6. Water Reuse and Reclamation

This chapter summarizes the City's efforts regarding evaluation of the potential for reclaimed water to be a beneficial component of its wastewater management strategy. The regulatory framework surrounding water reclamation is described, followed by a summary of prior and concurrent reuse-related study efforts. The potential for water reuse within the City's service area is also examined, along with options for reclaimed water system configurations. The chapter concludes with an approach to future considerations regarding this water resource management tool.

6.1. Regulatory Framework

The State has identified reclaimed water as an important water resource management strategy that can offer benefits related to potable water supply, wastewater management, and environmental enhancement. The State's Reclaimed Water Act was approved by the legislature in 1992, codified as Chapter 90.46 RCW, and was amended in 1995. RCW 90.46.010 defines "reclaimed water" 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." This law supports the beneficial reuse of reclaimed water for consumptive applications (such as irrigation, commercial and industrial process use, etc.) and non-consumptive purposes (including groundwater recharge via surface percolation or direct injection, wetland enhancement, and streamflow augmentation).

Water reclamation projects are reviewed and permitted jointly by the State Department of Health (DOH) and the Department of Ecology (Ecology). DOH and Ecology have developed standards that guide the planning and development of reclaimed water projects and systems. These standards, summarized in the jointly published *Water Reclamation and Reuse Standards (September 1997)*, describe the allowable beneficial uses of reclaimed water and the required levels of treatment appropriate for each use. In Washington, there are four classes of reclaimed water: A, B, C, and D. Class A reclaimed water represents the highest level of treatment, referring to water that is oxidized, coagulated, filtered, and disinfected to certain standards. Of all levels of reclaimed water, Class A is acceptable for the widest range of uses.

The City has acknowledged the State's acceptance and promotion of reclaimed water as being a viable and important water resource management tool. A goal currently being considered for addition to the City's Comprehensive Plan (within the Utilities Element) pertains to exploring options for the City to create and utilize Class A reclaimed water at the Wastewater Treatment Plant, and evaluating the benefits and potential uses for reclaimed water throughout the City. This goal is consistent with the State's Growth Management Act and countywide planning policies, and furthers the purpose of the City's Comprehensive Plan by identifying opportunities to generate higher quality effluent from the Wastewater Treatment Plant.

6.2. Other City Reclaimed Water Planning Efforts

The City has previously explored the feasibility of implementing a reclaimed water program. Chapter 10 of the 2002 Wastewater Comprehensive Plan provided a discussion of reclaimed water regulations, identified potential reclaimed water uses in the City, considered system improvements necessary to produce and distribute reclaimed water from the Wastewater Treatment Plant, and provided an economic analysis of the feasibility of reuse.

Concurrent to developing this 2009 update of the Wastewater Comprehensive Plan, the City is also updating its Water System Plan (WSP). Per Municipal Water Law requirements, that WSP Update includes a discussion of the potential for implementation of a reclaimed water program.

Through these other efforts, City staff have continued to refine potential options for a reclaimed water program. Staff have briefed the City Council on the role that reclaimed water could potentially play in the future management of the City's wastewater. While no additional analysis of reclaimed water was conducted as part of this Wastewater Comprehensive Plan update, future consideration of reuse possibilities is captured in the capital improvement program.

6.3. Potential for Use of Reclaimed Water in the City

As noted above, the State's Water Reclamation and Reuse Standards define the permitted uses for reclaimed water. Class A reclaimed water is acceptable for a wide range of applications, including landscape and turf irrigation, as well as environmental enhancement (e.g., wetland creation and aquifer recharge). The 2002 Wastewater Comprehensive Plan identified potential landscape irrigation application sites located in proximity to the City's Wastewater Treatment Plant. These included Grandview Forest Park, the Gig Harbor High School/Peninsula Joint Use Park, the City Park at Crescent Creek and the Haven of Rest Cemetery. In addition, the jetting of sanitary and storm sewers was identified as a potential use of reclaimed water produced at the treatment plant.

During development of the 2009 Water System Plan Update, this list of potential application sites was expanded to include areas further away from the Wastewater Treatment Plant, given that the use of satellite reclaimed water production facilities may result in an increased level of reclaimed water use. Table 6-1 provides a summary of the reclaimed water use potential identified during that analysis. The total identified annual reclaimed water use potential is approximately 58.4 million gallons. The largest identified use is aquifer recharge. Further detail is provided in the Water System Plan Update.

Table 6-1. Summary of Potential Reclaimed Water Use Opportunities[1]

Potential Use (No. of Sites)	Use Period, Months (Days/Month)	Hours of Pumping per Day	Pumping Rate, gpm	Estimated Annual Reclaimed Water Use, MG
Cemeteries (1)	4 (30)	8	20	1.15
Parks (3)	4 (30)	3	15	0.97
Playgrounds (2)	4 (30)	3	10	0.43
School Yards (4)	4 (30)	4	15	1.73
Street Sweeping	12 (3)	8	5	0.09
Dust Control	6 (20)	6	50	2.16
Aquifer Recharge	12 (30)	12	200	51.84
TOTAL				58.37

gpm = gallons per minute; MG = million gallons

1. Source: City's 2009 Water System Plan Update.

6.4. Options for Reclaimed Water System Configurations

Reclaimed water systems have three primary components: a production (treatment) facility, transmission and distribution infrastructure (pumps and pipes), and end use sites (as described above). In terms of reclaimed water production, there are generally two options available to the City: centralized versus decentralized facilities.

A centralized approach to reclaimed water production involves expanding the City's Wastewater Treatment Plant to include the additional level of treatment needed to generate Class A reclaimed water. This would involve the installation of filtration equipment or a membrane bioreactor (MBR). MBR technology combines biological treatment processes with membrane filtration to remove organic contaminants and nutrients while also physically separating suspended solids from the water. Additional modifications to the existing facility regarding disinfection and controls would also likely be required.

By comparison, a decentralized approach involves the strategic installation of smaller, satellite reclaimed water production facilities further upstream in the wastewater conveyance system. Typically located at wastewater flow convergence points or lift stations, these facilities are used to capture wastewater flows from certain basins, and then generate reclaimed water for use in those areas. While a range of treatment approaches may be employed at a satellite facility, many utilities are implementing MBR technology in these types of applications, due to the small footprint required relative to other, more conventional forms of wastewater treatment.

The primary benefits of the centralized approach include maximizing the reclaimed water production potential (i.e., all wastewater flows generated in the City may be available for conversion to reclaimed water), and employing the existing treatment processes and facilities already in place. However, a centralized approach is often accompanied by high transmission/distribution costs associated with the pump stations and pipelines needed to convey the generated reclaimed water to use sites.

While the volume of reclaimed water generated at satellite facilities is often less than that produced at central wastewater treatment plant sites, the reclaimed water conveyance costs can often be much less, as the production facilities are in closer proximity to use sites. An additional benefit of satellite facilities is the reduction in wastewater flows to the central Wastewater

Treatment Plant. This can defer or eliminate the need to upsize conveyance facilities (especially in sewer basins where significant growth is expected), reduce operating costs associated with lift station pumping, and defer or eliminate the need to expand capacity at the central Wastewater Treatment Plant.

The City has the potential to implement either or both of these approaches if reclaimed water continues to be pursued. City staff have preliminarily identified areas at the current Wastewater Treatment Plant where additional filtration or MBR facilities could be located. In addition, staff have identified three potential satellite reclaimed water production sites, based upon amount of current and projected wastewater flow, and proximity to potential use sites. These three sites are identified in figure included in Appendix B and are described briefly below.

- **Lift Station No. 12**. A satellite reuse facility at this location has the potential to reduce flows to the Wastewater Treatment Plant by approximately 200,000 gpd. Potential uses of reclaimed water generated at this site include irrigation at the Canterwood Golf Course, stream augmentation, and use at an active construction gravel pit.
- **Lift Station No. 8A**. A reuse facility at this location would process wastewater flows from future growth in sewer basin 8A, and has the potential to reduce flows to the Wastewater Treatment Plant by 125,000 gpd. Primary use locations would include the Madrona Links Golf Course and the Tacoma Narrows Airport.
- **Lift Station No. 1**. A recently purchased property near this location could potentially be used for a satellite reuse facility that would process wastewater flows from future development in East Gig Harbor and generate 25,000 gpd of reclaimed water. Primary uses might include stream augmentation of Crescent Creek and irrigation at City Park.

Additional analysis is required to fully evaluate the costs and benefits associated with satellite facilities at these potential locations.

6.5. Future Planning Efforts

The City acknowledges the value a reclaimed water program might offer in the future, especially with regard to the following needs and objectives:

- Meeting effluent requirements that may become more stringent, particularly with regard to the protection and enhancement of Puget Sound.
- Optimizing Wastewater Treatment Plant capacity.
- Managing potable water withdrawals.
- Offsetting and mitigating for additional water rights.
- Enhancing local area surface and ground waters.

Therefore, although not planning for specific capital improvements related to reclaimed water, the City will continue to consider the costs and benefits of various types of reclaimed water programs and how they may best fit within the City's water resource management strategy. The Capital Improvement Program outlined in Chapter 7 includes budgeted resources to support such future evaluations.