permit Holder shall prepare the plan after providing a draft and opportunity to comment to Ecology, WDFW, NOAA Fisheries, USFWS, USGS, the Puyallup Tribe of Indians and Muckleshoot Indian Tribe. The final plan shall be submitted to Ecology for review and

approval in accordance with Condition 21. The plan shall be implemented, including installation and operation of all gages, within one year after approval by Ecology.

The Permit Holder shall use the most accurate gaging equipment and methodology as determined by the USGS. At least every five (5) years, Permit Holder shall evaluate the adequacy of the stream flow monitoring gages. The Permit Holder shall maintain the above streamflow gages for the duration of this project.

9. Maintenance of Diversion Canal Fish Screens

The Permit Holder shall maintain the fish screens in the diversion canal so that they continue to meet or exceed their design specifications for fish passage and all applicable federal or state requirements.

10. Annual Compliance Summary Report

On an annual basis, the Permit Holder shall submit to Ecology a report summarizing and documenting compliance with the conditions of this permit. At a minimum, the report shall include compliance with the Minimum Flows for the White River, ramping rates, maximum diversion rates, recreational lake levels, and reductions of diversion during spring for the Puyallup River Minimum Instream Flow, as well as emergency operations, and any non-compliance with conditions of this permit. Annual reports shall document compliance with mitigation requirements over a calendar year and shall be submitted to Ecology by February 15 of the subsequent year.

11. Tailrace Study

The Permit Holder shall conduct the following studies regarding the tailrace canal of Lake Tapps Reservoir.

a) A study of the tailrace releases from Lake Tapps to determine if releases are causing or contributing to non-attainment of designated uses and water quality criteria violations in the lower White and Puyallup Rivers. If the study determines discharge from Lake Tapps is adversely affecting water quality, the Permit Holder shall develop and implement a plan to improve tailrace water quality.

   i. Study Schedule: Within five (5) years of permit issuance, the Permit Holder shall submit a Quality Assurance Project Plan ("QAPP") for the water quality study to Ecology for review and approval in accordance with Condition 21. For guidance on preparing QAPPs, see Ecology Publication No. 04-03-030. The study period shall not exceed five (5) years. The final report for the study shall be submitted to Ecology within one hundred eighty (180) days after the end of the study period, or as specified by Ecology in its QAPP approval. The water quality study should include, but not necessarily be limited to, continuous monitoring of temperature and dissolved oxygen in tailrace releases and instream locations to be identified in the QAPP.

   ii. Tailrace Water Quality Plan: If the water quality study concludes, or if Ecology determines, that tailrace releases from Lake Tapps are causing or contributing to non-attainment of designated uses or water quality criteria violations in the Lower White and Puyallup Rivers, the Permit Holder shall develop and implement a plan to improve water quality in tailrace releases. The plan shall provide for an adequate period of monitoring to determine the success of the plan in improving water quality of tailrace releases.

A draft plan shall be submitted to the following for review and comment: the agencies and parties to the 1998 Agreement on the Allocation of the Puyallup River TMDL Reserve Capacity of Biochemical Oxygen Demand ("BOD") and Ammonia or any successors in interest, Puyallup Tribe of Indians, Muckleshoot Indian Tribe, and NOAA Fisheries. The final plan shall be submitted to Ecology for review and approval in accordance with Condition 21 within one year from submittal of the final study report.

Upon receipt of the final plan, Ecology may issue an order approving or modifying the plan, and the Permit Holder shall implement the plan.

b. A study to assess the relationship between salmonids and the tailrace canal. Within one hundred eighty (180) days of the completion of Condition 7 above (Minimization of Powerhouse Leakage), Cascade shall begin a study to assess the occurrence of entry, delay, stranding, and/or delayed migration of salmonids in the tailrace canal. If the study determines that adverse conditions are occurring and remediation is necessary, the Permit Holder shall develop and implement a plan to improve conditions. The plan shall include consideration of a tailrace barrier. Prior to implementation, the Permit Holder shall submit the plan to Ecology for review and approval in accordance with Condition 21.

12. Department of Health Water System Planning

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Department of Health's Office of Drinking Water Supply, prior to any new construction or alterations of a public water supply system.

13. Shortage Management Plan

No later than two (2) years after this authorization to make use of public water becomes effective, Permit Holder shall adopt and submit to Ecology a shortage management plan intended to reduce and minimize the need for water for municipal water supply purposes when the region is experiencing dry or drought conditions.

14. Fish Screens on Outlets from Lake Tapps Reservoir

Within five (5) years of permit issuance, the Permit Holder shall install fish screens on any outlets from Lake Tapps Reservoir, if required and warranted based on scientific studies. Prior to construction, the Permit Holder shall submit a plan for installation, operation, and maintenance of the fish screens to WDFW for approval or modification. Fish screens shall be installed, operated, and maintained according to the plan approved by WDFW.

15. Measuring and Reporting Water Use

An approved measuring device shall be installed and maintained for the Lake Tapps water supply withdrawal pipeline to the water treatment plant in accordance with the rule "Requirements for Measuring and Reporting Water Use", chapter 173-173 WAC.

Water use data shall be recorded daily. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology in digital format by January 31 of each calendar year.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, Water Resource Inventory Area ("WRIA"), Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units:

- Monthly meter readings including units;
- Peak monthly flow including units;
- Department of Health WFI water system number and source number(s);
- Purpose of use; and
- Open channel flow or pressurized diversion.

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

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

16. Existing Rights

This authorization to make use of public water granted by the State of Washington is subject to existing water rights, including any existing rights held by the Tribes or the United States for the benefit of Tribes under treaty or settlement.

17. Use of Claim

This permit is expressly conditioned on the use of water under Claim No. 160822 to satisfy recreational, lake level, aquatic habitat, water quality, and other regulatory beneficial uses and the conditions of this permit.

18. Combined Diversion Not to Exceed Limits

The combined instantaneous diversion of water from the White River for municipal water supply under this authorization and under the rights the Permit Holder claims under Claim No. 160822 shall not exceed the limits established for additional purposes under the change decision in Claim No. 160822.

19. Trust Water Donation

No later than two (2) years after this authorization to make use of public water becomes effective, the Permit Holder shall submit to Ecology an application to make a permanent donation of a portion of Claim No. 160822 to the State's Trust Water Program.

20. Emergency Operations

Permit conditions regarding or affecting operation of Lake Tapps Reservoir and related facilities do not apply and shall be waived to the extent that emergency conditions require or as ordered by a court or by a

state or federal agency with jurisdiction. The Permit Holder shall notify Ecology of any emergency operations in accordance with Condition 21. Emergency conditions mean a temporary circumstance or condition caused by a natural disaster, accident or physical damage, or other extraordinary event that is not avoidable by the exercise of reasonable diligence. Emergency conditions do not include droughts or long term changes in hydrologic conditions.

21. Ecology Review and Approval Process

This provision defines two processes for communicating with Ecology for compliance with the provisions of this water right, including conditions 1, 2, 4, 5, 6, 7, 8, 11, and 20.

1. **Notify Ecology**
   Permit Holder shall provide notice in writing to Ecology's Southwest Regional Office Water Resources Program Supervisor, or other staff identified by Ecology, and shall ensure that Ecology receives the notice. This provision does not limit Ecology's legal authority to act. This provision applies to the requirement to notify Ecology in Condition 20.

2. **Ecology Review and Approval**
   Permit holder shall submit the required information for Ecology's review, comment, and approval. The information shall be submitted in writing to Ecology's Southwest Regional Office Water Resources Program Supervisor, or other staff identified by Ecology, and Permit Holder shall ensure that Ecology receives the information. Ecology shall review the submitted information and respond to the Permit Holder in a timely manner. This provision applies to the requirements for review and approval by Ecology in Conditions 1, 2, 4, 5, 6, 7, 8, and 11.

22. Adaptive Management

Based on the analyses conducted to evaluate this water right, Ecology is confident the project can achieve its instream flow, recreational lake level, and municipal water supply objectives on a reliable basis. The conditions of this water right provide the Permit Holder flexibility to adapt to a wide range of hydrologic conditions and still meet those objectives.

In the event that instream flow, recreational lake level, or municipal water supply objectives are not reliably met, Ecology shall consult with the Permit Holder to consider the reasons the objectives are not being met and identify possible operational changes in conformity with the conditions of this water right.

If necessary, Ecology may also convene, or direct the Permit Holder to convene, a process through which input is sought from stakeholders and other interested parties to identify possible operational changes which will result in the achievement of instream flows, recreational lake levels, and municipal water supply on a more reliable basis.

Consideration of operational changes will include, but not be limited to, the adaptive management measures identified in Section 12.3 of the Final Environmental Impact Statement. Additionally, the Permit Holder will work with other interested parties to secure funding for capital improvement projects if capital improvements are needed to meet the objectives of the project.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Lacey, Washington this 10th day of Dec. 2010.

Department of Ecology

OK _____

By _____
Thomas Loranger, Section Manager

File NR S2-29920(B)
WR Doc ID 46978

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
WATER RIGHT PERMIT

PRIORITY DATE
6/20/2000

WATER RIGHT NUMBER
S2-29920(B

MAILING ADDRESS
CASCADE WATER ALLIANCE
11400 SE 8TH ST STE 440
BELLEVUE WA 98004

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
10	CFS	5060

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal	10		CFS	5060		01/01 - 12/31

REMARKS

Ecology has issued two separate Reports of Examination corresponding to application S2-29920: one corresponds to the Lake Tapps Reservoir Water Rights and Supply Project [permit S2-29920(A)] and the other corresponds to the Regional Reserved Water Program [permit S2-29920(B)]. Water quantities from the two permits are additive. The two permits have the same priority date, but the permit for S2-29920(A) is superior in priority. Both of the permits are evaluated in one Investigator's Report.

This permit establishes a Regional Reserved Water Program to be used by the Cities of Auburn, Bonney Lake, Buckley, and Sumner (collectively referred to as the "Four Cities"). The Regional Reserved Water Program provides a mechanism that can be used by the Four Cities to mitigate impacts to the mainstem White and Puyallup Rivers in connection with water right applications to be submitted in the future. "Regional Reserved Water" refers to the water allocated by this permit.

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

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	White River	Puyallup River	10-Puyallup-White

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
WHITE RIVER (NON DIVERSIONARY)			19N	06E	02			

Datum: NAD83/WGS84

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

White River from the diversion dam (RM 24.3) to the confluence with the Puyallup River (RM 0.0) and the Puyallup River from the confluence with the White River (RM 10.4) to Commencement Bay (RM 0.0).

Proposed Works

Not Applicable

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
December 31, 2030		

Any water right applicant seeking to use the Regional Reserved Water as a component of their application shall obtain an approved water right from the Washington State Department of Ecology ("Ecology") prior to the Begin Project Date of December 31, 2030. The Begin Project Date shall not be extended.

The remaining development schedule shall be established in the Report of Examination for any water right application making use of Regional Reserved Water

Provisions:

The Permit Holder must meet the provisions and conditions of this section.

1. Minimum Flow

Regional Reserved Water has no mitigation value when flows are below the Minimum Flow established in table and its use shall not reduce the instream flow of the White River below the Minimum Flow established in Table 1. Compliance with the Minimum Flows shown in table shall be measured at USGS gage 12099200 – White River above Boise Creek at Buckley, or other appropriate gage established by the Permit Holder of S2-29920(A) in accordance with the conditions of that water right.

Table 1. Minimum Flow

Time Period	Minimum Flow	Time Period	Minimum Flow
January 1-14	650 cfs	July 1-23	800 cfs
January 15-31	525 cfs	July 24-31	650 cfs
February 1-14	550 cfs	August 1-6	650 cfs
February 15-29	500 cfs	August 7-31	500 cfs
March 1-14	550 cfs	September 1-14	500 cfs
March 15-31	725 cfs	September 15-30	500 cfs
April 1-14	775 cfs	October 1-14	500 cfs
April 15-30	825 cfs	October 15-31	500 cfs
May 1-14	875 cfs	November 1-14	500 cfs
May 15-31	875 cfs	November 15-30	550 cfs
June 1-14	800 cfs	December 1-14	550 cfs
June 15-30	800 cfs	December 15-31	600 cfs

2. Subject to Puyallup River at Puyallup Minimum Instream Flow

The Regional Reserved Water Program is junior to the Minimum Instream Flow ("MIF") for the Puyallup River at Puyallup established in WAC 173-510-030. Regional Reserved Water shall not be used as mitigation in any way that would decrease flows in the Puyallup River at Puyallup when that gage is below the MIF.

3. Mitigation Value Limited to Mainstem White and Puyallup Rivers

The mitigation value of Regional Reserved Water is limited to the mainstem of the White River downstream of the diversion dam and the mainstem of the Puyallup River downstream of the confluence with the White River. Regional Reserved Water is not available to mitigate impacts to tributaries of the White River or the Puyallup River.

4. Additional Water Right(s) Required

Regional Reserved Water cannot be used as mitigation except as authorized by a new water right or change to existing right.

5. Supply and Demand Analysis Required

Any application proposing to use Regional Reserved Water shall provide a detailed water supply and demand analysis documenting that the water quantities in the application will be put to beneficial use.

6. Use Limited to Four Cities

Use of the Regional Reserved Water Program established by this water right is limited to the Cities of Auburn, Bonney Lake, Buckley and Sumner.

7. Subject to Cancellation on January 1, 2031

Ecology approval for any water rights using the Regional Reserved Water Program must be secured by December 31, 2030. Any portion of the permit for the Regional Reserved Water Program that has not been allocated in conjunction with a water right approved by Ecology shall be cancelled on January 1, 2031.

This Permit Subject to Cancellation

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Lacey, Washington this 10th day of Dec., 2010

OK

Department of Ecology

By Thomas Loranger

Thomas Loranger, Section Manager

File NR S2-29934
WR Doc ID 22232

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
WATER RIGHT PERMIT

PRIORITY DATE
9/15/2000

WATER RIGHT NUMBER
S2-29934P

MAILING ADDRESS
CASCADE WATER ALLIANCE
11400 SE 8TH ST STE 440
BELLEVUE WA 98004

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
135	CFS	54300

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal	135		CFS	54300		01/01 - 12/31

REMARKS

The diversion location will be Lake Tapps, likely in the forebay area of the White River Hydroelectric Project, but the specific location is not yet determined.

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	Lake Tapps	White River	10-Puyallup-White

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
UNBUILT FACILITY ON LAKE TAPPS	0520082019		20N	05E	08	SWNE	47.237999 Datum: NAD83/WGS84	-122.203379

Locations and parcel number are approximate.

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use for this water right is the combined service areas described in the most recent Water System Plans approved by the Washington State Department of Health for the Cascade Water Alliance, the City of Seattle and the City of Tacoma.

Proposed Works

Lake Tapps Reservoir Water Rights and Supply Project

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
December 31, 2040	Within 15 Years of Begin Project	December 31, 2060

Provisions

The Development Schedule, and Provisions and Conditions of the 2010 Report of Examination for S2-29920(A) in their entirety are incorporated by reference.

This Permit Subject to Cancellation

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by the Department documenting such compliance.

Given under my hand and the seal of this office at Lacey, Washington this 10th day of Dec, 2010.

OK

Department of Ecology

By Thomas Loranger

Thomas Loranger, Section Manager

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 1

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – EXISTING STATUS

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME / NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		EXISTING CONSUMPTION		CURRENT WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits / Certificates 1. S2-29920(A)	Cascade Water Alliance	6/20/2000	White River	No[1]	1,000 cfs	54,300 AF	NA[1]	NA[1]	NA[1]	NA[1]
2. S2-29920(B)	Cascade Water Alliance	6/20/2000	White River	No[1]	10 cfs	5,060 AF	NA[1]	NA[1]	NA[1]	NA[1]
3. S2-29934P	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	135 cfs	54,300 AF	0	0	135 cfs	54,300 AF
4. R2-29935	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	N/A	46,700 AF (Storage)	NA[1]	NA[1]	NA[1]	NA[1]
Claims 1. 160822	Cascade Water Alliance	1895	White River	No [1]	1,988 cfs	931,281 AF	NA[1]	NA[1]	NA[1]	NA[1]
TOTAL	**********	********	********	**********	135 cfs	54,300 AF	0	0	135 cfs	54,300 AF

INTERTIE NAME / IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		EXISTING CONSUMPTION THROUGH INTERTIE		CURRENT INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. SPU Block Contract	Seattle Public Utilities	103.0 cfs	37,303 AF	88.8 cfs	32,150 AF	14.2 cfs	5,153 AF
TOTAL	**********	103 cfs	37,303 AF	88.8 cfs	32,150 AF	14.2 cfs	5,153 AF

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1. N/A					

[1] The three Lake Tapps water right permits (S2-29920 [A] and [B], S2-29934 and R2-29935) provide for diversion, storage and ultimate annual consumptive use of 54,300 AF for municipal water supply purposes. Claim 160822 provides for diversion to maintain Lake Tapps for multiple non-consumptive uses. A portion of this Claim will be placed in the State Water Right Trust Program for the benefit of White River flows and fishery. The Qi and Qa of the permits and the Claim are not cumulative.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 2

WATER SYSTEM PLAN

WATER RIGHTS SELF ASSESSMENT – 6 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME / NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (6-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S2-29920(A)	Cascade Water Alliance	6/20/2000	White River	No[1]	1,000 cfs	54,300 AF	NA[1]	NA[1]	NA[1]	NA[1]
2. S2-29920(B)	Cascade Water Alliance	6/20/2000	White River	No[1]	10 cfs	5,060 AF	NA[1]	NA[1]	NA[1]	NA[1]
3. S2-29934P	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	135 cfs	54,300 AF	0	0	135 cfs	54,300 AF
4. R2-29935	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	N/A	46,700 AF (Storage)	NA[1]	NA[1]	NA[1]	NA[1]
Claims 1. 160822	Cascade Water Alliance	1895	White River	No[1]	1,988 cfs	931,281 AF	NA[1]	NA[1]	NA[1]	NA[1]
TOTAL	**********	********	********	**********	135 cfs	54,300 AF	0	0	135 cfs	54,300 AF

INTERTIE NAME / IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. SPU Block Contract	Seattle Public Utilities	103.0 cfs	37,303 AF	87.4 cfs	31,634 AF	15.6 cfs	5,669 AF
TOTAL	**********	103 cfs	37,303 AF	87.4 cfs	31,634 AF	15.6 cfs	5,669 AF

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1. N/A					

[1] The three Lake Tapps water right permits (S2-29920 [A] and [B], S2-29934 and R2-29935) provide for diversion, storage and ultimate annual consumptive use of 54,300 AF for municipal water supply purposes. Claim 160822 provides for diversion to maintain Lake Tapps for multiple non-consumptive uses. A portion of this Claim will be placed in the State Water Right Trust Program for the benefit of White River flows and fishery. The Qi and Qa of the permits and the Claim are not cumulative.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Table 3

WATER SYSTEM PLAN
WATER RIGHTS SELF ASSESSMENT – 20 YEAR FORECAST

PERMIT CERTIFICATE OR CLAIM #	NAME ON DOCUMENT	PRIORITY DATE (List oldest first)	SOURCE NAME / NUMBER	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	EXISTING WATER RIGHTS		FORECASTED WATER USE FROM SOURCES (20-year Demand)		FORECASTED WATER RIGHT STATUS (Excess/Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1. S2-29920(A)	Cascade Water Alliance	6/20/2000	White River	No[1]	1,000 cfs	54,300 AF	NA[1]	NA[1]	NA[1]	NA[1]
2. S2-29920(B)	Cascade Water Alliance	6/20/2000	White River	No[1]	10 cfs	5,060 AF	NA[1]	NA[1]	NA[1]	NA[1]
3. S2-29934P	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	135 cfs	54,300 AF	7.1	336	127.9	53,964
4. R2-29935	Cascade Water Alliance	9/15/2000	Lake Tapps	No[1]	N/A	46,700 AF (Storage)	NA[1]	NA[1]	NA[1]	NA[1]
Claims 1. 160822	Cascade Water Alliance	1895	White River	No [1]	1,988 cfs	931,281 AF	NA[1]	NA[1]	NA[1]	NA[1]
TOTAL	**********	********	********	**********	135 cfs	54,300 AF				

INTERTIE NAME / IDENTIFIER	NAME OF PURVEYOR PROVIDING WATER	EXISTING LIMITS ON INTERTIE USE		FORECASTED CONSUMPTION THROUGH INTERTIE		FORECASTED INTERTIE SUPPLY STATUS (Excess/Deficiency)	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1. SPU Block Contract	Seattle Public Utilities	62.8 cfs	22,740 AF	62.8 cfs	22,740 AF	0	0
2. TPU Supply Contract	Tacoma Public Utilities	15.4 cfs	8,659 AF	15.4 cfs	8,659 AF	0	0
3. Covington Supply Contract[2]	Covington Water District[2]	10.8 cfs	5,601 AF	10.8 cfs	5,601 AF	0	0
TOTAL	**********	89.0 cfs	37,000 AF	89.0 cfs	37,000 AF	0	0

PENDING WATER RIGHT APPLICATION (New/Change)	NAME ON APPLICATION	DATE SUBMITTED	ANY PORTION SUPPLEMENTAL? (If yes, explain in footnote)	PENDING WATER RIGHTS	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1. N/A					

[1] The three Lake Tapps water right permits (S2-29920 [A] and [B], S2-29934 and R2-29935) provide for diversion, storage and ultimate annual consumptive use of 54,300 AF for municipal water supply purposes. Claim 160822 provides for diversion to maintain Lake Tapps for multiple non-consumptive uses. A portion of this Claim will be placed in the State Water Right Trust Program for the benefit of White River flows and fishery. The Qi and Qa of the permits and the Claim are not cumulative.

[2] Supply pending. Covington Water District is a Member of Cascade and discussions indicate a strong likelihood that the District is willing to contract with Cascade to supply surplus water from the Regional Water Supply System, in which the District is a partner. Contract discussions with the District were underway in late 2011, as documented in Section 5.6 of the TSP.

APPENDIX J

SEPA Documentation and DOH Review Comments

CASCADE WATER ALLIANCE

DETERMINATION OF NONSIGNIFICANCE

Description of proposal: Adoption of the Cascade Water Alliance Transmission and Supply Plan. It is an up[date to the 2004 Cascade Transmission and Supply Plan and establishes Cascade's water service area, sources of supply, conservation policies and capital program. As with most major capital projects, these will generally require supplemental project-level SEPA review prior to final design and construction.

Proponent: Cascade Water Alliance

Location of proposal, including street address, if any: Includes the Cascade Water Alliance Service Area (which is the service area of its Members: the Cities of Bellevue, Issaquah, Kirkland, Redmond and Tukwila; the Covington Water District; and the Sammamish Plateau and Skyway Water and Sewer Districts); facilities Cascade owns (including the White River-Lake Tapps Reservoir Project (the Reservoir Project) and the Bellevue-Issaquah Pipeline; and the Place of Use associated with the Reservoir Project water rights (the combined service areas described in the most recent Water System Plans approved by the Washington State Department of Health for Cascade, the City of Seattle and the City of Tacoma).

Lead agency: Cascade Water Alliance

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

☐ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

☒ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of signature below. Comments must be submitted by: January 31, 2012

☒ There is no agency appeal.

Responsible Official: Michael A. Gagliardo

Position/title: Director of Planning Phone: 425-453-0930

Address: 11400 SE 8th Street, Suite 440, Bellevue, WA 98004

Date: December 30, 2011 Signature Michael A. Gagliardo

CASCADE WATER ALLIANCE
TRANSMISSION AND SUPPLY PLAN
ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:

Cascade Water Alliance Transmission and Supply Plan

2. Name of applicant:

Cascade Water Alliance

3. Address and phone number of applicant and contact person:

11400 SE 8th Street, Suite 440
Bellevue, WA 98004
Phone: (425) 453-0930

Attn: Michael Gagliardo, Director of Planning

4. Date checklist prepared:

December 16, 2011

5. Agency requesting checklist:

Cascade Water Alliance

6. Proposed timing or schedule (including phasing, if applicable):

It is anticipated that the Transmission and Supply Plan (hereafter, "Plan") will be in effect for six years and will then be updated.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Cascade's transmission and supply needs and system components may change from time to time. Such revisions will be incorporated in future updates of the Plan.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Environmental information has been prepared previously for several projects described in the Plan. Examples include the Tacoma Second Supply Project (a.k.a. Regional Water Supply System), the Tacoma-Cascade Pipeline and the Lake Tapps – White River Reservoir. Documents are listed as follows:

Cascade Water Alliance
Lake Tapps Reservoir Water Supply Project

- Environmental Checklist and State Environmental Policy Act (SEPA) Mitigated Determination of Nonsignificance (MDNS) – February 22, 2008

Cascade Water Alliance
Lake Tapps Reservoir, Issuance of New Municipal Water Rights and Change of Use for Existing Claim No.60822

- Determination of Significance and Request for Comments on Scope of Environmental Impact Statement and Environmental Checklist – June 30, 2008

Cascade Water Alliance
Lake Tapps Reservoir Water Rights and Supply Project

- Draft Environmental Impact Statement – January 29, 2010
- Final Environmental Impact Statement – June 16, 2010

Cascade Water Alliance
Cascade Regional Water Supply System, Tacoma-Cascade Pipeline

- Determination of Significance and Request for Comments on Scope of Environmental Impact Statement and Environmental Checklist – July 21, 2006
- Draft Environmental Impact Statement – December 21, 2006
- Final Environmental Impact Statement – April 26, 2007

City of Tacoma and King County, Washington
Pipeline No.5

- Draft Environmental Impact Statement – August 1987
- Final Environmental Impact Statement – June 1988

Tacoma Public Utilities
Second Supply Project (Pipeline No.5)

- Draft Supplemental Environmental Impact Statement – August 10, 1994
- Final Supplemental Environmental Impact Statement – October 18, 1994
- Addendum to Supplemental Environmental Impact Statement – April 28, 1995

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No specific applications for governmental approvals of other proposals are known at this time.

10. List any government approvals or permits that will be needed for your proposal, if known.

The Plan will be submitted to King County and the Washington Department of Health (WDOH) for review under King County Code (Title 13.24) and Washington Administrative Code (WAC) 246-290, respectively.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Cascade Water Alliance

The Cascade Water Alliance (Cascade) was created on April 1, 1999, through an Interlocal Agreement (Interlocal) among certain cities and special districts that own and operate public water systems (Members) in King County. Cascade was formed by its Members to jointly plan, develop and operate a water supply system for its Members. Each of these public water systems is authorized to provide water within its designated service area.

The Members of Cascade have entered into the Interlocal to enhance their ability to supply water to their respective service areas and the region by developing, owning, and operating regional water supply assets. Cascade serves solely as a regional supplier to its Members. Cascade does not serve water directly to the public, and does not plan to own or operate local distribution facilities. Cascade serves as an instrument of its Members by exercising certain essential governmental functions on their behalf as authorized by the Interlocal Cooperation Act (Chapter 39.34 RCW).

Members of Cascade include:

- City of Bellevue (Bellevue)
- City of Issaquah (Issaquah)
- City of Kirkland (Kirkland)
- City of Redmond (Redmond)
- City of Tukwila (Tukwila)
- Covington Water District (Covington)
- Skyway Water and Sewer District (Skyway)
- Sammamish Plateau Water and Sewer District (Sammamish Plateau)

Cascade is a non-profit corporation composed of municipal corporations and special purpose municipal corporations in King County that are party to an Interlocal Agreement entered into under the authority of the Interlocal Cooperation Act (Chapter 39.34 RCW) for the purpose of its Members working together to plan, develop and operate a water supply system and regional assets that will meet Cascade's Members' current and future drinking water needs.

The Interlocal identifies the purposes underlying the formation of Cascade, a few of which include:

- Provide a safe, reliable and high quality drinking water supply to meet the current and projected demands of its Members serving the Central Puget Sound Region and for non-Members as determined by Cascade, and to carry out this task in a coordinated, cost-effective and environmentally sensitive manner.
- Develop, contract for, manage, acquire, own, maintain, and operate water supply assets including, without limitation, surface water supplies, groundwater supplies, reclaimed water supplies and other water supply resources as determined by the Board;
- Contract with Seattle to transfer to Cascade and to modify Seattle's rights and duties with respect to Seattle Contract Purveyors;
- Contract for, or assume certain contractual rights and duties related to the Tacoma Second Supply Project;
- Purchase and provide water supply, transmission services, treatment facilities and other related services.

Cascade and its Members currently utilize a variety of water supply sources, including Members' independent supplies, wholesale water purchased by Cascade from Seattle Public Utilities (SPU), wholesale water purchased by Members from non-Member water purveyors, and a small amount of reclaimed water. Cascade has a wholesale purchase contract with Tacoma Public Utilities (TPU) but does not currently use water from this source. Cascade also holds water rights for the use of Lake Tapps, located in Pierce County, and anticipates developing Lake Tapps in the future for municipal water supply.

Cascade began providing wholesale water to its Members on January 1, 2004, via the wholesale agreement with SPU. Cascade will provide water to its Members through a combination of owned and contracted supply and transmission resources. Individual Members having ground water sources will continue to produce water to meet a portion of Cascade's needs. Together, these sources will provide supply for the immediate needs of Cascade Members. Over the long term, supply received from SPU will be partially replaced by other supplies such as wholesale purchases from TPU, water from Lake Tapps, reductions in demand from water conservation and/or other sources.

The overall goal of the Plan is to provide secure and reliable water supplies to Cascade Members through at least year 2050, in a fiscally responsible fashion. The Plan builds on the existing water supply management planning efforts included in the individual Members' water system plans and the King County Comprehensive Plan. The Plan is updated periodically (typically every six years) in accordance with state requirements for water system planning at Chapter 246-290-100 RCW.

Cascade Planning Process

The Plan is focused on specific goals for water supply and water resource management, while seeking to foster regional water planning partnerships. The primary steps in the Plan development process included:

- Develop planning objectives.
- List potential supply options.
- Screen for "fatal flaws."
- Evaluate remaining source options.
- Prepare 50-year demand forecast.
- Select options for further consideration.
- Assemble and evaluate combinations of sources (portfolios).
- Select preferred supply portfolio.

The planning process has included Cascade's Board committees, technical, financial and management staff from the Members, Cascade staff, and consultants retained to assist in the process. Cascade also convened the Cascade Connections Working Group comprised of a range of stakeholders, to provide input for Cascade's development of the Plan. The Working Group met six times during 2009 and 2010 to review Plan elements and provide input.

The Plan is a Non-Project Action under SEPA. Project Actions referenced by the Plan that have environmental impacts associated with the construction, maintenance, and operation of those site-specific projects either have been or will be evaluated under SEPA during the project review process.

12. **Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site**

plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The location covered by the Plan includes the Cascade Water Alliance Service Area (which is the service area of its Members: the Cities of Bellevue, Issaquah, Kirkland, Redmond and Tukwila; the Covington Water District; and the Sammamish Plateau and Skyway Water and Sewer Districts); facilities Cascade owns (including the White River-Lake Tapps Reservoir Project (the Reservoir Project) and the Bellevue-Issaquah Pipeline; and the Place of Use associated with the Reservoir Project water rights (the combined service areas described in the most recent Water System Plans approved by the Washington State Department of Health for Cascade, the City of Seattle and the City of Tacoma).

TO BE COMPLETED BY APPLICANT | **EVALUATION FOR AGENCY USE ONLY**

B. ENVIRONMENTAL ELEMENTS

The proposed adoption of Cascade's Plan is a Non-Project Action under SEPA, which includes decisions on policies, plans and programs, and is intended for long term planning purposes. The Plan refers to the development and utilization of transmission and water supply projects that either are, or may become components of the Cascade water supply system in the future.

Project Actions referenced by the Plan that have environmental impacts associated with the construction, maintenance, and operation of those site-specific projects either have been or will be evaluated under SEPA during the project review process.

Section B, Environmental Elements, which applies to specific Project Actions is not applicable to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other ……..

b. What is the steepest slope on the site (approximate percent slope)?

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

d. **Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.**

e. **Describe the purpose, type, and approximate quantities of any filling or grading proposed.**
Indicate source of fill.

f. **Could erosion occur as a result of clearing, construction, or use? If so, generally describe.**

g. **About what percent of the site will be covered with impervious surfaces after project**
construction (for example, asphalt or buildings)?

h. **Proposed measures to reduce or control erosion, or other impacts to the earth, if any:**

Sections 1(a) through 1(h) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

2. **Air**

a. **What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.**

b. **Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.**

c. **Proposed measures to reduce or control emissions or other impacts to air, if any:**

Sections 2(a) through 2(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

3. **Water**

a. **Surface:**

1) **Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

2) **Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

3) **Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

4) **Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.**

5) **Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

6) **Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge**

b. Ground:

1) **Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.**

2) **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

c. Water runoff (including stormwater):

1) **Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known).**

Where will this water flow? Will this water flow into other waters? If so, describe.

2) Could waste materials enter ground or surface waters? If so, generally describe.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Sections 3(a) through 3(d) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

4. Plants

a. Check or circle types of vegetation found on the site:

——— deciduous tree: alder, maple, aspen, other
——— evergreen tree: fir, cedar, pine, other
——— shrubs
——— grass
——— pasture
——— crop or grain
——— wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
——— water plants: water lily, eelgrass, milfoil, other
——— other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

c. List threatened or endangered species known to be on or near the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Sections 4(a) through 4(d) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

5. Animals

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

c. Is the site part of a migration route? If so, explain.

d. Proposed measures to preserve or enhance wildlife, if any:

Sections 5(a) through 5(d) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

6. Energy and natural resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Sections 6(a) through 6(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) **Describe special emergency services that might be required.**

2) **Proposed measures to reduce or control environmental health hazards, if any:**

b. Noise

1) **What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?**

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.**

3) **Proposed measures to reduce or control noise impacts, if any:**

Sections 7(a) through 7(b) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

8. Land and shoreline use

a. What is the current use of the site and adjacent properties?

b. Has the site been used for agriculture? If so, describe.

c. Describe any structures on the site.

d. Will any structures be demolished? If so, what?

e. What is the current zoning classification of the site?

f. What is the current comprehensive plan designation of the site?

g. If applicable, what is the current shoreline master program designation of the site?

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

i. Approximately how many people would reside or work in the completed project?

j. Approximately how many people would the completed project displace?

k. Proposed measures to avoid or reduce displacement impacts, if any:

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Sections 8(a) through 8(l) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

c. Proposed measures to reduce or control housing impacts, if any:

Sections 9(a) through 9(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

b. What views in the immediate vicinity would be altered or obstructed?

c. Proposed measures to reduce or control aesthetic impacts, if any:

Sections 10(a) through 10(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

b. Could light or glare from the finished project be a safety hazard or interfere with views?

c. What existing off-site sources of light or glare may affect your proposal?

d. Proposed measures to reduce or control light and glare impacts, if any:

Sections 11(a) through 11(d) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

b. Would the proposed project displace any existing recreational uses? If so, describe.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Sections 12(a) through 12(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

13. Historic and cultural preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

c. Proposed measures to reduce or control impacts, if any:

Sections 13(a) through 13(c) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

c. How many parking spaces would the completed project have? How many would the project eliminate?

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

g. Proposed measures to reduce or control transportation impacts, if any:

Sections 14(a) through 14(g) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Sections 15(a) through 15(b) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Sections 16(a) through 16(b) do not apply to the proposed adoption of Cascade's Plan. Please refer to Section D, Supplemental Sheet for Non-Project Actions, which provides general programmatic-level environmental impact information.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Michael A. Gagliardo

Michael Gagliardo, Director of Planning

Date Submitted: December 30, 2011

TO BE COMPLETED BY APPLICANT

EVALUATION FOR AGENCY USE ONLY

D. SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

The Transmission and Supply Plan ("Plan") is a Non-Project Action under SEPA. Project Actions referenced by the Plan that have environmental impacts associated with the construction, maintenance, and operation of those site-specific projects either have been or will be evaluated under SEPA during the project review process. The following paragraphs discuss potential impacts in a very general manner.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The construction of some of the proposed components of Cascade's water supply system may involve the creation and discharge of construction stormwater. Effects on surface waters during construction could include increased runoff volumes and increased peak flows. The construction of some facilities may also result in the creation of impervious surfaces and the associated runoff.

Impacts to air quality due to the construction of water system facilities could include temporary increases in particulate emissions that would depend on the level and type of activity, soil characteristics, weather, and equipment employed; carbon monoxide and oxides of nitrogen in the exhaust of construction equipment powered by gasoline and diesel engines; increases in the levels of carbon monoxide and oxides of nitrogen emitted from vehicles that are delayed while transiting through the work areas; and fugitive dust. Diesel or gasoline-driven emergency electrical generation equipment located at some facilities would produce emissions to the air as well, but only intermittently during routine testing or non-routine emergency events.

The production and release of toxic or hazardous substances is not anticipated. There would, however, likely be some storage and use of chemicals associated with the operation of water treatment facilities.

The construction, maintenance, and operation of proposed components of Cascade's water supply system would result in the production of noise.

Proposed measures to avoid or reduce such increases are:

Minimization of impacts to surface waters would be achieved through implementation of applicable BMPs and compliance with regulatory requirements and permit conditions (e.g. NPDES Construction Stormwater Permit).

Minimization of impacts to air quality would be achieved by keeping exposed soil damp by spraying with water, covering all truck loads, using wheel washers, removing particulate matter deposited on public roads, covering dirt and debris piles, properly maintaining equipment, and communications and coordination with the proponents of other projects and appropriate local jurisdictions regarding the scheduling and routing of construction truck traffic to help eliminate or reduce delays encountered by local traffic. Such mitigation and coordination are usually facilitated by the local jurisdiction through traffic management and mitigation plans, haul road agreements, and other permitting requirements.

Any necessary chemical storage would be designed to meet required safety and environmental regulatory requirements including secondary containment, leak detectors, alarms, and the use of plans for the prevention, containment, and clean-up of any spills.

Cascade would comply with applicable noise regulations.

2. **How would the proposal be likely to affect plants, animals, fish, or marine life?**

Transmission and water supply system components would not affect marine life. However, plants, animals, or fish could be affected by certain facilities depending on their location and function. Because buried transmission pipelines would comprise the majority of the system, the impacts would be temporary and limited to the construction period. For above-ground facilities such as pump stations and water treatment facilities, effects could extend beyond the construction period.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

The siting and design of system components would emphasize avoidance of impacts to plants, animals, and fish. Where complete avoidance was not possible, the principal of minimization would be stressed. Impacts would be mitigated and enhancement measures implemented, as appropriate. Generally, these protective provisions are set forth in land use codes, laws and regulations, permit conditions, and memoranda of agreement with local jurisdictions.

3. How would the proposal be likely to deplete energy or natural resources?

Transmission and water supply system components would consume, but not deplete, energy and natural resources.

Proposed measures to protect or conserve energy and natural resources are:

System components would be sited, designed, constructed, maintained, and operated to be as efficient as possible.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

None of the transmission and water supply system components are or would be located on prime farmlands, wild and scenic rivers, or wilderness. It is possible that some components could be located near or on, or traverse, environmentally sensitive areas. Pipelines could be routed through wetlands or floodplains. Parks, endangered species habitat, and historic or cultural sites would be avoided whenever possible.

Proposed measures to protect such resources or to avoid or reduce impacts are:

System components would be sited with the intent of avoiding all environmentally sensitive areas. If use of an environmentally sensitive area were necessary, the "footprint" and construction impacts of the component would be minimized. For example, in the case of a pipeline traversing a wetland, the following measures would be utilized to minimize impacts:

- Minimize trench width
- Minimize construction vehicle impact areas
- Segregate excavation spoils keeping topsoil separate
- Restore the disturbed wetland areas after pipeline installation
- Improve or enhance wetland vegetation, as appropriate
- Comply with work windows established by the resource agencies if working in the vicinity of the habitat of a threatened or endangered species.

Additional measures include, avoiding the construction of above-ground facilities in floodplains, using trenchless technologies for crossing significant fish-bearing water

courses, and observing "fish windows" set by fish agencies for work below the ordinary high water mark.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Transmission and water supply system components would neither affect land and shoreline use nor allow or encourage land or shoreline uses incompatible with existing plans.

Proposed measures to avoid or reduce shoreline and land use impacts are:

System components would comply with existing land use and shoreline management plans. The majority of the system would consist of underground water transmission pipelines that would be located in existing rights-of-way. When a pipeline alignment required passing through or in the vicinity of a shoreline, measures would be implemented to minimize construction impacts and to ensure proper restoration of the affected area. Construction of above-ground facilities in shoreline areas would be avoided whenever possible.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The construction, maintenance, and operation of transmission and water supply system components identified in the Plan would, to varying degrees depending on the specific facility and location, increase the demands on transportation, public services, and utilities. The increases should be insignificant, with the possible exception of the need for electrical power associated with the operation of pumps and water treatment equipment.

Proposed measures to reduce or respond to such demand(s) are:

Power consumption would be one criterion in selecting equipment. Also, to the extent possible, transmission system alignments would be chosen that would maximize the use of gravity flow and minimize the need for pumps to move water in the system.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Transmission and water supply projects identified in the Plan do not and will not conflict with local, state, or federal laws or requirements for the protection of the environment.

King County

Utilities Technical Review Committee
Department of Natural Resources and Parks
King Street Center
210 South Jackson Street, Suite 512
Seattle, WA 98104-3855
www.kingcounty.gov

February 17, 2012

Michael Gagliardo, Director of Planning
Cascade Water Alliance
11400 SE 8th Street, Suite 440
Bellevue, WA 98004

Dear Mr. Gagliardo:

Thank you for submitting the Cascade Water Alliance (Cascade), draft Transmission and Supply Plan (Plan) for King County approval. The Plan was received on January 9, 2012. In accordance King County Code (KCC) 13.24 the King County's Utilities Technical Review Committee (UTRC) has reviewed the Plan for consistency with the King County Comprehensive Plan and King County Code. In reviewing the Plan, the UTRC found that the Plan is consistent with the County's comprehensive plan and code.

We look forward to seeing the final Plan and working with you to secure the King County Council's approval. The Council's action represents King County's final action on the Plan and is the statement of consistency under Revised Code of Washington 43.20.260.

The County would like to take this opportunity to get some clarification from Cascade with regards to a franchise for the water transmission pipeline(s). As you know, Cascade applied for a franchise in November 2006, for a planned pipeline from near Covington to Bellevue. Cascade and the County had negotiated an agreement with a handful of remaining final issues for you to review with Cascade members. To date we have not received a formal response from Cascade to explain what happened in 2009 to date.

It appears with this Plan that your plans and pipeline routing have changed with regards to transmission lines. Currently, the Plan provides that a transmission link called Tacoma-Cascade Pipeline will be needed to convey supply from Tacoma Public Utilities and/or the Covington Water District and within the vicinity of the Covington Water District north to connect with existing SPU transmission lines at Lake Youngs Reservoir. The plan states that various configurations are possible for the Tacoma-Cascade Pipeline and it will be needed by 2024.

The Plan also mentions a project called Lake Tapps Project, Phase I. This would consist of a 30-mile 66-inch diameter pipeline sized to convey the peak flow associated with the Lake Tapps Project water right. The planned pipeline from Lake Tapps north to the vicinity of Bellevue appears to traverse the Kent Valley and also includes construction of a storage

reservoir near the north end of the pipeline and a booster pump station in the Kent Valley. The transmission line will be needed in 2030. The Plan notes that rights of way and some land acquisition will be required. As described, the Lake Tapps Phase I pipeline proposes a transmission path different than that applied for in the pending franchise application.

Given that pipelines proposed in the Plan are not needed for some time, it appears we have time to resolve franchise issues. What would be helpful is if Cascade could provide clarification regarding the need for the originally applied for franchise. If there is no longer a need for that franchise, we encourage Cascade to amend the originally applied for franchise application to reflect current plans or alternatively, withdraw it and start anew.

Often times the construction and/or maintenance of utility lines requires work within the road right-of-way for roads in unincorporated King County. When a utility has a proposed project within unincorporated King County, please contact the King County Department of Transportation (KCDOT), Road Services Division, Traffic and Engineering Services Section for coordination with the County's annual overlay program. Failure to do so may result in the denial of the permit to work within the right-of-way once an overlay of the road section has been completed. Although each utility has a set of construction standards and specifications for their projects, when construction and or maintenance of utilities requires work within the road right-of-way for roads in unincorporated King County, please be aware that the current edition of the King County Road and Construction standards apply to any installation or work in these rights-of-way. Not adhering to these standards could result in the installation of non specified and approved methods and/or materials that are out of the specifications for King County, and could potentially add additional costs to the purveyor for future repairs or adversely affect acceptance of those repairs/installations. The KCDOT- 2007 King County Road Design and Construction Standards can be found on the World Wide Web at http://www.kingcounty.gov/transportation/kcdot/Roads/EngineeringServices/RoadStandards2007.aspx

If you have any questions or concerns about any of the information in the letter, please do not hesitate to call me at 206-205-0817.

Sincerely,

Stephen Hirschey
Chair, Utilities Technical Review Committee

cc: Richard Rodriguez, Regional Planner, Washington State Department of Health

CASCADE
WATER ALLIANCE

July 23, 2012

Mr. Stephen Hirschey, Chair
Utilities Technical Review Committee
Department of Natural Resources and Parks
King Street Center
210 South Jackson Street, Suite 512
Seattle, WA 98104-3855

Dear Mr. Hirschey:

Thank you for your February 17, 2012 letter regarding the King County Utilities Technical Review Committee's (UTRC) review of Cascade's draft Transmission and Supply Plan (TSP) and the conclusion that the TSP is consistent with the County's comprehensive plan and code.

Cascade has prepared a final TSP document which has been revised from the draft to address the comments received from the City of Renton and the Department of Health. The revised TSP document also contains minor factual updates and clarifications.

As we discussed, Cascade's need for the Tacoma-Cascade Pipeline and Lake Tapps transmission pipelines are beyond the six-year planning horizon of this TSP. We have received the May 17, 2012 letter from B. Douglas Williams, Supervisor, Real Estate Services and agree that the file on the November 2006 franchise application can be closed. Cascade will submit a new franchise application when the pipeline projects are activated.

At its regular meeting on July 25, the Cascade Board of Directors will consider adoption of the final TSP. Once adopted by the Board, Cascade will forward a copy to you for King County Council action.

Sincerely,

Michael A. Gagliardo
Director of Planning

CC: Andrew Graham, HDR Engineering, Inc.
Richard Rodriguez, Washington Department of Health
B. Douglas Williams, King County Facilities Management Division

520 112th Avenue NE — Suite 400 — Bellevue, WA 98004
Phone: 425.453.0930 — Fax: 425.453.0953
Website: www.cascadewater.org

Denis Law
Mayor

City of Renton

Department of Community and Economic Development
Alex Pietsch, Administrator

January 31, 2012

Michael Gagliardo, Director of Planning
Cascade Water Alliance
11400 SE 8th Street, Suite 440
Bellevue, WA 98004

SUBJECT: Cascade Water Alliance Transmission and Supply Plan Determination of Non-Significance and SEPA Environmental Checklist

Dear Mr. Gagliardo:

Thank you for the opportunity to review the Determination of Non-Significance (DNS) and SEPA environmental checklist for the non-project six-year Cascade Water Alliance (CWA) Transmission and Supply Plan. The City of Renton's comments are noted below.

City of Renton Community Services staff participated in meetings and corresponded with consultants for the CWA relating to the Tacoma-Cascade Pipeline (TCP) or Lake Tapps Pipeline north of Tacoma SSP from 2005 to 2008. The focus was to make a connection from the south to the north which included going through Renton. During this time CWA's desired alignment was identified as being through Renton park-managed properties. The first preferred alternative was across/under the Cedar River Trail through the Maplewood Golf Course and the Cedar River Natural Area. Later the alignment was modified away from the golf course but under the Cedar River Trail, through Ron Regis Park and then north. Three alternative alignments through Ron Regis Park were identified along with a preferred alignment. Soil borings were conducted in Ron Regis Park to determine the best waterline locations. We understand that the project was placed on hold in 2008.

A concern we have consistently noted to CWA's consultant is that some property (and a portion of the golf course) was acquired with federal Land and Water Conservation Funds (LWCF). Because of this, the National Park Service would need to review and approve any project. Staff also noted the state WWRP funds were used in acquiring and developing the park land as well, also requiring state approval. In either area, it was highly likely that locating the pipeline in the park would require a federal and state conversion process (for loss of park land opportunity) and replacement land would need to be acquired by the Alliance. Very similar requirements would apply to the trail.

The current CWA plan does not provide specific routing information to allow us to provide detailed comments. We request that additional information be provided as it becomes available, and that Renton be notified for any specific routing and construction

that could affect properties within the city limits or our annexation area. In particular, we are concerned about specific impacts to park properties and how that could affect our funding restrictions.

In addition, we have the following specific comments regarding the Plan:

1. Page 5-20 notes the Tacoma Cascade Pipeline and potential ROW acquisition problems, urban development complications, etc. While this is a non-project plan document, there is no mention of the alignment within the City of Renton nor specific park impacts/funding restrictions. This discussion does not entirely coincide with the discussion on page 7-2 or the map on page 7-4.

2. Page 7-2 under Tacoma-Cascade Pipeline discusses a pipeline from the RWSS pipeline in the vicinity of the Covington Water District, north to connect with existing SPR transmission lines at the Lake Youngs Reservoir. Conveyance of treated Tacoma Public Utility/Covington water will be directed through existing Seattle Public Utilities lines to a point near the Eastside Reservoir in Bellevue. Rights of way and some land acquisition may be needed. While it appears that existing pipelines would be utilized, it does not coincide with the map on page 7-4.

3. Page 7-4 (map). The legend does not identify/clarify the yellow, orange, and purple dashed lines. If these dashed lines represent proposed alignments then it appears that the orange alignment through Renton is through Ron Regis Park. The map is also at such a small scale, the exact alignment cannot be discerned.

Again, we request that more detail be provided as it is available in order to determine whether City of Renton park properties (especially Ron Regis Park) would be impacted. If you have any questions regarding this letter, please contact me directly at jhenning@rentonwa.gov or 425.430.7286.

Sincerely,

Jennifer Henning, AICP
Planning Manager

cc: Alex Pietsch, CED Administrator
Terry Higashiyama, Community Services Administrator
Gregg Zimmerman, Public Works Administrator
Chip Vincent, Planning Director
Leslie Betlach, Parks/Planning/Natural Resources Director
Lys Hornsby, Utility Systems Director

CASCADE
WATER ALLIANCE

July 23, 2012

Ms. Jennifer Henning, AICP
Planning Manager
City of Renton
Department of Community and Economic Development
Renton City Hall
1055 South Grady Way
Renton, WA 98057

Dear Ms. Henning:

Thank you for your January 31, 2012 letter regarding the City of Renton's review of Cascade's draft Transmission and Supply Plan (TSP).

Cascade is aware of the constraints associated with routing a regional water transmission pipeline that could impact the Cedar River Trail, Maplewood Golf Course, the Cedar River Natural Area and/or Ron Regis Park. The preferred supply portfolio in the TSP does not require the Tacoma-Cascade Pipeline until approximately 2024. Additional routing studies, design and environmental review will be needed prior to finalizing the pipeline route. We currently anticipate these activities would begin in approximately 2020. The City of Renton will be consulted and provided with additional information related to specific routing and construction that could affect properties within the City limits as it becomes available.

In response to your specific comments, the TSP does not propose any specific pipeline alignments at this time. The descriptions and maps are general in nature. The legend for Figure 7.1 (the map on page 7-4) has been changed for the final TSP to better distinguish between existing and future pipelines.

If you have any questions regarding this information please contact me.

Sincerely,

Michael A. Gagliardo
Director of Planning

CC: Alex Pietsch, CED Administrator
Terry Higashiyama, Community Services Administrator
Gregg Zimmerman, Public Works Administrator
Chip Vincent, Planning Director
Leslie Betlach, Parks/Planning/Natural Resources Director
Lys Hornsby, Utility Systems Director
Andrew Graham, HDR Engineering, Inc.

520 112th Avenue NE — Suite 100 — Bellevue, WA 98004
Phone: 425.453.0930 — Fax: 425.453.0953
Website: www.cascadewater.org

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20435 72nd Avenue South, Suite 200, Kent, Washington 98032-2358

April 9, 2012

CHUCK CLARK
CASCADE WATER ALLIANCE
520 - 112TH AVENUE NE STE 400
BELLEVUE WA 98004

Subject: Cascade Water Alliance, ID# AA374
King County
Transmission Supply Plan
Submittal #12-0101

Dear Mr. Clark:

Thank you for submitting the Transmission System Plan (TSP) for the Cascade Water Alliance (Cascade) received in this office on January 3, 2012. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

General Comments

1. Please summarize the contractual obligations between the Cascade and its individual members.

2. Please discuss the Bellevue-Issaquah Pipeline (BIP) agreement relating to responsibilities for operations & maintenance and water quality monitoring activities.

3. Please describe the engineering and construction lead-time required for the Tacoma-Cascade Pipeline and Phase 1 of the Lake Tapps Project.

4. Please define and describe the basis for the CERU. What are the projected growth rates for each individual member utility within the six-year planning horizon in this TSP?

5. Please discuss current and future watershed monitoring and control activities and any coordination with surrounding municipalities or other entities that may affect water quality in the White River watershed as it relates to Lake Tapps.

6. Were there any significant 'lessons learned' about communication with your members from the initial TSP document that were used in the preparation of this current TSP?

7. Please provide any comments or issues from adjacent utilities, local land use authorities and other interested agencies or parties, and the responses provided by Cascade.

8. We understand that the map provided at the March 26th meeting replaces the service area map on page 1-3 of the TSP.

9. This document must bear the seal, signature, and date of a professional engineer licensed in the State of Washington. Please submit a signed certificate sheet which can be inserted into each document.

Please respond to the above comments in letter form by July 9, 2012. **It is not necessary to submit a revised WSP document.**

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents were adopted August 3, 2007 (WAC 246-290-990). The total cost is **$ 5,484.00**. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **WSDOH, Revenue Section, PO Box 1099, Olympia WA 99507-1099.**

If you have any questions please give me a call at (253) 395-6771, or Paige Igoe at (253) 395-6764.

Sincerely,

Paige Igoe, P.E.
Regional Engineer
NW Drinking Water Operations

Richard Rodriguez
Regional Planner
NW Drinking Water Operations

cc: Bob James, DOH
Steve Hirschey, King Co. UTRC
Jacque Klug, WSDOE, NRWO
Andrew Graham, HDR Engineering

CASCADE
WATER ALLIANCE

July 23, 2012

Paige Igoe, PE
Regional Engineer
Richard Rodriguez
Regional Planner
NW Drinking Water Operations
Department of Health
20435 72nd Avenue South
Suite 200
Kent, WA 98032-2358

Dear Ms. Igoe and Mr. Rodriguez:

Thank you for your April 9. 2012 letter to Chuck Clarke providing comments on Cascade's Transmission and Supply Plan (TSP). Cascade has prepared a final TSP document which has been revised from the draft to addresses the comments you provided as well as the comments received from the City of Renton and King County. The revised TSP document also contains minor updates which Cascade identified as appropriate.

At its regular meeting on July 25, the Cascade Board of Directors will consider adoption of the final TSP. Once adopted by the Board, Cascade will forward a copy to you for your approval.

Cascade's responses to the comments in your April 9 letter follow:

- Please summarize the contractual obligations between the Cascade and its individual members.

  The contractual obligations between Cascade and its Members are contained in Section 1.3 - Water Supply Policies of the final TSP. These policies are defined in the Cascade Joint Municipal Utility Services Agreement (formerly the Cascade Interlocal Contract) which is Appendix A to the TSP.

  Cascade completed the conversion to a municipal corporation in July 2012. Additional detail on the conversion is contained in Section 1.1 – History and Purpose of the final TSP.

- Please discuss the Bellevue-Issaquah Pipeline (BIP) agreement relating to responsibilities for operations & maintenance and water quality monitoring activities.

  Additional detail is provided in Section 2.10.1 of the final TSP.

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- Please describe the engineering and construction lead-time required for the Tacoma-Cascade Pipeline and Phase 1 of the Lake Tapps Project.

  Additional detail is provided in Section 7.1 of the final TSP. For the Tacoma-Cascade Pipeline we anticipate two years will be required from initiation of final design to the beginning of construction, and an additional two years will be needed from the start of construction to the time the pipeline is put in to service. For the Lake Tapps Water Supply project we anticipate three years will be required from initiation of final design to the beginning of construction, and an additional seven years will be needed from the start of construction to the time the pipeline is put in to service.

- Please define and describe the basis for the CERU. What are the projected growth rates for each individual member utility within the six-year planning horizon in this TSP?

  A description of the CERU basis has been added to Section 8.2 of the final TSP.

  The projected growth rates for each individual member utility within the six-year planning horizon are presented in the table below:

CERU Projections	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Projected CERU Counts:							
Bellevue	66,719	66,885	67,054	67,227	67,404	67,594	67,798
Covington WD	17,538	17,668	17,818	18,118	18,418	18,740	19,086
Issaquah	11,739	11,864	11,989	12,114	12,239	12,373	12,517
Kirkland	17,982	18,032	18,082	18,132	18,182	18,236	18,293
Redmond	31,267	31,517	31,767	32,042	32,342	32,664	33,010
Sammamish Plateau WSD	21,825	21,955	22,255	22,575	22,895	23,238	23,607
Skyway WSD	3,807	3,860	3,865	3,870	3,875	3,880	3,886
Tukwila	8,189	8,194	8,199	8,204	8,209	8,214	8,220
Total	179,064	179,973	181,027	182,280	183,562	184,939	186,418
Annual Growth In CERUs:							
Bellevue	166	169	173	177	190	204	219
Covington WD	130	150	300	300	322	346	371
Issaquah	125	125	125	125	134	144	155
Kirkland	50	50	50	50	54	58	62
Redmond	250	250	275	300	322	346	371
Sammamish Plateau WSD	130	300	320	320	344	369	396
Skyway WSD	53	5	5	5	5	6	6
Tukwila	5	5	5	5	5	6	6
Total	909	1,054	1,253	1,282	1,377	1,480	1,585

- Please discuss current and future watershed monitoring and control activities and any coordination with surrounding municipalities or other entities that may affect water quality in the White River watershed as it relates to Lake Tapps.

  Additional detail is provided in Section 6.5 of the final TSP.

- Were there any significant "lessons learned" about communication with your members from the initial TSP document that were used in preparation of this current TSP?

  Cascade used a number of techniques to promote effective communication with its Members in the preparation of this TSP. Specifically we held three workshops related to the planning process and plan development: Planning Objectives Workshop; Demand Forecasting and Source Criteria Workshop; and Supply Portfolio Workshop. Through these workshops, Cascade Members (elected officials and staff) received detailed briefings and provided input on major planning activities. Cascade also used its Standing Committees and regular Member Staff meetings to discuss key issues over the course of the planning effort.

- Please provide any comments or issues from adjacent utilities, local land use authorities and other interested agencies or parties, and the responses provided by Cascade.

  Comment letters were received from the City of Renton and King County. These letters and Cascade's responses are provided in Appendix J – SEPA Documentation of the final TSP.

- We understand that the map provided at the March 26th meeting replaces the service area map on page 1-3 of the TSP.

  The map on page 1-3 of the draft TSP (Figure 1-1) has been replaced in the final TSP. All other maps in the final TSP have been updated (as appropriate) to be consistent with Figure 1-1.

- This document must bear the seal, signature, and date of a professional engineer licensed in the State of Washington. Please submit a signed certificate sheet which can be inserted into each document.

  The final TSP document will bear the seal, signature, and date of a professional engineer licensed in the State of Washington.

In addition to the above, the following revisions have also been made in the final TSP:

- Section 6.4 – Lake Tapps Project Contract Operator Transition was updated to reflect the completion of the transition.
- Section 7.3 – Costs of Supply Portfolio has been updated to reflect the Cascade's planned buy-back of Regional Capital Facilities Charges (RCFC's) from its Members at a cost to Cascade of $10 million.
- Section 8.3 – Cascade's Near-term Financial Forecast, Section 8.4 – Cascade Capital Funding Strategy and Section 8.5 – Projected Cascade Member Charges have been updated to reflect current information.
- Appendix J – SEPA Documentation has been included.
- Appendix K – Water Right Self-Evaluation Tables has been included.

If you have any questions about the final TSP please contact me.

Sincerely,

Michael A. Gagliardo
Director of Planning

CC: Andrew Graham, HDR Engineering, Inc.
Steve Hirschey, King County, UTRC
Jacque Klug, WSDOE, NRWO
Bob James, DOH