
Chapter 9

Reclaimed Water Program

Reclaimed water is wastewater treated to such a high level that it can be used safely and effectively for many purposes. Production and use of reclaimed water can help King County to better manage its effluent and provide regional benefits such as reducing effluent discharges to Puget Sound and increasing flows for fish in local streams.

RWSP water reuse policies call for King County to pursue the use of reclaimed water and to develop a water reuse program. Water reuse is also a component of the RWSP treatment plant policies. These policies call for continued reuse at existing facilities and for exploration of opportunities for expanded reuse at existing treatment facilities and reuse at all new facilities. In addition, RWSP policy calls for the county to support regional water supply agencies and water purveyors in their public education campaign on the need and ways to conserve water.

This chapter describes the county's Reclaimed Water Program accomplishments in 2007 and anticipated activities for 2008.

9.1 Reclaimed Water from Existing Facilities

King County's reclaimed water program is over 10 years old. The Wastewater Treatment Division (WTD) has been safely using reclaimed water since 1997 at the South and West Point plants. The plants used 294 million gallons of reclaimed water for landscape irrigation, internal plant reuse, and other non-drinking purposes in 2007. The South plant, which produces approximately 99 million gallons per year of Class A reclaimed water, distributes some of this water offsite to the King Conservation District Wetland Nursery and Fort Dent Park sports fields for irrigation during the summer months.¹

As called for in RWSP treatment plant policies, WTD is exploring ways to expand reclaimed water use at and in the vicinity of the South and West Point plants. An agreement to extend the reclaimed water distribution line from South plant to Foster Golf Links was approved by the City of Tukwila's utility committee and is expected to be on the agenda for city council approval in July 2008. If approved, the extension is scheduled to be built in fall 2008. Construction will be managed by the City of Tukwila.

¹ "Class A Reclaimed Water" is reclaimed water that, at a minimum, is at all times an oxidized, coagulated, filtered, and disinfected wastewater. Allowed end uses of Class A reclaimed water are irrigation of food and non-food crops and irrigation of open access areas, such as parks. The water could also be used for industrial cooling and process water and other non-drinking-water (non-potable) uses.

9.2 Reclaimed Water from New Facilities

In 2007, WTD made progress on developing reclaimed water projects associated with new treatment facilities. Both the Brightwater Treatment Plant and Carnation Wastewater Treatment Facility will use membrane bioreactor technology (MBR) to produce reclaimed-quality effluent when they come online in 2011 and 2008, respectively. Reclaimed water distribution pipelines are under construction to bring water south from the Brightwater plant through Bothell to the Sammamish Valley and west as far as I-5 in Shoreline. Enhancements of a nearby wetland and distribution pipe from the Carnation facility to the wetland were completed in 2007 to prepare for eventual discharge of effluent to the wetland.

9.2.1 Brightwater Reclaimed Water Pipeline

As much as 21 mgd of the wastewater treated at the new Brightwater Treatment Plant will meet reclaimed water standards and can be safely recycled for irrigation and industry. In late 2005, the King County Council approved funding for the Brightwater reclaimed water “backbone” (Figure 9-1). The backbone will consist of reclaimed water pipes in tunnels already being built for the Brightwater conveyance system (West Segment of the backbone) and will install new pipe from the Brightwater Influent Pump Station to the North Creek Pump Station, convert an existing 4.5-mile wastewater pipe to the York Pump Station, and install new pipe to carry reclaimed water to the Sammamish Valley (South Segment).

In 2007, WTD initiated construction of the reclaimed water pipes in the Brightwater tunnels and made headway on engineering design, environmental review, and permitting for conversion of the existing 4.5-mile wastewater pipe and construction of new pipe to distribute reclaimed water to the Sammamish Valley. Completion of final design, acquisition of permits, and award of a construction contract for these portions of the South Segment are anticipated in 2008. Construction of the new portion of the South Segment to the North Creek Pump Station will begin in 2008.²

WTD is identifying and working with customers to be served by the South Segment of the backbone. Discussions were initiated with the City of Bothell regarding the feasibility of distributing reclaimed water in the city. WTD and the city agreed to develop and enter into a memorandum of agreement (MOA), expected to occur in 2008, to carry out a feasibility study.

² Also see Chapter 2 of this report for information on the Brightwater reclaimed water backbone.

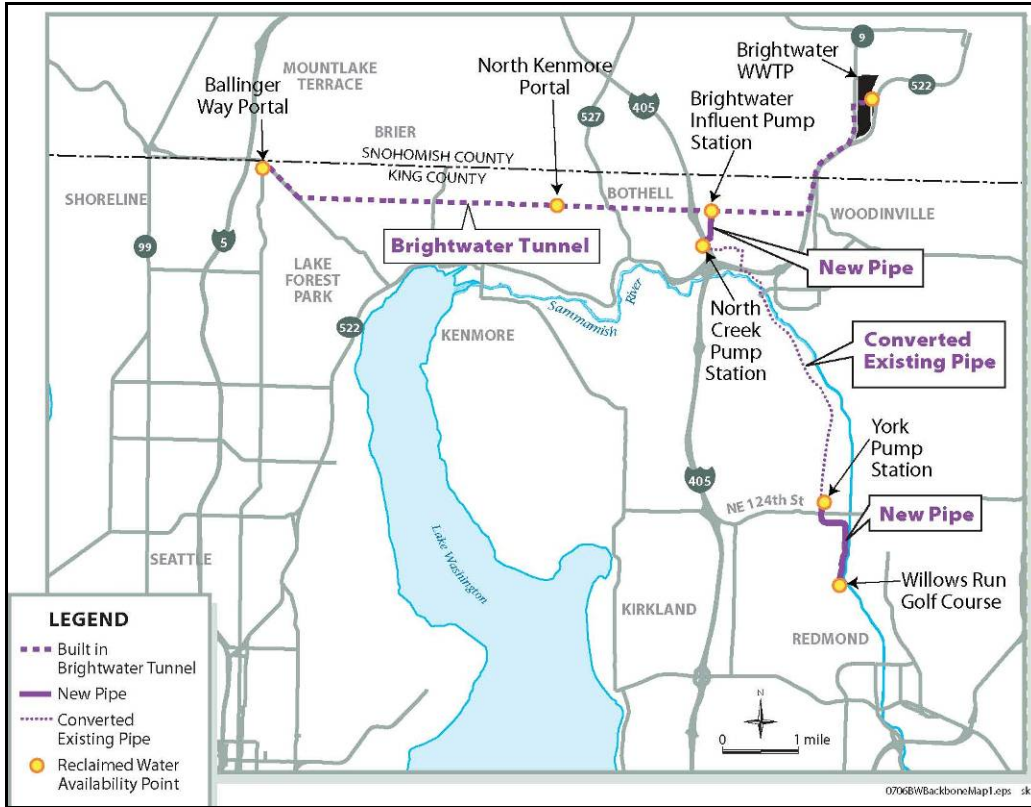


Figure 9-1. Brightwater Reclaimed Water System

9.2.2 Wetland Enhancement for Discharge from the Carnation Treatment Facility

The Carnation Wastewater Treatment Facility will produce reclaimed water that will be used to enhance a wetland in the Chinook Bend Natural Area (Figure 9-2). WTD is partnering with Ducks Unlimited, a non-profit group dedicated to wetland conservation, to develop the wetland enhancement. Ducks Unlimited completed construction of the wetland enhancement in October 2007. WTD completed construction of the reclaimed water distribution line to the Chinook Bend Natural Area in 2007. After treatment facility startup is complete and a Washington State reclaimed water use permit has been issued, the wetland will become the primary discharge location for reclaimed water.

See Chapter 6 of this report for more information on the wetland enhancement project.

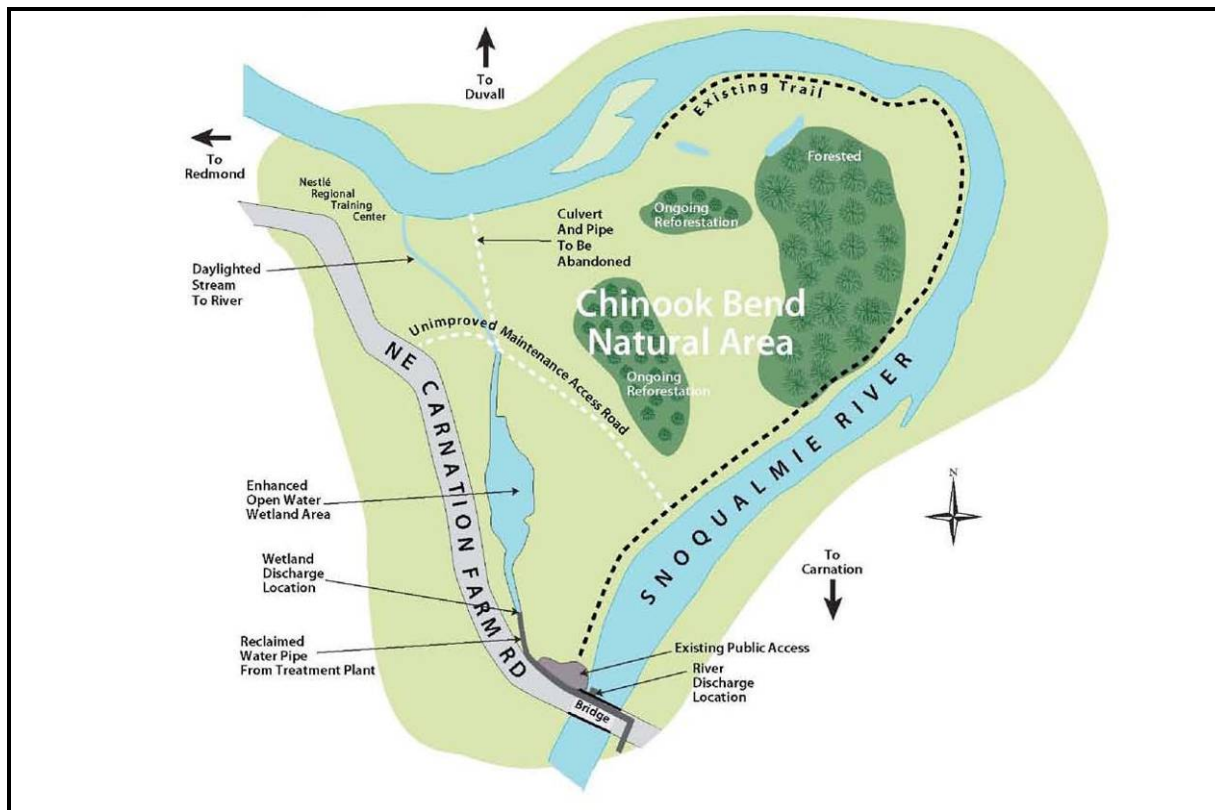


Figure 9-2. Components of the Chinook Bend Natural Area Wetland Enhancement

9.3 Reclaimed Water Studies

In 2007, King County completed two studies to aid in developing its reclaimed water program: a reclaimed water feasibility study to meet RWSP policy objectives and a study to explore reclaimed water options in the Green River Valley. The county also agreed to work with the Covington Water District on exploring the feasibility of reclaimed water facilities in the district.

9.3.1 Reclaimed Water Feasibility Study

In 2007, WTD prepared a reclaimed water feasibility study to meet the provisions of RWSP Water Reuse Policy-2 (WRP-2).³ Provisions call for reviews of reclaimed water technologies, revenue sources, markets, and environmental and regional benefits. The general approach for completing each of these reviews was as follows:

- The reviews of reclaimed water treatment technologies and revenue sources relied in part on case studies that highlight the types of treatment technologies used in Washington and other states, including construction and operations costs for these technologies, and how reclaimed water producers are funding and recovering costs for reclaimed water systems.

³ The study was submitted to the King County Council in spring 2008.

- The market analysis update identifies potential users based on review of available data, on proximity to reclaimed water sources, and on interviews and focus groups conducted for the feasibility study.
- The environmental and regional benefits are presented in terms of wastewater and water resource management challenges in the region, including reducing wastewater discharges to Puget Sound, protecting threatened and endangered fish species, and preparing for uncertainties associated with climate change, population growth, and other unknowns.

Information from these reviews was used to show how the economic framework, developed by WaterReuse Foundation, can be used as a tool for evaluating the costs and benefits of reclaimed water and determining the feasibility of potential projects.⁴

Overall findings of the feasibility study are as follows:

- Reclaimed water is an effective wastewater management tool.
- Reclaimed water technologies in use at West Point and South Treatment Plants and planned for the Carnation and Brightwater Treatment Plants are highly effective.
- Benefit-cost analysis and tools like the WaterReuse Foundation's framework should be used to evaluate projects.
- Sources of revenue are varied and may be increasing at state and federal levels.
- Feasible projects would include one or more of the following characteristics:
 - Reclaimed water is a requirement or a secondary benefit of new or upgraded wastewater facilities.
 - Reclaimed water demand is close to supply.
 - Reclaimed water will mitigate or benefit another environmental objective for which others will contribute to costs.
- Public education and research/development are essential to maintain public support for reclaimed water.
- A comprehensive reclaimed water plan is needed that identifies and prioritizes water resource management needs for a full range of beneficial uses.

The reclaimed water feasibility study is part of a continuum in developing a reclaimed water program for King County. It offers methods for analyzing reclaimed water projects more systematically and enables the county to focus on areas where there is the greatest potential to implement feasible projects. Subsequent efforts, including a reclaimed water comprehensive plan to be developed over the next couple of years, will build on the work of this feasibility study and supply information not included in its scope. Information on the comprehensive plan is provided later in this chapter.

⁴ The WaterReuse Foundation is an educational, nonprofit, public-benefit corporation that serves as a centralized organization for the water and wastewater community to advance the science of water reuse, recycling, reclamation, and desalination.

More information the Reclaimed Water Feasibility Study is available on the Web:
<http://dnr.metrokc.gov/wtd/reuse/docs/FeasibilityStudy/index.htm>.

9.3.2 Green River Reclaimed Water Study

In 2007, WTD completed a preliminary analysis of reclaimed water options in the Green River Valley to answer questions raised by the Cities of Auburn, Covington, Kent, Renton, and Tukwila. The key questions addressed in the study are as follows:

- What treatment processes and equipment are necessary to produce and deliver Class A reclaimed water to the Green River Valley?
- How much reclaimed water might be made available through each production/delivery scenario?
- What can be estimated about the relative capital and operating costs for each production/delivery scenario?
- What appears to be the most feasible approach to producing and delivering reclaimed water in the Green River Valley based on preliminary estimated costs, capacities, demands, and operational issues?

The study considered various delivery options, including a South plant backbone, satellite reclaimed water polishing plants, and satellite reclaimed water treatment plants. Preliminary cost estimates and analysis of ability to meet reclaimed water demands were prepared for each delivery option. Cost and flexibility to support various demand, distribution, and supply needs were key criteria used in the analysis.

Of the three scenarios assessed, the South plant backbone appears to be the most cost-effective overall and offers the greatest flexibility to support varied reclaimed water demand, distribution, and supply needs. This preliminary finding was based on best available estimates and assessments. The study recommended further refinement and development as reclaimed water options for the Green River Valley are reviewed and considered. WTD plans to do this during development of the reclaimed water comprehensive plan.

9.3.3 Covington Feasibility Study

In 2007, King County and the Covington Water District signed an MOA to jointly study the feasibility of developing reclaimed water facilities. Implementing the MOA in 2008 will include focusing on updating the 2006 *Covington Water District Water Reuse Feasibility Report* with current WTD flow data. Future work under the MOA will be used to inform WTD's reclaimed water comprehensive plan and will be coordinated with other local agencies in southeast King County.

9.4 Public Outreach

Public education activities in 2007 included support of reclaimed water and water conservation Web sites and inclusion of reclaimed water and water conservation education in tours of King County wastewater treatment plants.

In June 2007, King County and the Pacific Northwest Clean Water Association cosponsored a conference “Reclaimed Water: Tapping the New Resource.” The conference brought together 260 representatives from jurisdictions, agencies, and environmental groups in Washington State to discuss reclaimed water issues. It received positive reviews from attendees.

9.5 Reclaimed Water Comprehensive Plan

The King County Council approved development of a reclaimed water comprehensive plan in the 2008 budget adopted in November 2007. The reclaimed water comprehensive plan will define WTD’s reclaimed water business plan both near term (next 10 years) and long term (next 30 years). The plan is being developed to find ways to manage treated effluent as a water resource and reduce the amount of effluent discharged to Puget Sound from WTD’s wastewater treatment system. It is expected to result in amendments to the existing RWSP water reuse policies. Operation of WTD’s existing regional reclaimed water program will continue while the plan is being developed.

Stakeholders, including regional leaders, industrial and commercial organizations, interest groups, organizations, and the general public, will be involved throughout the planning process. These stakeholders will assist in shaping the plan through individual interviews and a series of workshops. Each stakeholder will be interviewed multiple times to gather information on a variety of topics including reclaimed water uses, alternatives development, and alternatives analysis. Up to four workshops will be held with all stakeholders together to present analytical findings and information gathered through stakeholder interviews.

Development of a draft reclaimed water comprehensive plan that reflects the input of all stakeholders is expected to take two years (2008 and 2009) to complete. In 2010, the draft plan will be issued for public review and comment. In 2011, the King County Executive will transmit a final plan to the council for consideration and approval.

9.6 Schedule for 2008

The following reclaimed water activities are planned for 2008:

- Continue construction of the reclaimed water backbone in the Brightwater East and West Tunnels. The schedule for construction of this portion of the reclaimed water pipeline is included in and coincides with the East and West Tunnel construction schedules (see Chapter 2).

- Complete final design, acquire permits, and award construction contract for conversion of the existing 4.5-mile pipe and construction of new reclaimed water pipe to distribute reclaimed water to the Sammamish Valley (see Chapter 2).
- Begin construction of the new reclaimed water pipe between the Brightwater Influent Pump Station and the North Creek Pump Station.
- Continue to identify and work with reclaimed water customers.
- Start up the Carnation Wastewater Treatment Facility; submit and receive approval of a reclaimed water use permit application from the Washington State Departments of Health and Ecology; and begin discharge of reclaimed water to enhance the wetland at the Chinook Bend Natural Area once the permit is issued.
- Begin to develop the reclaimed water comprehensive plan, including interviewing stakeholders and holding a workshop on policy criteria to guide development and evaluation of reclaimed water alternatives.

For more information on the Reclaimed Water Program, visit <http://dnr.metrokc.gov/wtd/reuse/>.

For more information on the Water Conservation Program, visit <http://dnr.metrokc.gov/WTD/waterconservation/>.