Regional Wastewater Services Plan

2004 Update

Wastewater Treatment Division

April 2004

0403RWSPcover.eps

RAY HELLER

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Regional Wastewater Services Plan 2004 Update

April 2004

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

For comments or questions, contact:
Laura Wharton
King Street Center
201 S. Jackson
M.S. KSC-NR-0512
Seattle, WA 98104-3856
206-684-1238
laura.wharton@metrokc.gov

RWSP 2004 Update

Alternative Formats Available
206 684-1280 TTY Relay: 711

Contents

Tables

Figures

Acronyms and Abbreviations

AMSA	Association of Metropolitan Sewerage Agencies
AWV	Alaskan Way Viaduct
AWWF	average wet-weather flow
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMOM	Capacity Management, Operations, and Maintenance
CSI	Conveyance System Improvement
CSO	combined sewer overflow
DNRP	Department of Natural Resources and Parks
DNS	Determination of Non-Significance
DOT	(King County) Department of Transportation
E&P	Engineering and Planning (subcommittee of MWPAAC)
EBDRP	Elliott Bay/Duwamish Restoration Program
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPP	Executive's Preferred Plan
ESA	Endangered Species Act
ETS	effluent transfer system
FAZ	forecast analysis zone
GC/CM	general contractor/construction manager
G-DWQA	Green-Duwamish Water Quality Analysis
GMA	Growth Management Act
gpad	gallons per acre per day
gpcd	gallons per capita per day
gped	gallons per employee per day
HCP	Habitat Conservation Plan
I/I	inflow and infiltration
MBR	membrane bioreactor
MG	million gallons
mgd	million gallons per day
MOA	memorandum of agreement
MOSS	Marine Outfall Siting Study
MOU	memorandum of understanding

MWPAAC	Metropolitan Water Pollution Abatement Advisory Committee
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OMP	Operational Master Plan
PBT	Persistent, Bioaccumulative, and Toxic
PSRC	Puget Sound Regional Council
RCE	residential customer equivalent
RCW	Revised Code of Washington
RI/FS	remedial investigation and feasibility study
RWQC	Regional Water Quality Committee
RWSP	Regional Wastewater Services Plan
SEPA	State Environmental Policy Act
SMP	sediment management plan
SSES	sewer system evaluation survey
SSO	sanitary sewer overflow
SWAMP	Sammamish-Washington Analysis and Modeling Program
SWD	Solid Waste Division
TAZ	traffic analysis zone
TMDL	total maximum daily load
USFWS	U.S. Fish and Wildlife Service
VE	value engineering
WAC	Washington Administrative Code
WEF	Water Environment Federation
WERF	Water Environment Research Foundation
WLRD	Water and Land Resources Division
WTD	Wastewater Treatment Division
WQA	water quality assessment
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

Chapter 1
Introduction

In November 1999, the Metropolitan King County Council adopted the Regional Wastewater Services Plan (RWSP) as an amendment to the King County Comprehensive Water Pollution Abatement Plan. The RWSP serves as the policy basis for a capital improvement program for providing wastewater management services to this region through 2030 and beyond. This update report summarizes the first four years of RWSP implementation, from 2000 through 2003.

History and Purpose of the RWSP

In the 1990s, King County predicted that by 2030 an additional 56 million gallons of wastewater treatment capacity would be required to meet the needs of this region's growing population. The County developed four service strategies to meet this need and presented them to the public in May 1997 in the *Draft Regional Wastewater Services Plan*. The King County Executive outlined his preferred strategy in the April 1998 *Regional Wastewater Services Plan—Executive's Preferred Plan (EPP).* This strategy calls for a new regional treatment plant to be located in the north portion of the service area—an area of rapid population growth. The King County Council and its Regional Water Quality Committee (RWQC) reviewed the EPP and recommended several amendments.[1] The Council adopted the RWSP in Ordinance 13680 on November 29, 1999. The ordinance became effective on December 13, 1999.

The mission of the RWSP is to protect public health and the environment. The Wastewater Treatment Division (WTD) carries out this mission by conveying and treating wastewater and by reclaiming wastewater byproducts for residents living in the King County wastewater service area, which includes portions of King, Pierce, and Snohomish Counties. With guidance from citizens, stakeholders, and RWQC, King County developed several objectives for implementing the RWSP:

- Remain consistent with the King County comprehensive plan and state Growth Management Act.
- Maximize the public's existing investment in the wastewater system.
- Reduce wastewater flow and solids through demand management programs, conservation, and coordination of services with wastewater utilities outside of King County's service area.
- Locate wastewater facilities designed to serve new growth where that growth is occurring.
- Design and construct the wastewater system to meet regulatory requirements.
- Preserve and enhance water quality and protect public health.

[1] RWQC is a committee to the Council composed of members from the Suburban Cities Association, City of Seattle, Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC), and the King County Council.

- Provide maximum flexibility to respond to population growth and regulations.
- Provide opportunities to recycle treated wastewater and help meet water supply needs for people and for fish.
- Minimize impacts on ratepayers and provide reasonable equity.

An Operational Master Plan (OMP) was submitted to Council in 2000, as required by King County Code 4.04.200 C.1 and section 18 of Ordinance 13680. The OMP specifies how the RWSP is to be implemented and defines performance measures for assessing implementation progress.

Elements of the RWSP

The RWSP includes policies that direct the operation and further development of King County's wastewater system. It identifies needs through 2030 and major capital projects to meet these needs (Figure 1-1).

The most significant project in the RWSP is the siting, design, and construction of the Brightwater Regional Wastewater Treatment System in the north end of the service area (called the North Treatment Facility in the RWSP). This system consists a 36-mgd treatment plant and associated conveyance facilities that are scheduled to be online line in 2010. Other major RWSP treatment projects include expansion of the South Treatment Plant to 135 mgd by 2029.

The RWSP calls for systemwide conveyance improvements, including pipelines, pump stations, and storage facilities, to accommodate new growth and to maintain the system's high level of service. RWSP policies set as a priority the exploration of measures to reduce inflow and infiltration of groundwater and stormwater into conveyance systems, including those owned by local agencies that the County serves.

Other elements include a program to reduce the volume of combined sewer overflows in the City of Seattle, to continue recycling the byproducts of the treatment process and to explore ways to improve the quality and use of these byproducts, and to actively build flexibility into the wastewater system for expansion of reclaimed water use both on and off treatment plant sites.

RWSP Update Process

The King County Council recognized that the RWSP was a complex and dynamic plan that would require regular updates. Accordingly, the Council included language in Ordinance 13680 that required a comprehensive review of the RWSP every three years. The purpose of these reviews is to update the information that was used to prepare the RWSP, including the rate and location of population growth, and to evaluate the phasing and sizing of facilities and the effectiveness of RWSP policies. The County Executive and Council may recommend changes to RWSP policies based on new regulations, emergent technologies, or other relevant factors identified in the update reports.

Regional Wastewater Services Plan 2000 – 2030

Recommended Improvements

Treatment Plant Projects

1. Construct 36 mgd North Treatment Plant (2010)
2. Increase South Treatment Plant capacity to 135 mgd (2029)

Outfall Projects

1. Construct North Treatment Plant Outfall (2010)

Conveyance Projects*

1. Increase York Pump Station (2000)
2. Parallel Eastside Interceptor Section 1 (2001)
3. Construct 6 MG Storage (2002)
4. Parallel Auburn Interceptor Sections 1, 2, and 3 (2004)
5. Construct North Lake Interceptor and pump station (2006)
6. Construct tunnel from North Treatment Plant to Outfall (2010)
7. Construct new Kenmore Pump Station to pump flow to North Treatment Plant (2010)
8. Construct forcemain from Kenmore Pump Station to North Treatment Plant (2010)
9. Modify York Pump Station to pump 35 mgd to North Creek Pump Station (2016)
10. Construct forcemain to Convey North Creek Flow to Kenmore Pump Station (2016)
11. Upgrade North Creek Pump Station (2016)
12. Construct 3-5 MG effluent storage at South Treatment Plant (2030)

* There are other smaller conveyance improvements throughout the system. 2000-2040

No site identified at this time for north treatment plant, conveyance, or outfall.
1 6 8 1

SNOHOMISH COUNTY / KING COUNTY

MILL CREEK
WOODINVILLE
REDMOND
LYNNWOOD
MOUNTLAKE TERRACE
BOTHELL
TOTEM LAKE
KIRKLAND
Lake Sammamish
ISSAQUAH
EDMONDS
SHORELINE
U-DISTRICT
Lake Washington
BELLEVUE
MERCER ISLAND
Cedar River
BLACK DIAMOND
RICHMOND BEACH
BALLARD
SEATTLE
SOUTH TREATMENT PLANT
RENTON
WEST TREATMENT PLANT
Puget Sound
Elliott Bay
Duwamish River
TUKWILA
KENT
Green River
BURIEN
SEATAC
DES MOINES
AUBURN
KING COUNTY / PIERCE COUNTY
FEDERAL WAY

Recommended Improvements

CSO Projects*

1. South Magnolia CSO Storage Tank (2010)
2. SW Alaska CSO Storage Tank (2010)
3. Murray CSO Storage Tank (2010)
4. Barton Pump Station (2011)
5. North Beach CSO Storage Tank & Pump Station (2011)
6. University/Montlake CSO Storage Tank (2015)
7. Hanford #2 CSO Storage/Treatment Tank (2017)
8. West Treatment Plant Primary/Secondary enhancements due to CSO Projects (2018)
9. Lander CSO Storage/Treatment Tank at Hanford (2019)
10. Michigan CSO Storage/Treatment Tank (2022)
11. Brandon CSO Storage/Treatment Tank (2022)
12. Chelan CSO Storage Tank (2024)
13. Connecticut CSO Storage/Treatment Tank (2026)
14. King Street CSO Conveyance (2026)
15. Hanford at Rainier CSO Storage Tank (2026)
16. 8th Ave S CSO Storage Tank (2027)
17. W Michigan CSO Conveyance (2027)
18. Terminal 115 CSO Storage Tank (2027)
19. Ballard CSO Storage Tank (2029)
20. 3rd Ave W CSO Storage Tank (2029)
21. 11th Ave NW CSO Storage Tank (2030)

*CSO control projects at Denny Way, Martin Luther King Jr. Way, and Henderson Street CSOs are part of current plans and are scheduled for construction.

LEGEND

Wastewater service areas

- WEST SERVICE AREA
- SOUTH SERVICE AREA
- NORTH SERVICE AREA

Existing Wastewater Facilities

- Wastewater treatment plant
- Wastewater pipeline
- Tunnel section
- Local wastewater pipeline connecting King County interceptors

NOTES
- Map not to scale
- Marked areas are approximate and are not exact locations or delineations
- Dates are approximate for construction completion

802008HGD.FH8

Figure 1-1
Regional Wastewater Services Plan as Adopted in 1999

The first update report was due on March 1, 2003. Because so many important elements of the RWSP would change depending on the location of the Brightwater plant, a decision was made to delay the report until the site was selected (in December 2003). The publication date was moved to April 2004, allowing for incorporation of the selected Brightwater facilities and to respond to a request by RWQC for a structured review of the status of RWSP elements to better inform their recommendations. Since King County assumed the rights, responsibilities, functions, and obligations of wastewater management in 1994, this committee has worked diligently on the issues of wastewater treatment and water quality in the region and was instrumental in the development of the policies in the RWSP.

Two all-day ad hoc workshops for RWQC and Council members were held in spring 2003. The first workshop, held on April 30, provided an overview of each RWSP element, progress to date, and changes to scope or cost since adoption in 1999. The second workshop, held on June 11, covered the financial impacts of changes since 1999, financial strategies to mitigate increases in the projected capacity charge and rates, and ideas for cost containment.

The next RWSP update report is due in 2007.

Organization of this Update Report

This update report is organized to provide an overview of the elements of the RWSP. It generally follows the format of the Operational Master Plan. Chapter 2 describes wastewater services and planning, including population and flow projections. The next six chapters present the plan's six major program elements: treatment improvements, conveyance system improvements, inflow and infiltration reduction, combined sewer overflow reduction, recycling biosolids, and exploring and increasing water reuse. Subsequent chapters describe supporting elements of the RWSP, such as environmental mitigation and financing. Each chapter evaluates original planning assumptions and identifies any changes, progress to date, work anticipated before the next update, important issues, and recommended policy changes.

A glossary of terms is included as Appendix A. Details for each RWSP element, including original planning assumptions, accomplishment of performance measures defined in the OMP, and implementation of the policies specified in Ordinance 13680, are found in Appendix B. A list of informative Web sites is in Appendix C. The 2004 RWSP Water Quality Report comprises Appendix D, a separately bound document. As required by Ordinance 13680, this Water Quality Report documents King County's water quality, conservation, pollution abatement, and reclamation programs and their results. Programs include wastewater management, ongoing monitoring programs, special scientific studies, and compliance with regulations and agreements.

The executive summary of this report is bound as a separate document.

Chapter 2
Wastewater Services and Planning

The Regional Wastewater Services Plan (RWSP) contains policies that define the parameters—both physical and institutional—within which King County is to meet its wastewater management mandate. These "Wastewater Services" policies provide the framework for defining the wastewater service area and the services to be provided.

Because the RWSP is a complex and dynamic plan and because wastewater planning is an integral foundation for providing cost-effective wastewater services, King County is committed to periodically review the RWSP and its implementation to verify that it remains consistent with other County-adopted policies, with planning assumptions, and with scientific, economic, and technical information. As a part of these updates, King County regularly reviews population and wastewater flow projections to ensure that wastewater treatment in the central Puget Sound region keeps pace with development and demand, that the quality of the region's waters is not degraded, and that growth mandated by Washington's Growth Management Act (GMA) plans is accommodated when and where it is planned.

This chapter summarizes how policies have guided implementation of RWSP wastewater services and planning. It describes these programs, including flow projection and capacity management efforts in 1999 and 2003, and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of program costs. Assumptions underlying RWSP wastewater services and planning and more information on implementation of policies and performance measures are provided in Appendices B-7 (Wastewater Services) and B-9 (Wastewater Planning).

Overview of Policy Accomplishments

No changes are recommended in the policies for wastewater services and planning set by the King County Council in adopting the RWSP. To date, the policies have proven to be sound and are being implemented as intended.

In adopting the RWSP, the King County Council framed the operation of the wastewater system and the implementation of the RWSP program with policies that defined the County's vision and values for the provision of services. The core mission of these services is to protect public health and the environment by managing the region's wastewater. This mission is implemented in a way that meets commitments, promotes environmental stewardship, recognizes the value of wastewater in the regional water resource system, and reflects a wise use of public funds. The policies call for comprehensive planning for these services that considers the ultimate needs when the service area is fully populated and that involves coordination with other jurisdictions to look for mutual cost savings and to minimize disruption to communities.

The County's success in protecting human health and the environment is evidenced by its record in minimizing wastewater overflows and complying with National Pollutant Discharge Elimination System (NPDES) permit requirements. Of key importance in maintaining this record is ensuring that high quality treatment facilities are placed online when they are needed. One of the major achievements during this period was selection in December 2003 of a site for the Brightwater Regional Wastewater Treatment System (called the North Treatment Facility in the RWSP). Site selection represents the culmination of a four-year siting and environmental review process that included a high level of public involvement and jurisdictional cooperation.

King County is honoring its contractual commitments to the local wastewater agencies that it serves. At the request of Vashon Island and the City of Carnation, the County has extended its service area to meet specific public health needs and to help manage the environmental impacts of growth in these communities. Ownership of sewer lines has been adjusted equitably, memoranda of agreement (MOA) have been executed with local agencies to build facilities using the combined resources of the County and these agencies, and the scope of water quality investigations has been carefully reviewed to ensure that sewer rate dollars are applied to support wastewater program needs as promised.

Environmental stewardship is being promoted through public education programs that help citizens understand the impact of their actions on the environment and through programs that help them reduce their use of harmful chemicals. The County is working for the restoration of endangered salmon through the development of a Habitat Conservation Plan and is pursuing the use of "green building" practices that use low-impact products and recycled materials.

Discussions are continuing between the County, water purveyors, local agencies, and citizens regarding the role of reclaimed water in water resources management. Under the RWSP, King County is building flexibility into existing and new facilities for the production and use of reclaimed water. This flexibility will allow the County to respond to an increasing need for such water and to achieve goals such as meeting water quality standards, benefiting species listed under the Endangered Species Act, and furthering the water reuse program. A report related to the development of the Sammamish Valley Reclaimed Water Production Facility was submitted to Council on April 15, 2004. Other byproducts of wastewater treatment are being recycled for use as fertilizer in agriculture and for generating power through innovative technologies such as fuel cells.

Efforts to use public funds wisely are evident in the County's efforts to manage Brightwater costs. New cost estimating models, value engineering peer reviews, and alternative project delivery methods are being applied to achieve cost-effective designs. The County is working with its citizens and local agencies to identify tradeoffs and to find a balance between competing priorities. For example, the decision to find a site for the Brightwater plant that would contain enough land to provide the flexibility for future water reuse and power generation had to be balanced with the added costs of purchasing a larger site.

Maintenance and management of existing facilities serve both to protect human health and the environment and to make maximum use of public resources. The Wastewater Treatment Division (WTD) was reorganized in 2002 to increase efficiency, to meet increasing system demands, and to manage an aging infrastructure in an organized fashion. Asset management functions from

several groups were combined into a new asset management section that will provide valuable information for decisions about how to expend limited resources.

Services are being planned with multiple needs and purposes in mind. Conveyance planning has developed into a basin approach that seeks to resolve needs for new capacity and for upgrades to existing facilities. This basin approach makes it possible to implement coordinated projects with local agencies, as is happening in the Soos Creek area, for example. The City of Seattle and the County are investigating combined sewer overflow (CSO) control projects that optimize control for both systems.

King County will continue to implement these policies, monitor their effectiveness, and make recommendations for changes as needed.

Wastewater Services and Planning

This section describes wastewater services and planning defined in the RWSP. The programs have changed very little since 1999. They remain within the 1999 policy framework, and the assumptions used to define the program are relevant today. (See "Implementation Highlights Through 2003" in this chapter and in subsequent chapters for descriptions of minor changes in the assumptions.)

Service Area

The perimeter of the wastewater service area is defined by the service areas of local agencies in King, Pierce, and Snohomish Counties that send their wastewater to the County's system. These areas are located within the limits of the Urban Growth Areas (UGAs) as defined by the GMA. The County's wastewater treatment plants also treat septage and sludge from local agencies and from private entities inside and adjacent to King County. Local areas are responsible for managing their stormwater flows, except for the joint County-City management of stormwater in the City of Seattle's combined sewer system.

In 1999, the County provided transport and treatment of wastewater from 31 local agencies (see Appendix B-7 for more details). At that time, 2.4 million people were living and working in the County's wastewater service area. As of 2003, 33 local agencies contract with King County for wastewater services (Figure 2-1). The Vashon Sewer and Water District and the City of Carnation have established new contracts for service with the County. Also, as the County has assumed responsibility for certain conveyance lines in south Snohomish County, the service area boundaries have extended farther north.

RWSP Scope of Services

Wastewater services policies provide the framework for policies and objectives for specific elements of the wastewater management program. The policies listed below are described in subsequent chapters:

- Provide secondary treatment to all base wastewater flows.
- Build conveyance capacity to the 20-year peak flow design standard in the separated sewer areas.

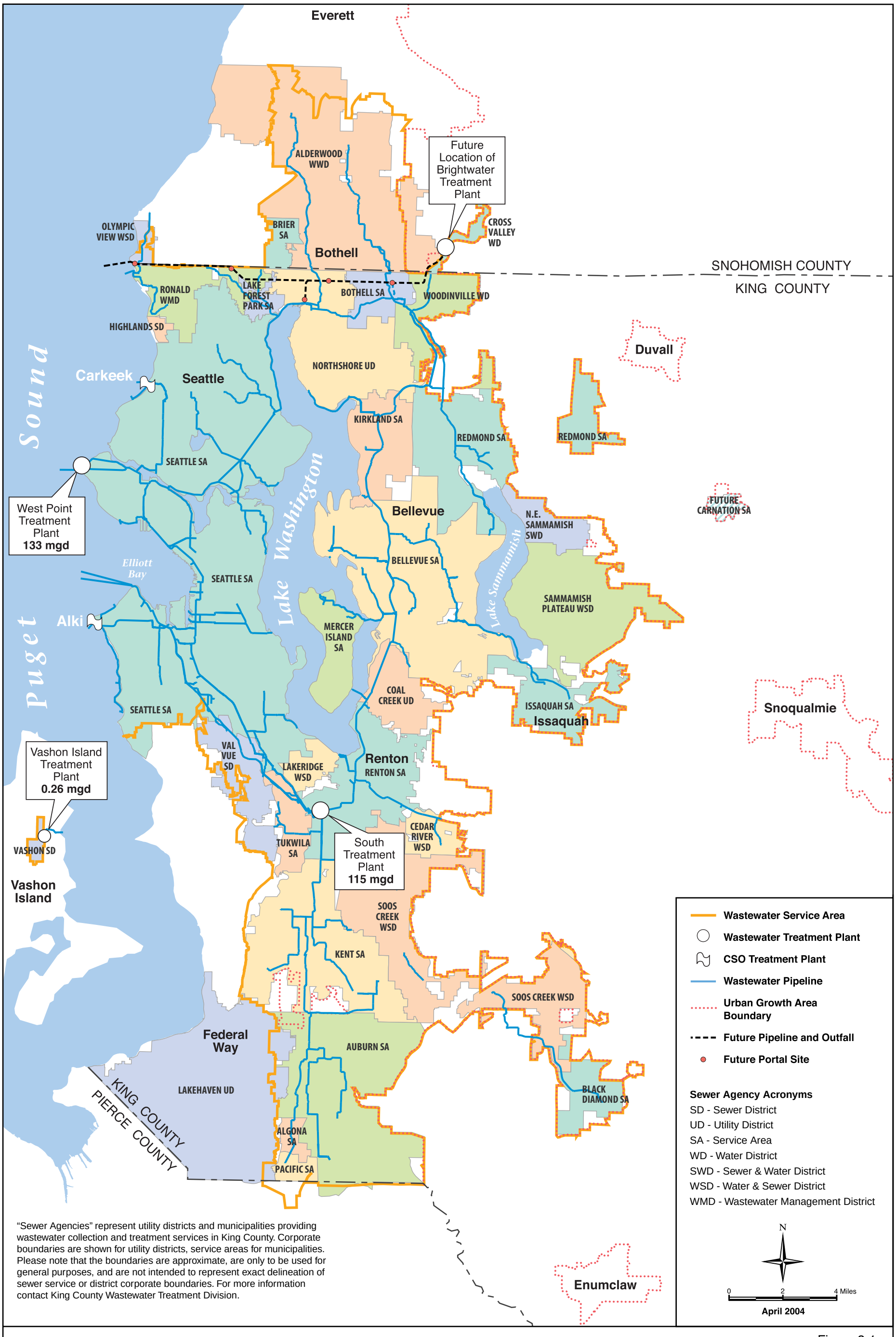
- Control CSOs to the once-per-year untreated overflow level of control. Update the CSO control plan by 2000 and 2005. Develop a sediment management plan.
- Supply Class B biosolids for recycling in the County and outside the County where there is a public-private partnership.
- Supply reclaimed water at the treatment plants for plant process and irrigation. Develop a work plan that considers possible pilot or demonstration plants and opportunities for coordination with regional water supply and basin planning.
- Work with regulators and other agencies to ensure that regulations and agreements are reasonable, cost-effective, and based on sound science and standards of practice.
- Optimize services through equipment and facility management under an asset management plan, to be updated annually.
- Set rules and monitor compliance for industrial discharges to the sewer system.
- Cost-effectively provide new capacity to manage service area flows when needed.

Wastewater Planning

Planning for services and facilities is based on a long-term assessment of wastewater system needs. The County collaborates with other jurisdictions in doing this planning, and it looks for opportunities to achieve cost savings for its customers. Planning considers buildout population in facility sizing (when no more development can occur in an area).

The ordinance adopting the RWSP (Ordinance 13680) calls for three types of planning reports to be prepared:

- **Semi-Annual Reviews.** The County Executive submits semi-annual written reports to the Regional Water Quality Committee and the Council on siting, permitting, design, and construction of any new treatment and conveyance facilities. The reports include project cost estimates, schedules, and issues of concern.
- **Annual Plan Reviews.** A report that has come to be known as the "Water Quality Report" is prepared annually. It addresses water pollution abatement, water quality monitoring results, water conservation, water reclamation, Endangered Species Act (ESA) compliance, septic system conversions to the regional sewer system, biosolids management, wastewater public health problems, compliance with other agency regulations, and agreements. Every third year, this report is prepared along with the RWSP update to inform any recommendations for changes in policies or programs.
- **Three-Year RWSP Update.** Every three years, a report is prepared to provide a comprehensive review of RWSP implementation. It re-evaluates the planning assumptions, phasing and size of facilities, and effectiveness of policy implementation for treatment improvements, conveyance improvements, infiltration and inflow reduction, combined sewer overflow abatement, water reuse, biosolids recycling, water quality protection, environmental mitigation, and public involvement.



"Sewer Agencies" represent utility districts and municipalities providing wastewater collection and treatment services in King County. Corporate boundaries are shown for utility districts, service areas for municipalities. Please note that the boundaries are approximate, are only to be used for general purposes, and are not intended to represent exact delineation of sewer service or district corporate boundaries. For more information contact King County Wastewater Treatment Division.

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Data Sources: 80194-B BHGD.FH7
File Name: 0404rwsp_fig02-01.pdf
Prepared by: King County WLR Visual Communications & Web Unit

Note: This map shows only the Local Sewer Agencies that have contracts with WTD.

Figure 2-1

King County Wastewater Service Area and Local Sewer Agencies

RWSP 2004 UPDATE

Flow Projections and Capacity Management

RWSP policies call for regular evaluation of the planning assumptions used for the phasing and sizing of facilities defined in the plan. This evaluation involves updating wastewater flow projections in King County's service area over the planning horizon. Future wastewater flows in the service area were projected in 1998 for purposes of the RWSP and in 2003 for purposes of this update to the RWSP. Population and employment forecasts serve as the basis for flow projections. In the process, assumptions are made regarding the sewered area, water use and conservation, historical wastewater flow patterns, and the amount of inflow and infiltration (I/I). This section describes these analysis and presents their results. Additional detail on population forecasts and flow projections is available on request.

Population Forecasts

To project wastewater flows, King County relies on the Puget Sound Regional Council's (PSRC's) analysis of population and employment census data and trends developed through 2020.[2] For the decades 2030, 2040, and 2050, King County forecasts population and employment based on a linear trend analysis of the earlier decades. It is assumed that by 2050, the service area will reach buildout and no further increase in population will occur in the UGA.

PSRC data used by the County come in two levels of detail—the more geographically broad forecast analysis zones (FAZ) and the more detailed traffic analysis zones (TAZ). Population estimated by TAZ is allocated to each of the King County wastewater hydraulic model basins according to the number of developed parcels in each TAZ and model basin. Adjustments are made to account for major employers and apartment complexes in the service area. Detailed basin delineations are done by marking the sewered areas, potentially sewered areas, and areas where development is not expected to occur. It is assumed that by 2020 all population within the UGA, including customers who are currently on septic systems, will be served by sewers and that there will be no sewer expansion outside of the UGA. Estimated sewered population is then calculated on the basis of developed parcels in the sewered and potentially sewered areas within the UGA. Most of the population growth and flow increases are expected to occur in the areas outside of Seattle where there is much more developable land.

PSRC data from 1995 was used in the preparation of the RWSP. These 1995 forecasts were compared with an updated PSRC population forecast in 1998. Because only small differences were found, the County continued to use the 1995 population forecasts to complete the RWSP flow projections. Forecasts were updated when FAZ data based on the 2000 census became available in late 2002, and were refined when TAZ data became available in early 2003.

As shown in Table 2-1, both the 1995 and 2003 sets of projections indicate that the sewered population will grow by approximately 1 million between 2000 and 2030. The 2003 information indicates that sewered population in 2000 was slightly lower than anticipated during RWSP

[2] The Puget Sound Regional Council was created in 1991 as an association of governments working together on planning issues of regional significance.

forecasting. Overall, the 1995 and 2003 forecasts align closely (within 2.5 percent) by 2030. However, significant differences in population distribution exist between the 1995 and 2003 forecasts. This difference is especially apparent in commercial employment, where much higher commercial employment has occurred east of Lake Washington and much less in Seattle than was projected in the RWSP.

Table 2-1
Original RWSP and Updated Forecasts of Sewered Population

	Sewered Population (Residential + Commercial + Industrial)		
Decade	**RWSP (1995) Forecasts[a]**	**Updated (2003) Forecasts[b]**	**Percent Change**
1990	2,053,746		
2000	2,385,578	2,380,283	-0.2%
2010	2,756,598	2,688,001	-2.6%
2020	3,129,189	3,179,354	1.6%
2030	3,438,937	3,354,826	-2.5%
Percent Change 2000–2030	44%	41%	

a. Based on Puget Sound Regional Council forecasts by FAZ in 1995, which used 1990 census data.

b. Based on Puget Sound Regional Council forecasts by TAZ in 2003, which used 2000 census data.

Wastewater Flow Projections

Wastewater flows are calculated from base residential, industrial, and commercial wastewater volumes and I/I volumes. Base residential and commercial wastewater volumes are computed using the winter water usage reported by the water purveyors in the service area. Industrial volumes are as reported by each industry to King County's Industrial Waste Division. This information, along with population and employment data, is used to develop flow factors for gallons per capita per day (gpcd) and gallons per employee per day (gped).

Water use data from most of the water purveyors in King County's wastewater service area revealed that indoor water consumption was lower in Seattle and higher in non-Seattle residences than was estimated during the RWSP. Furthermore, industrial water use was significantly lower. Commercial water use was slightly less than assumed in the RWSP.

It is now projected that by 2010, per capita indoor water consumption will be about 10 percent below 2000 levels. Recent data from water purveyors indicate that by 2003, the per capita water consumption had already dropped 5 to 8 percent from 2000 levels, reducing the flow even more from that estimated in the RWSP. Water purveyors have committed to further increases in water conservation.

Table 2-2 shows the daily per capita and per employee wastewater generation assumed in the RWSP, actual flows in 2000, and projected flows between 2010 and 2050 with 10 percent more water conservation over 2000 levels.

Table 2-2
RWSP, Actual, and Projected Daily Wastewater Generation

	RWSP Assumption	Actual 2000[a]	Projected 2010–2050[b]
Residential	60 gpcd	56 gpcd within Seattle 66 gpcd outside Seattle	50 gpcd within Seattle 60 gpcd outside Seattle
Commercial	35 gped	33 gped	30 gped
Industrial	75 gped	55 gped	50 gped

gpcd = gallons per capita per day.
gped = gallons per employee per day.

a. Based on winter water consumption.
b. Assumes 10 percent more water conservation than in 2000.

The I/I contribution to flows is estimated through an analysis of recent average wet-weather flow (AWWF) patterns in relation to rainfall. For the portion of King County's service area with separate sanitary sewers, AWWF is defined as the average of all wastewater flow between November 1 and April 30. For the West Point system, which is largely a combined sewer system, AWWF is defined as the average of the flow from November 1 through April 30 excluding the days it rained and the first day after each rain event. This definition is part of the West Point NPDES discharge permit and reflects the nature of the combined system, which collects much of the stormwater runoff during and immediately after rainfall events. AWWF I/I is the difference between measured AWWF and base flow.

In 2000, the AWWF at West Point was 101 million gallons per day (mgd), resulting in an AWWF I/I estimate of 45 mgd, or 690 gallons per acre per day (gpad). Similarly, the AWWF at the South plant in 2000 was 102 mgd, resulting in an AWWF I/I estimate of 36 mgd, or 340 gpad.

Table 2-3 presents the AWWF projections through 2030 for the RWSP (1995) and for the updated (2003) analysis. The 2003 projections show AWWF both with and without a 10 percent decrease in water consumption from 2000 levels by the year 2010.

Table 2-3
Original RWSP and Updated Wastewater Flow Projections

	RWSP (1998) Projections	Updated (2003) Projections	
Decade	AWWF (mgd)	AWWF (mgd)	AWWF with 10% Water Conservation by 2010
1990	190		
2000	214	205	205
2010	238	226	213
2020	257	260	246
2030	283	279	263

AWWF = average wet-weather flow.

It is assumed in the analyses that I/I will increase at a rate of 7 percent per decade over the planning period because of continued deterioration of conveyance pipelines owned by local agencies that convey flows to the County system. It was also assumed that no I/I control will be in place. The King County Executive is scheduled to propose an overall I/I control program at the end of 2005, after which I/I reduction, if warranted, may be included in flow projections. See Chapter 5 for additional information on I/I control efforts.

Figure 2-2 shows a comparison of the RWSP and 2003 updated AWWF projections for the King County service area as a whole, with and without additional water conservation past the year 2000. Additional benefits of increased water conservation, if realized, will be seen by 2010 and thereafter.

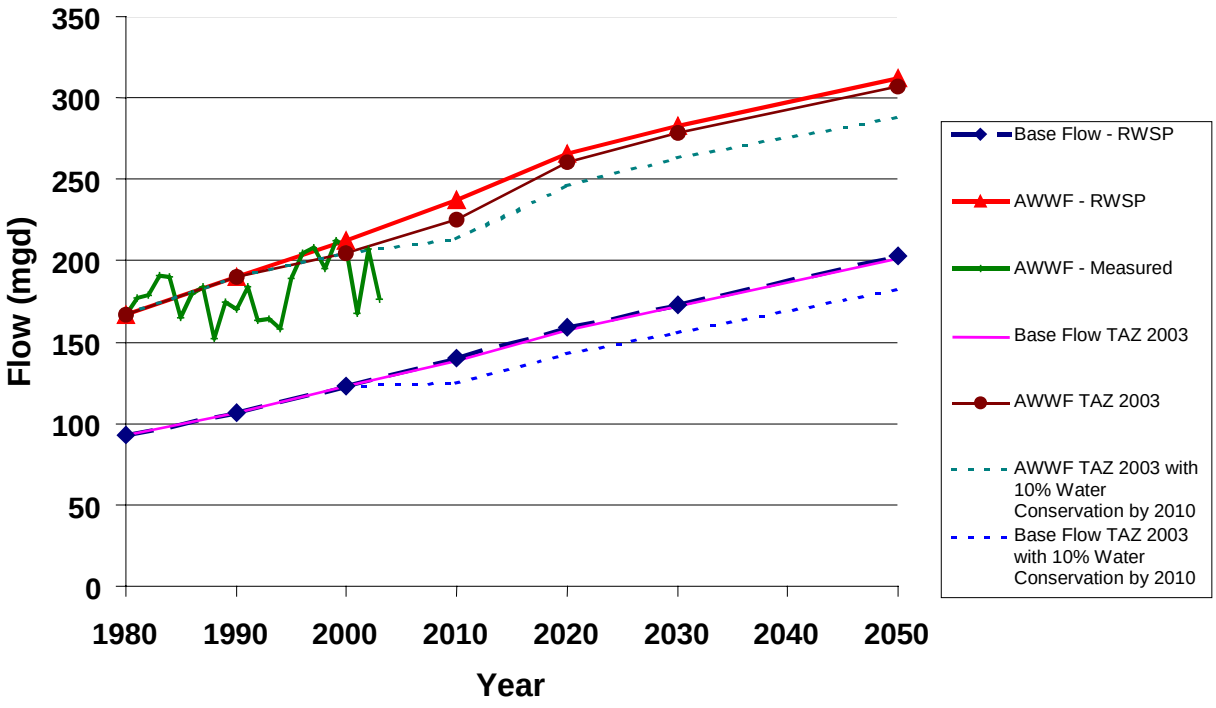


Figure 2-2
Original RWSP and Updated Systemwide Base Flow and AWWF Projections (1980–2050)

Provision of Wastewater Treatment Capacity

Wastewater capacity must be provided before it is needed. The overall treatment capacity strategy developed for the RWSP (Figure 2-3) appears to be appropriate for the 2003 projections.

Brightwater facilities are still needed by 2010 to manage peak flows. Successful I/I control may reduce peak flow, but its effectiveness will not be known until studies are completed. Increases in water conservation in areas outside of Seattle could change the need and sizing for facilities that are scheduled to manage non-peak flows after Brightwater is online.

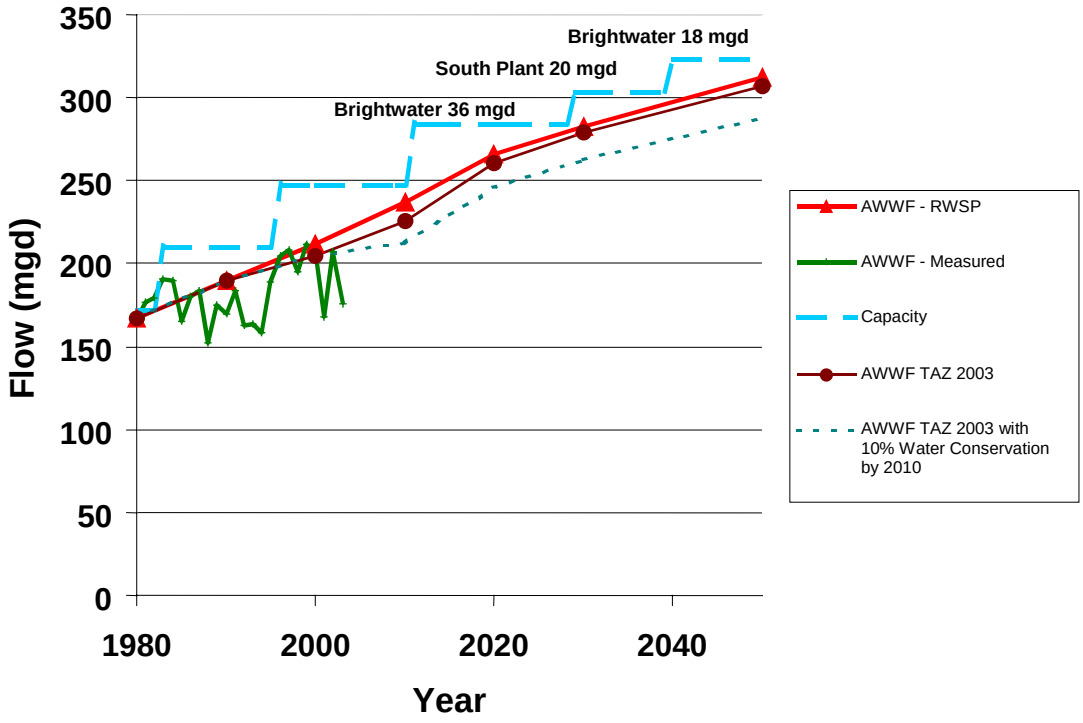


Figure 2-3
Original RWSP and Updated Systemwide AWWF Projections with RWSP Treatment Plant Capacity Strategy (1980–2050)

New information indicates that additional capacity will be needed in the south service area earlier than expected. Detailed identification of sewered areas during I/I control program surveys and updated population estimates indicate that the sewered population in the South plant service area in 2000 was significantly greater than that assumed in the RWSP. The South plant may now reach its capacity in 2007. Figure 2-4 shows the current capacity and projected AWWF at the South plant, assuming Brightwater comes online in 2010 and is expanded in 2040. The figure also shows projected AWWF assuming 10 percent water conservation (over 2000 values) by 2010.

Brightwater is now needed by 2010 not only to provide treatment capacity and peak conveyance flow relief to the north end of the service area, but also to receive flows from portions of the South plant system until its next expansion. Brightwater will receive flows from parts of the northeast service area that currently go to the South plant. This flow transfer will free up capacity at the South plant to manage the growing flows from the east and south service areas.

If growth in the south occurs as currently forecast and if water conservation does not increase as predicted, there could be a period between 2007 and 2010 when flows to the South plant will exceed capacity. Operators at South plant report that the plant's actual capacity may be greater than its rated capacity.[3] King County is evaluating the possibility of working with the Washington State Department of Ecology to test the plant's capabilities, make any needed adjustments, and re-rate the plant. In addition, the expansion scheduled for 2029 may need to be completed by 2023.

King County will continue to monitor population, employment, and flow trends, as well as septic conversions, water conservation, and the success of I/I control measures, to identify if and when additional capacity will be needed across the wastewater service area and to determine if re-rating of the South plant should be pursued. Plans will be adjusted, if necessary, to meet those needs.

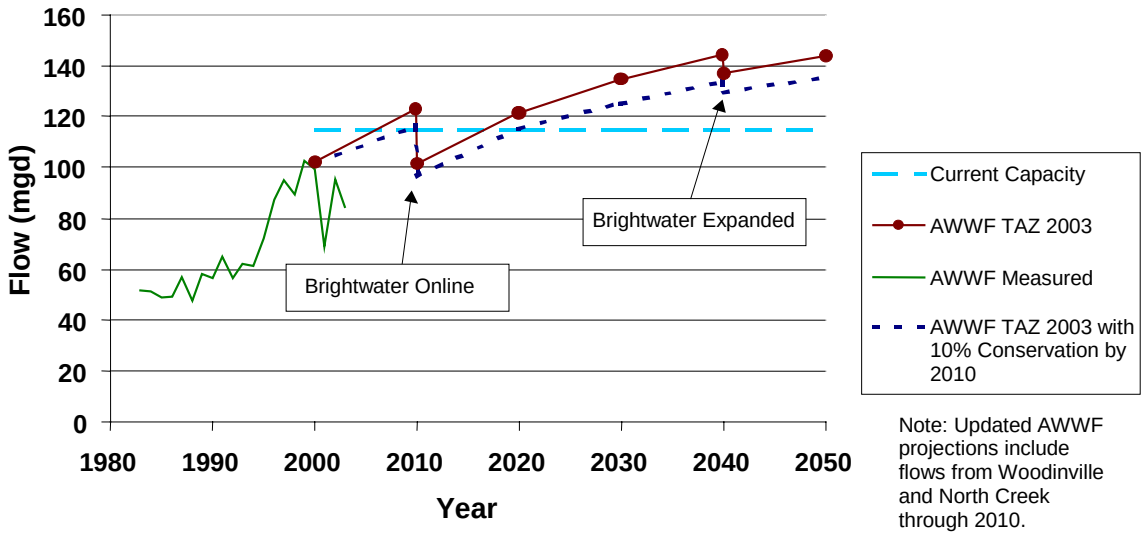


Figure 2-4
Updated AWWF Projections for South Plant (1980–2050)

[3] Rated capacity is developed based on theoretical criteria before the plant is constructed. The Washington State Department of Ecology approves this rating as part of a facility's design and permit.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Ten policies for wastewater services and five policies for wastewater planning were specified in the RWSP. All policies are being implemented successfully.

Three wastewater services performance measures were specified in the RWSP Operational Master Plan:

- Develop facility plans and engineering specifications for each project.
- Review all comprehensive plans developed by the local agencies served by the County system.
- Update the facilities asset management plan.

The first two performance measures are ongoing. The asset management plan that was called for in the RWSP wastewater services policies was completed and is updated regularly. To more fully address asset management, a new asset management section was created in the WTD (described below). Findings from assessments being conducted by the new section will be incorporated into the asset management plan.

Appendix B-7 (Wastewater Services) and Appendix B-9 (Wastewater Planning) provide more detail on implementation of policies and performance measures through 2003.

Asset Management

An important accomplishment during this period was the reorganization of the WTD in 2002. The purpose of the reorganization is to increase productivity by combining asset management functions from several groups into a new asset management section.

Asset management is a proactive way of looking at increasing system demands and aging infrastructure in an organized fashion, allowing decision-makers to make the best decisions about how, when, and where to expend valuable and often limited resources. Decisions are based on long-term management philosophies and service-level definitions, asset inventory and condition assessments, financial and economic evaluations (life-cycle cost analyses), and risk assessment and consequence planning. Asset management focuses on managing existing infrastructure, as opposed to capital improvement, which focuses on building new capacity. These two programs can overlap and complement each other for improved cost-effectiveness. When new capital facilities are completed, they become “existing assets,” adding to the asset management program base and increasing its efforts and costs.

The asset management program is currently under way. The program is conducting asset inventories, condition assessments, and risk evaluations for all assets in order to form a complete picture of program needs and to develop a detailed capitalization plan (financial plan over time). The analyses will be completed in stages over the next three to five years and results will be incorporated into future updates to the asset management plan, which was developed since adoption of the RWSP. See Appendix B-7 for additional information on asset management.

Wastewater Planning

Planning through 2003 occurred as defined in the RWSP. The semi-annual reviews and annual water quality reports were completed on time. This first RWSP update report was delayed a year in order to incorporate the decision on the location of Brightwater facilities. Reports have been posted on the Web site listed in Appendix C.

Outlook Through 2006

Wastewater services will be provided as defined in the RWSP. Information on planned implementation for each element can be found in subsequent chapters of this update report. All planning reports will be submitted on schedule. The next RWSP update will be completed in 2007.

Costs[4]

In 1999, the RWSP program was estimated to cost $1.8 billion over 30 years. Since adoption of the RWSP through the end of 2003, many new facilities and supporting programs have been added to the RWSP, as described in this update report. The RWSP program is now estimated to cost $2.6 billion over 30 years. The details of these costs are shown in Table 14-1 in Chapter 14.

The RWSP did not identify new costs for asset management. It included an annual amount of $35 million. This amount was a preliminary estimate that was developed for the rate analysis process on the basis of historical annual asset management expenditures. At that time, it was difficult to estimate these expenditures because asset management functions were part of several program budgets. Since adoption of the RWSP, a process was developed to identify costs from each program budget. This process includes the following steps:

- Reviewing WTD records to determine the costs paid for replacing assets
- Using of a construction cost inflation index to escalate those costs to current year prices
- Modeling the replacement of assets based on assumptions about their useful life

The process identified that an amount of approximately $49 million per year better represents expenditures as of 1998. This estimate is sensitive to the useful life of the assets. If assets last twice as long as expected, annual asset management costs may be less than $49 million; if assets reach the end of their useful life sooner, costs may increase. Moreover, as Brightwater and other RWSP facilities come online, their management costs will be estimated and folded into the asset management program. WTD will review and adjust estimates as more information becomes available.

[4] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 3
Treatment Improvements

King County owns and operates two regional wastewater treatment plants—the West Point plant in Seattle and the South plant in Renton. It currently is designing a new regional plant (the Brightwater plant) that will be located in unincorporated Snohomish County and will start operating in 2010. This chapter summarizes how policies have guided implementation of the wastewater treatment improvement program specified in the RWSP. It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of treatment improvement program costs, focusing in particular on costs associated with the Brightwater project. Appendix B-1 lists the assumptions underlying the RWSP treatment improvements and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for treatment improvements set by the King County Council in adopting the RWSP. The policy framework for treatment improvements is achieving its intent. The policies reaffirm the County's commitment to protecting public health and the environment. The core service values—meeting commitments, promoting environmental stewardship, recognizing the value of wastewater in the regional water resource system, and using public funds wisely—are reflected in these policies and guide their implementation.

The siting and design of the new Brightwater Regional Wastewater Treatment System in the north end of the service area illustrate policy implementation on a number of fronts. The policies direct the County to meet its commitments equitably by providing new capacity in areas where growth is occurring. A treatment plant at the selected Route 9 site north of Woodinville will meet the needs of the rapidly growing south Snohomish County and north King County areas while minimizing the transport of flows to more distant locations and honoring the spirit of the West Point Settlement Agreement made with the Magnolia community.

The development of new odor control policies illustrates the wise use of public funds. After a thorough review of available and cost-effective odor control technologies, the County estimated costs for candidate systems and developed and prioritized levels of odor control to allow for phased implementation. Decision-makers were then able to balance these costs with anticipated benefits, such as improved acceptance of facilities and streamlined permitting processes, to translate odor control goals into policies.

Environmental stewardship has taken many forms, including involving the public in important decisions and making and meeting commitments to minimize impacts in the communities that host County treatment facilities. For the Brightwater siting process, extensive public involvement programs allowed the public to be informed and engaged, as evidenced by high attendance at public meetings in potentially affected communities and by the over 5,000 comments received on the Draft Environmental Impact Statement (Draft EIS). Between 2000 and 2003, the County

continued to fulfill the dictates of the West Point Settlement Agreement through ongoing testing of new technologies that could minimize solids management facilities at West Point and reduce the number of biosolids truck trips through the neighborhood.

Finally, the value of reclaimed water as a water resource has been recognized through development of a work plan that lays the groundwork for future production and distribution of reclaimed water when it is needed. And opportunities to incorporate water reclamation at Brightwater have been included in the plant's design.

The County will continue to monitor the effectiveness of treatment improvement policies during implementation of the RWSP.

Treatment Improvement Program

This section describes the treatment improvement program defined in the Regional Wastewater Services Plan (RWSP). The program has changed very little since 1999. It remains within the 1999 policy framework, and the assumptions used to define the program are relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few minor changes in assumptions.)

The RWSP calls for the operation of three regional wastewater treatment plants to provide secondary treatment to base flows in the service area: two existing secondary plants, South and West Point, and a new plant to be constructed in north King County or south Snohomish County.

According to the plan, the South plant will be expanded from 115 to 135 mgd in 2029. The West Point plant will maintain its existing capacity, but improvements will be made by 2018 to enhance the plant's ability to handle transferred combined sewer overflow (CSO) flows. The potential for expansion at the West Point and South plants will be retained to accommodate unexpected circumstances such as higher than anticipated population growth or new regulatory requirements.

The new Brightwater Treatment Plant will be constructed on a site in south Snohomish County large enough to accommodate future wastewater needs in the north service area as defined in the plan. The plant will have an initial capacity of 36 mgd by 2010, with an anticipated 18-mgd expansion by 2040 to serve projected population growth in the area. The RWSP Operational Master Plan (OMP) outlines the following schedule for the Brightwater project:

1999–2003	Planning and siting
2003	Land acquisition
2002–2004	Predesign and environmental review
2004–2005	Design
2005–2010	Construction
2010–2011	Startup, commissioning, and closeout

In regard to water reuse, the RWSP calls for the following actions:

- During planning for the Brightwater Treatment Plant, consider construction of an outfall into Lake Washington or Lake Sammamish as a means to maintain water levels and thus indirectly augment upstream potable water supplies.

- Build flexibility into existing and new facilities for the production and use of reclaimed water to respond to an increasing need for such water and/or to achieve goals such as meeting water quality standards, benefiting species listed under the Endangered Species Act (ESA), or furthering the water reuse program.
- Prepare a reuse work plan (see Chapter 8).

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Ten policies were specified in the RWSP to guide treatment improvements. All policies are being implemented successfully.

Most performance measures developed for 2000–2003 focused on siting the Brightwater System. With one exception, all Brightwater siting performance measures for this period were met on schedule. Issuance of the Brightwater Final EIS was delayed for five months to allow time to respond to over 5,000 comments received on the Draft EIS. Predesign, permitting, and property acquisition for the project began in 2003.

Appendix B-1 provides more detail on implementation of policies and performance measures through 2003.

Brightwater Siting Process

Following adoption of the RWSP in 1999, the County began a four-year, three-phase process to site the Brightwater Treatment Plant and its associated conveyance pipes and outfall. The first two phases identified and screened potential treatment plant and outfall locations. The third phase developed three alternative systems—each consisting of treatment plant, outfall, and conveyance sites—and evaluated probable significant adverse environmental impacts and mitigation measures in draft and final EISs. The Draft EIS was issued on November 6, 2002, and the Final EIS on November 19, 2003. The siting process culminated in the King County Executive's selection on December 1, 2003, of the Route 9–195th Street System. This system includes a treatment plant at the "Route 9 site" in unincorporated Snohomish County, north of the City of Woodinville. It also includes an influent pipeline from Kenmore to the plant site; an effluent pipeline from the plant site to Puget Sound, placed in underground tunnels primarily under NE 195th and NE 205th Streets in King County; and a marine outfall pipeline extending off Point Wells into Puget Sound. (For more detail on the siting process, see Chapter 12 of this report and the Brightwater Final EIS.)

Number of Secondary Treatment Plants

The communities of Vashon and Carnation were added to the service area described in the RWSP. As a result, King County will operate two small local secondary treatment plants in addition to the three regional plants assumed in the RWSP. The County contracted with Vashon in 1999 to manage its wastewater treatment plant. Upgrades to this plant will be completed in 2005. The County contracted with Carnation in 2002 to design and manage its new wastewater treatment plant. Construction will be completed in 2006.

Capacity Strategies

During 2003, population change was assessed using 2000 census data and Puget Sound Regional Council (PSRC) forecasts (see Chapter 2). Updated population and flow information affirmed the need for providing peak flow relief to the north part of the service area and the Kenmore Lakeline and for providing average wet-weather flow (AWWF) capacity relief at the South plant.

Updated population forecasts show higher initial population and greater growth in the south end of the service area than was assumed for the RWSP. It now appears that the South plant will reach its rated design capacity by 2007. However, the South plant's actual capacity may be greater than its rated capacity. Rated capacity is an operating criterion based on conservative design predictions approved by the Washington State Department of Ecology (Ecology) before the facility is constructed. Since the South plant was built, performance has exceeded expectations. The County is exploring whether the plant, with a few adjustments, could provide more treatment capacity. If so, the County may then work with Ecology to re-rate the plant to reflect the higher performance. If successful, the re-rating will enable the South plant to manage flows until they can be sent to Brightwater.

If the forecasts for future population hold true and if the rate of water conservation does not increase, the South plant may need to be expanded by 2023 instead of by 2029. King County will continue to monitor actual population and flow against the projections. Schedules will be modified and completion dates for related performance measures will be changed to accommodate accelerated expansion of the South plant if and when it is needed.

Solids Processing at West Point

At the West Point plant, problems have occurred that indicate the digesters have reached their capacity. The County, in honoring the dictates of the West Point Settlement Agreement, has been operating with the minimum number of solids processing facilities. Problems with the digesters currently in use are limiting the plant's effective capacity. This reduction in performance does not affect treatment improvement strategies outlined in the RWSP. In 2003, a study identified a number of necessary improvements that will be implemented and monitored over the next several years to increase digester efficiency. These improvements include (1) piping modifications to allow the blending storage tank (Digester 6) to serve as an emergency backup digester and to provide continuous feed to all active digesters, and (2) the installation of improved mixing systems in Digesters 4 and 5.

Odor Control

The King County Council adopted new odor control policies on July 14, 2003, in Ordinance 14712. To develop these policies, available odor control technologies were reviewed. Three reports on the review were published in October 2002: *Odor Control Systems Inventory and Review of Applicable Technologies, Odor Measurement Methods and Regulations*, and *Odor Prevention Policy Recommendations.*

The policies are being applied to existing plants and to the design of Brightwater. The new capital cost estimates to provide odor control improvements at the South and West Point plants are discussed later in this chapter under "Costs."

Secondary Treatment

A modified approach to meet effluent limits for secondary treatment has been proposed for Brightwater. In this approach, an activated sludge/membrane bioreactor (MBR) process will treat wastewater flows up to the AWWF. Peak flows above this level will be treated using a ballasted sedimentation process and then blended with the MBR effluent prior to discharge. This "split-flow" approach would provide the water quality benefits of MBR technology but would be more cost-effective than using MBR for peak flows. All secondary treatment effluent limits will be met without building additional costly secondary treatment facilities that would be idle except during infrequent high-flow events.

On average, use of MBR will produce higher quality effluent than if the conventional activated sludge process were used and will thereby streamline the permitting process and provide opportunities for water reuse.

Outlook Through 2006

The following major activities will be undertaken in the next three years to continue implementation of the treatment improvements outlined in the RWSP:

- Predesign of the Brightwater System will be completed in June 2004, after which final design will begin. Construction is scheduled to begin in late 2005.
- If re-rating of the South plant capacity is deemed beneficial, King County will work with Ecology to re-rate the plant by 2007. Any needed process improvements to achieve the new rating will be implemented.
- Implementation of improvements to West Point solids capacity will begin in 2004 and will take approximately 4 years. The County will continually monitor their effectiveness and will implement further modifications if needed to ensure that the plant can perform at its rated capacity of 133 mgd AWWF.
- Vashon plant upgrades and Carnation plant construction will be completed in 2005 and 2006, respectively.

Costs[5]

When the RWSP was adopted in 1999, the estimated cost was $913 million for a treatment system in the north part of the service area, including treatment plant ($421 million), conveyance facilities ($461 million), and land acquisition ($31 million). As of issuance of the Final EIS at the end of 2003, the system is estimated to cost $1.35 billion, including costs for the treatment plant ($548 million) and conveyance facilities including land ($802 million). The reasons for the change are discussed below under "Brightwater Cost Control."

A placeholder of $12 million was set for odor control improvements at the South plant, but it was expected that this estimate could change after the technologies review and odor control policies

[5] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

were completed. With completion of these studies and policies, the new estimated capital cost to provide odor control improvements at the South plant ranges from $4 million to provide the high-priority improvements to another $13 million to implement the medium- and low-priority improvements.

The following are costs for treatment improvements not included in Ordinance 13680, adopting the RWSP:

- Odor control at the West Point plant: $3 million
- Improvements to the Vashon plant and system: $16 million
- Construction of the Carnation plant: $12 million.

Brightwater Cost Control

Cost containment strategies for the Brightwater System were the major focus of ad hoc RWSP update workshops held in April and June 2003 to assist interested Regional Water Quality Committee and Council members in their review of the RWSP. As described below, cost estimates typically change as projects move from generic to project-specific detail. This increasing level of detail provides the information needed to narrow the range of uncertainty and to refine cost estimates.

Ranges of Certainty in Cost Estimating

Cost estimating involves a narrowing process so as to limit resources and time spent on alternatives that will be discarded. Planning-level cost estimates, such as those used in the *Executive's Preferred Plan* and in the adopted RWSP, are based on generic facility concepts. Specific details of the project such as location, technologies, and environmental impacts are not determined at that point in the process. On the one hand, not specifying these details early gives decision-makers more choices about the final facilities. On the other hand, these details can significantly change the cost from the original estimate.

The greater the uncertainty surrounding the details, the greater the range behind the cost estimate. The County used standard estimating methods available to the wastewater industry in developing Brightwater cost estimates for the RWSP. Standard industry practice results in planning-level cost estimates for major capital projects within a range of +/– 30 to 50 percent of the final cost. Given the uncertainty of details at the time of RWSP adoption and the expected complexity of the project, the range expected for Brightwater and its associated facilities was –25 to +40 percent, as reported in the draft financial plan.[6] As more uncertainty is resolved, the cost estimate range will narrow. It is generally expected that more precise estimating models will narrow the predesign estimate to +/– 20 percent and the final design estimate to +/– 10 percent.

Effects of Siting and Predesign on Cost Estimates

Both increases and decreases in estimated costs for Brightwater project elements have occurred as the project has gained greater specification during siting and predesign. The following are examples of conditions that have prompted cost increases:

[6] *Regional Wastewater Services Draft Financing Plan*, Gibson Economics for King County Department of Natural Resources, May 1997.

- **Selection of larger sites.** The King County Council directed that sites have adequate space for future reclaimed water production and on-site energy generation. The siting process, therefore, considered sites that were at least 60 to 90 acres, up from the 18-acre minimum used early in the process. The Route 9 site is 114 acres. The additional acreage will allow for stream and wetland mitigation and a buffer around the site.
- **Higher level of odor control.** The decision was made to use a level of odor control at Brightwater that is higher than that included in the conceptual plant for the RWSP. This enhanced odor control will meet recent Council-adopted odor policies.
- **Longer influent and effluent conveyance.** The conceptual plant for the RWSP assumed 68,112 feet of conveyance pipeline based on a treatment plant located in the Swamp Creek area; the Route 9 treatment plant location requires approximately 109,400 feet of conveyance pipeline.

During predesign, the following ways to save costs have been identified:

- Optimizing the size of treatment plant processes and tunnels
- Using gravity flow as much as possible
- Reducing land requirements and the use of construction easements
- Using less costly construction methods
- Relying on systems at the South and West Point plants as backup, rather than building redundant systems at Brightwater
- Eliminating the effluent pump station at the Route 9 site
- Using alternative project delivery and contracting methods (explained below).

In December 2003 and January 2004, value engineering (VE) was done as a part of predesign. VE is a technical peer review in which outside experts are brought in to evaluate and develop ideas to improve the project and to lower costs. Recommendations from these sessions are expected to be available in mid 2004; assessment of associated costs for these recommendations will be available later in 2004.

Predesign will be completed June 2004; a Brightwater budget will be established by fall 2004. Cost control will be a high priority. It is expected that the budget will undergo third-party review and that a productivity target will be set. Project elements will continue to be refined as predesign and design continue. Cost control will remain a high priority as predesign is completed and design and construction are implemented.

Alternative Project Delivery and Contracting Methods

Because of the cost and complexity of RWSP projects, in early 1999 the County conducted a study of new project delivery strategies. The traditional strategy for public works projects is to use the design-bid-build contracting process. In this process, the County contracts with an engineering firm to design the project and prepare contract plans and specifications. The project is then advertised for construction bids, and the contract is awarded to the lowest responsive, responsible bidder. During construction, the engineer remains involved in order to review changes to the project and ensure consistency of the constructed project with the plans.

The approach chosen for the Brightwater plant is general contractor/construction management (GC/CM). In GC/CM the owner contracts with the designer and builder separately; however, in contrast to design-bid-build, the contractor is selected on qualifications in addition to price and is brought on board before final plans and specifications are prepared so that the contractor can provide input in the design process. During the design phase, the owner and GC/CM negotiate a guaranteed maximum price for project construction. During construction, the GC/CM is responsible for managing construction and acting as general contractor, with subcontractors performing the majority of the construction work.

RCW 39.10.030 requires public notification and opportunity for public review and comment before alternative project delivery and contracting are used in public projects. Notice was published and public meetings were held May 2 and 29, 2003. An ordinance approving the use of GC/CM was forwarded to Council by County Executive Sims and was approved as Ordinance 14684 on June 16, 2003. Selection of the GC/CM was completed in March 2004. King County will continue to evaluate alternative project delivery for other elements of the Brightwater project.

Chapter 4
Conveyance System Improvements

Local agencies in the service area send their wastewater flows to King County's conveyance system, which then conveys the flows to treatment plants via large pipelines, pump stations, regulators, and storage facilities. The system also includes pipelines that convey flows from the treatment plants to outfall pipes for discharge to Puget Sound.

This chapter summarizes how policies have guided implementation of the conveyance system improvement program specified in the Regional Wastewater Services Plan (RWSP). It then describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of program costs. Appendix B-2 lists the assumptions underlying the RWSP conveyance improvements and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for conveyance system improvements set by the King County Council in adopting the RWSP. The conveyance improvement policies are achieving their goals. The policies support the County's mission to protect public health and the environment through the program's emphasis on the prevention of sanitary sewer overflows (SSOs). Such overflows can expose the public to disease-causing organisms in wastewater and can degrade water quality through the release of organic materials and chemicals.

Overflows are being prevented by building new conveyance facilities that can handle peak flows and by taking good care of existing facilities. Conveyance projects undertaken since adoption of the RWSP—such as Brightwater System conveyance and North Creek storage—are being built to meet the 20-year peak flow design standard specified in the policies. The newly consolidated asset management program is working to optimize the useful life of existing conveyance facilities through maintenance, repair, and upgrade. More efficient asset management not only will prevent malfunctions and breaks that can result in overflows but also will allow for more service from each facility for every dollar invested.

Significant resources are being dedicated to ensure that Brightwater is online by 2010 so that the system can manage peak wastewater flows and avoid SSOs in the north end of the service area. By working to meet this schedule, the County is affirming its commitment to minimize disruption to local agencies and host communities that would otherwise occur if alternatives to Brightwater, such as projects to parallel the Eastside Interceptor or Kenmore Interceptor Lakeline, were to be implemented to manage north-end flows.

The County is carefully tracking population growth in all parts of its service area and is fine-tuning its plans to ensure that new facilities are sized to meet needs without excess capacity and are available when needed. This planning places a high priority on alternatives that optimize

opportunities to promote reclaimed water, control inflow and infiltration, and manage demand. This integrated "just-in-time" approach provides the platform for responsible stewardship of resources, including materials, staff, support services, public funds, and community support.

The County will continue to monitor the effectiveness of conveyance system improvement policies during implementation of the RWSP.

Conveyance System Improvement Program

This section describes the Conveyance System Improvement (CSI) program defined in the RWSP. The program has evolved since adoption of the RWSP, but remains within the 1999 policy framework. The assumptions used to define the program are relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few minor changes in assumptions.)

The conveyance planning approach has undergone substantial reorganization since 1999. This reorganization is the result of Council direction to address problems identified during the heavy storms in 1996 and 1997 and to integrate conveyance planning with inflow and infiltration control, water reuse, and local agency plans. Conveyance planning is now being conducted on a geographic basis by natural drainage basins, rather than site-by-site, to assess in greater detail population growth and conveyance needs in each basin.

The RWSP calls for repair or modification of existing conveyance facilities and for construction of new facilities. The CSI program consists of three components: (1) conveyance needed to serve the North Treatment Plant (now called Brightwater), (2) major conveyance improvements, and (3) improvements to minor pipelines ("trunks") in the system.

Conveyance improvements specified in the RWSP are as follows:

- Increase the capacity of the York Pump Station to 68 mgd by 2000.
- Build an underground facility at the North Creek Pump Station to store 6 million gallons (MG) of wastewater during large storms by 2002.
- Build the North Lake Interceptor and pump station to provide 10 MG of storage and provide safeguards in the north end of the service area by 2006.
- Build pipes, pump stations, and an outfall needed to convey wastewater to and from the Brightwater Treatment Plant and upgrade existing conveyance system in the north end of the service area by 2010.
- Increase the capacity of the North Creek Pump Station to 50 mgd, modify the York Pump Station to send 35 mgd to Brightwater, and construct a pipeline to send flow from the North Creek Pump Station to the Kenmore Pump Station by 2016.
- Parallel sections of the Auburn Interceptor by 2004 and construct storage in the interceptor by 2020.
- Construct storage to increase the capacity of the Effluent Transfer System for the South plant by 2030.

- Make a series of improvements to minor trunks throughout the service area.

To avoid SSOs, facilities to provide additional capacity are timed to be online when the 20-year peak flow is expected to exceed the capacity of existing facilities. Moreover, RWSP facilities are sized to accommodate 20-year peak flows projected to occur at population buildout in 2050. Phasing of construction or installation of equipment such as pumps is being done when a facility's useful life does not extend to 2050. Ultimately, all facilities will manage 20-year peak flows expected to occur in 2050.

A 5-year peak flow standard was designated for the Effluent Transfer System (ETS) for the South plant because the ETS carries fully treated effluent. The RWSP calls for construction of a storage tank in 2030, when peak flows are expected to exceed the 5-year standard. Before 2030, during especially large storms, secondary treated flows above the capacity of the ETS will be discharged to the Green River. The *1999 Water Quality Assessment of the Duwamish (Green) River and Elliott Bay* predicted that discharge to the Green River would occur only about two times each year, usually in winter when flows in the river are higher, and that there is little risk to the environment from these infrequent discharges of treated wastewater. To date, effluent has not exceeded the capacity of the ETS and been discharged to the river. The only discharges to the river have been planned discharges as part of routine maintenance and testing.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Six policies were specified in the RWSP to guide conveyance improvements. All policies are being implemented successfully.

Figure 4-1 illustrates the evolution of conveyance planning since adoption of the RWSP, provides links between performance measures and projects identified in basin planning, and includes information on project status and schedule. Performance measures will be modified to incorporate the results of basin planning and Brightwater siting.

Appendix B-2 provides more detail on implementation of policies and performance measures through 2003.

Brightwater Siting Process

Following adoption of the RWSP in 1999, the County began a four-year process to site the Brightwater Treatment Plant and its associated conveyance pipes and outfall. The siting process culminated in the King County Executive's selection on December 1, 2003, of the Route 9–195th Street System. This system includes a treatment plant at the "Route 9 site" in unincorporated Snohomish County, north of the City of Woodinville. It also includes an influent pipeline from Kenmore to the plant site; an effluent pipeline from the plant site to Puget Sound, placed in underground tunnels primarily under NE 195th and NE 205th Streets in King County; and a marine outfall pipeline extending off Point Wells into Puget Sound. For more detail on the siting process, see Chapter 12 of this report and the Brightwater Final Environmental Impact Statement (Final EIS).

Basin Planning

The CSI program now integrates the RWSP conveyance projects with other programs, including asset repair and replacement, to provide consistency in systemwide conveyance planning and to take advantage of opportunities to address common issues, reduce costs, and minimize customer disruption. Conveyance improvements are now grouped into 10 planning areas that correspond to natural drainage basins.

The 10 basin planning areas are as follows (see Figure 4-2):

- Hidden Lake
- Northwest Lake Washington
- North Lake Washington (includes Brightwater)
- Northeast Lake Washington
- North Lake Sammamish
- South Lake Sammamish
- Southeast Lake Washington
- South Lake Washington
- North Green River
- South Green River (divided into three planning zones)

Water reuse, water conservation, and other demand management data are routinely considered in conveyance planning. For example, to provide flexibility for future offsite water reuse, "purple pipe" will be installed from the Brightwater Treatment Plant to the North Creek Portal (Portal 41), located southwest of the plant site in Bothell. Purple pipe distinguishes reclaimed water conveyance lines from wastewater lines. The cost to install this section of pipe now in coordination with construction of Brightwater conveyance lines will be significantly less than the cost to install it in the future.

Effects of Basin Planning on RWSP Conveyance Projects

Results of basin planning have modified recommended plans for some RWSP conveyance projects, primarily in the North Lake Washington and South Green River planning areas. Conveyance projects in the North Lake Washington planning area have also been affected by Brightwater activities, including the siting of facilities and the initiation of predesign, permitting, and property acquisition efforts. In all cases, RWSP objectives and policies are being met in these modifications.

In the North Lake Washington planning area, basin planning and selection of the Route 9 site for the Brightwater Treatment Plant allowed for incorporation of flows planned for some RWSP conveyance projects into the design of other projects. Brightwater influent conveyance will include construction of an influent pump station in Bothell and a gravity influent tunnel from Kenmore to the Route 9 site, with flow diversions where the tunnel intersects the Swamp Creek and North Creek lines. This design allows for integration of flows from the following RWSP-recommended projects into Brightwater influent conveyance: (1) increasing the capacity of the York Pump Station, (2) construction of the North Lake Interceptor and Pump Station, (3) transfer of the McAleer/Lyons flows north, (4) construction of a new pump station at the Kenmore Pump Station site and a force main from the station to Brightwater, and (5) increasing the capacity of the North Creek Pump Station and constructing a force main between this pump station and the Kenmore Pump Station.

In the South Green River planning area, recommended projects to construct future storage facilities and parallel pipelines to Sections 1, 2, and 3 of the Auburn Interceptor have been modified or deferred by the Southwest Interceptor project identified in basin planning.

1999 Adoption	Integrated Planning (#423373) (refer to Figure 4-2)	2003 Capital Improvement Program	Status
I/I Control Program @ $39M		**I/I Control Program @ $39M (423297)**	**In Construction, Phase 1 Will be Completed in 2006**
North Treatment Plant (NTP) Conveyance @ $495.5M North Lake Interceptor & Pump Station by 2006 @ $83.7M McAleer-Lyons Pump Station flows to NTP by 2006 @ $12.4M New 120 mgd Kenmore Pump Station by 2010 @ $80.2M Kenmore Forcemain by 2010 @ $67.2M NTP Tunnel to Outfall by 2010 @ $188.4M NTP Outfall by 2010 @ $8.7M Increase North Creek Pump Station to 50 mgd by 2016 @ $2.4M Modify York Pump Station to 35 mgd to NTP by 2016 @ $7.8M North Creek to Kenmore Forcemain by 2016 @ $44.7M	PLANNING BASINS **Hidden Lake**	**Hidden Lake & Boeing Trunk @ $32.2M (#423365)**	**In Design, Will be Completed in 2009**
	North Lake Washington	**North Creek Storage @ $32.8M (#423519)**	**Completed 2/04**
		Swamp Creek Interceptor Extension @ $7M (#423272)	**Completed 2/03**
		Kenmore Lakeline Flapgates @ $ 0.03M (#423373)	**In Construction, Will be Completed in 2004**
		Brightwater Conveyance @ $788M (#423575)	**In Predesign, Will be Completed in 2010**
	Northwest Lake Washington		
	Northeast Lake Washington	**Juanita Bay Pump Station @ $34.7M (#423406)**	**In Design, Will be Completed in 2007**
		Bellevue Pump Station (Sweyolocken II) @ $21M (#423521)	**In Predesign, Will be Completed in 2008**
	Southeast Lake Washington	**Fairwood Interceptor (Replaced Madsen Creek) @ $21.6M (#423494)**	**In Construction, Will be Completed in Late 2006**
		ESI Section 1 @ $9.3M (#423420)	**Completed 11/03**
	South Lake Washington		
	North Lake Sammamish		
	South Lake Sammamish		
	North Green River	**Tukwila Freeway Crossing (#423520)**	**On Hold**
	South Green River	**Pacific Pump Station @ $7.8M (#423529)**	**In Construction, Will be Completed in 2006**
Specific Conveyance Projects @ $138.2M ESI Section 1 by 2000 @ $19.3M North Creek Storage by 2002 @ $35.6M Auburn Interceptor Sections 1, 2, & 3 by 2004 @ $59.5M Auburn Interceptor Storage by 2020 @ $4.5M South Plant Effluent Storage (3-5 mgd) by 2030 @ $19.2M			
Minor Trunk Improvements @$197.1M 1990-2000 Projects @ $85.7M 2001-2010 Projects @ $49.3M 2011-2020 Projects @ $59.4M 2021-2030 Projects @ $7.4M			
2000 Budget Proviso Projects			
Asset Management Projects			**Ongoing**

Notes:

1. All cost estimates expressed in 2003 dollars.
2. North Treatment Plant is now called Brightwater.
3. (423###) = Capital Budget Number.

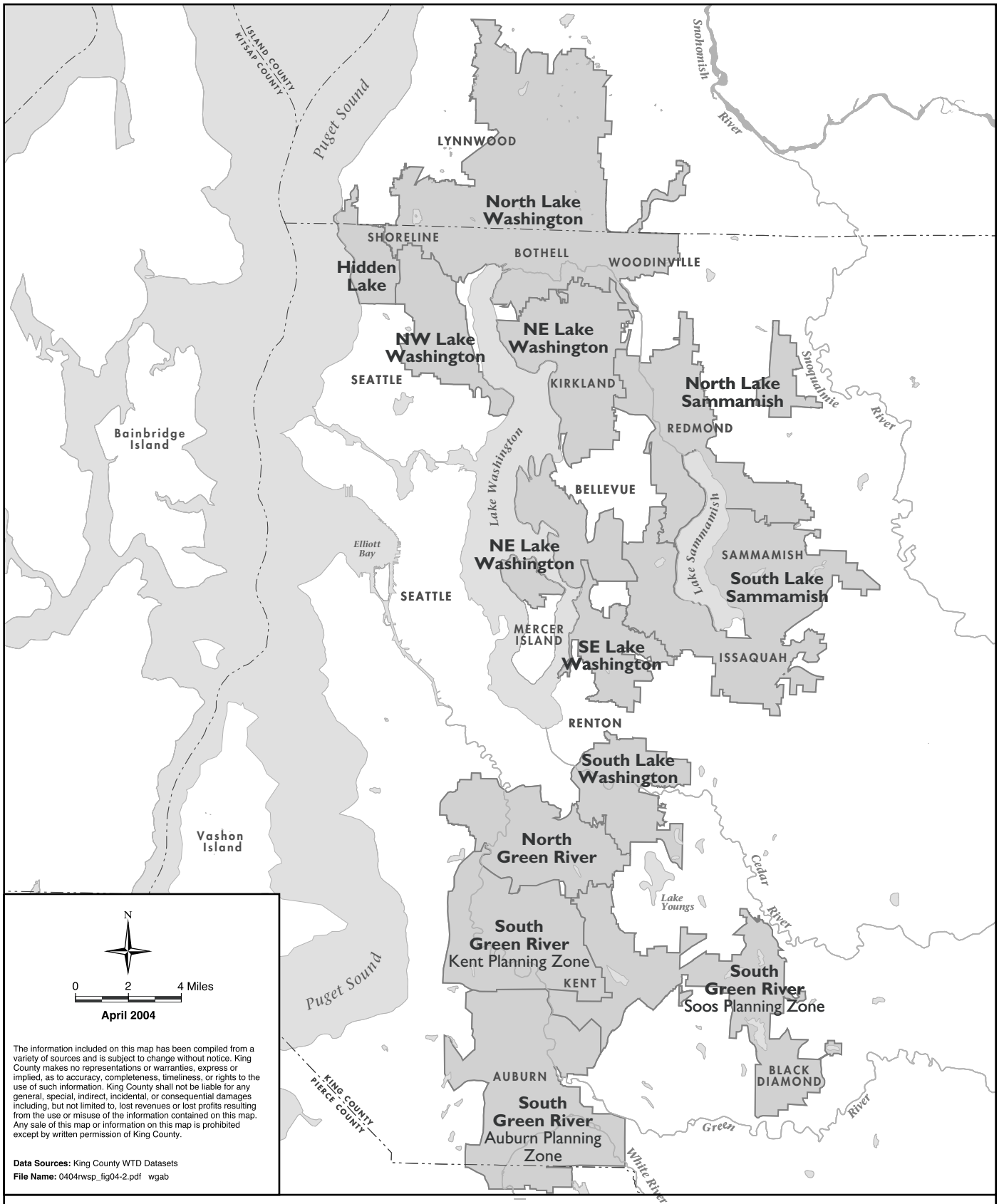
King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

File name: 0404rwsp_fig04-1.pdf wgab

Figure 4-1

Evolution of RWSP Conveyance System Improvement Projects

RWSP 2004 UPDATE



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Figure 4-2

Conveyance Planning Basin Areas

RWSP 2004 UPDATE

Seismic Vulnerability Study

A seismic vulnerability study was done to evaluate the County's major conveyance pipelines that are underwater or in liquefiable soils. The study assessed the vulnerability of these pipelines to earthquake damage and recommended short- and long-term protective measures. The County is using the results of the study to identify possible retrofits or other actions to be taken in conjunction with planned asset management programs and projects. Identified actions will be described under asset management in the capital budget.

Outlook Through 2006

Brightwater Conveyance

Predesign of the Brightwater conveyance and outfall will be completed in mid-2004; design is expected to be substantially complete by late 2005. Property purchases and negotiation of easements have been initiated. Construction permitting will occur in phases over the construction schedule. Construction will begin in late 2005.

Integration of Inflow and Infiltration Control with Conveyance

As information becomes available on the cost-effectiveness of I/I control, the County will assess the benefits of I/I alternatives versus identified conveyance improvements. If I/I alternatives are deemed more cost-effective in specific areas of the system, related conveyance projects may be delayed, reduced in scope, or eliminated. The I/I control program report will be completed in December 2005 and will specify any recommended changes to the conveyance program.

Conveyance Design Standard

King County sizes pipelines to convey the 20-year peak flow. This design standard involves both timing and sizing considerations:

- Building facilities that are **large enough** to contain flow levels that may occur up to once every 20 years by 2050
- Building facilities to be ready **when** the capacity to convey the 20-year peak flow is exceeded.

Building smaller facilities would cost less in the near term, but the facilities would reach their capacity sooner, resulting in increased risk of overflow and increased construction and disruption. Delaying construction of facilities could postpone capital expenditures to a time when they can be better assimilated into the financial plan, but delays would also carry increased risk of overflows until facilities are online.

During development of the RWSP, an analyses of a three-plant system indicated that about 16 percent of conveyance capital, operating, and maintenance costs could be saved by adopting a 5-year peak flow design standard, for both timing and sizing, instead of the 20-year standard. An 11 percent saving could result if the County retained the 20-year standard for sizing but used the 5-year standard for timing, indicating that the greater proportion of the cost saving would be

achieved if construction were delayed. A modification of the timing part of the design standard to 5 years is currently being investigated as a means to control costs of future conveyance projects.

Proposed Sanitary Sewer Overflow Policy

At the time of RWSP adoption, the Environmental Protection Agency (EPA) was in the process of defining a proposed sanitary sewer overflow policy. The policy is still being developed. A key component of the policy—the Capacity Management, Operations and Maintenance (CMOM) Program—appears to be sufficiently defined such that the County has modified its procedures to ensure that the CSI program will meet the policy's requirements. Because changes to this draft policy could have significant implications for wastewater operations, further developments will be monitored closely and additional County response will be developed if needed.

Costs[7]

When the RWSP was adopted in 1999, the estimated cost was $913 million for a treatment system in the north part of the service area, including treatment plant ($421 million), conveyance facilities ($461 million), and land acquisition ($31 million). As of issuance of the Final EIS at the end of 2003, the Brightwater System is estimated to cost $1.35 billion. This estimate consists of $548 million for the treatment plant and $802 million for conveyance facilities, including costs for land. The primary cause of the increase in conveyance costs is the longer influent and effluent conveyance required than assumed in the RWSP. The conceptual RWSP system involved 68,112 feet of conveyance assuming a Swamp Creek area location for the treatment plant; the Route 9 location requires approximately 109,400 feet of conveyance.

In December 2003 and January 2004, value engineering (VE) sessions were held for the Brightwater System. VE is a type of technical peer review in which outside experts evaluate and develop ideas to improve a project and lower its costs. Recommendations from these sessions are expected to be available mid 2004; assessment of associated costs for these recommendations will be available later in 2004.

Brightwater predesign will be completed at the end of June 2004, and a project budget will be established by fall 2004. It is expected that the budget will undergo third-party review and that a productivity target will be set. Project elements will continue to be refined as design continues.

The estimated cost was $326 million to implement the non-Brightwater conveyance system improvements defined in the RWSP. This estimate included $135 million to implement identified projects and another $191 million to make minor trunk improvements. The cost estimate for non-Brightwater conveyance projects is now $638 million. This updated cost reflects the addition of new projects to address problems identified during large storms in 1996 and 1997 (as mandated in the 2000 budget proviso), modifications to RWSP projects resulting from basin planning, application of improved cost estimating models, and other new projects to address recently identified needs. These projects will undergo further refinement during predesign. (See Table 14-1 in Chapter 14 for more information on costs.)

Cost control will remain a high priority in planning, design, and construction of all conveyance improvements.

[7] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 5
Reducing Inflow and Infiltration

Inflow and infiltration (I/I) is the introduction of stormwater or groundwater into the wastewater system through leaky connections of building roof and foundation drains to sewers and through leaks in damaged or defective manholes, mainlines, laterals, and side sewers (Figure 5-1). Approximately 95 percent of I/I occurs in local agency systems. This water, which is relatively clean and does not need treatment, uses up capacity in the wastewater conveyance and treatment system. The Regional Wastewater Services Plan (RWSP), therefore, included an I/I control program that would study the extent of I/I and identify ways to reduce its impact on the system.

This chapter summarizes how policies have guided implementation of the I/I control program specified in the RWSP. It then describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of I/I control program costs. Appendix B-3 lists the assumptions underlying the RWSP I/I control program and provides more information on implementation of policies and performance measures.

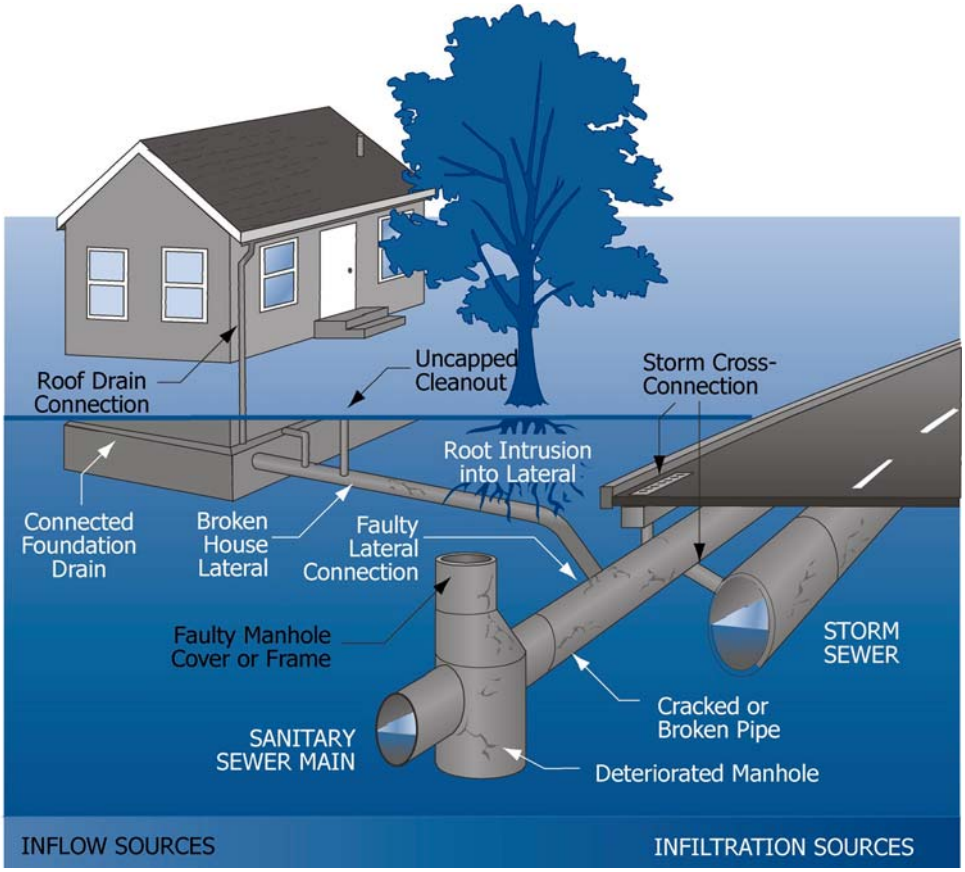


Figure 5-1
Sources of Inflow and Infiltration

Overview of Policy Accomplishments

No changes are recommended in the policies for the I/I control program set by the King County Council in adopting the RWSP. The policy framework for the I/I control program appears to be achieving its intent. Policies guiding the development of the program complement those of the conveyance program discussed in Chapter 4. As with conveyance, the intent is to protect public health and the environment by preventing sanitary sewer overflows. I/I control may provide a cost-effective alternative to building new conveyance facilities to meet capacity needs.

Because most technologies for I/I control are relatively new and unproven, County policies call for a systematic investigation that could form the basis for I/I control decisions. The investigation is under way and will culminate in the Executive's Regional Inflow and Infiltration Control Plan, to be issued the end of 2005. This approach will ensure that only projects with a high likelihood of being cost-effective will be pursued.

Working on I/I has required close collaboration with the local agencies served by the County wastewater system. A benefit of this collaboration has been a strengthening of relationships, a better understanding of local and County needs, and a solid foundation for future collaborative projects that could enhance resource management and reduce costs for agencies and their customers.

I/I Control Program

This section describes the I/I control program defined in the RWSP. The program has changed very little since 1999. It remains within the 1999 policy framework, and the assumptions used to define the program are still relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few changes in the program.)

Development of the I/I control program was prompted by the belief that I/I contributes a large volume of flow to the wastewater system, particularly under storm conditions, and that managing the resulting peak flows was driving the need for costly new facilities. During early phases of RWSP development in 1995, the County conducted a planning-level cost-benefit analysis of various levels of I/I control. Results of the analysis indicated that I/I control may be cost-effective at some levels. The RWSP I/I control program seeks to address the uncertainties in these preliminary cost estimates and to further analyze the benefits of I/I control.

The RWSP directs King County to develop a program that will rehabilitate facilities to control I/I when (1) the cost of rehabilitation is less than the cost of conveying and treating the I/I flow or (2) when rehabilitation would provide significant environmental benefits to water quality, water quantity, streamflow, wetlands, or habitat for species listed under the Endangered Species Act. The overall goal of this program is to reduce I/I in the service area by 30 percent for a peak 20-year storm event. A key component in the success of a long-term I/I control program is the meaningful involvement of local agencies in assessing and reducing I/I in their systems.

The first phase of the I/I control program has been defined. This phase, begun in 1999 and continuing through 2005, focuses on controlling I/I in local systems through the following tasks:

- Define current levels of I/I for each local agency tributary to the regional system.
- Select and construct pilot projects to demonstrate the cost-effectiveness of collection system rehabilitation projects.

- Develop model standards, procedures, and policies for use by local agencies to reduce I/I in their systems.
- Develop a long-term regional I/I control plan for approval by the County Council.

The Alternative/Options report due December 2004 will document the effectiveness of the various I/I control approaches; the Executive's Regional Inflow and Infiltration Control Plan due December 2005 will identify I/I control measures that could serve as cost-effective alternatives to planned conveyance and treatment projects. To allow time to implement the plan, all I/I control measures will be targeted for projects scheduled to be online after 2010. Some projects needed before 2010, however, may be divided into phases to take advantage of I/I cost savings after 2010.

The cost saving opportunities resulting from I/I control will be determined before final decisions are made on sewer rates and capacity charges to fund projects that could be affected by I/I control.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Three policies were specified in the RWSP to guide I/I control. They are being implemented successfully. The performance measures are being met, but in many cases, one year later than scheduled to adjust for drought conditions encountered during flow monitoring (see below). The dates will be changed by one year in the update to the Operational Master Plan. Appendix B-3 provides more detail on implementation of policies and performance measures through 2003.

Throughout this period, King County has been working with the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC)—composed of the local agencies that send wastewater to the King County system. In early 2003, the MWPAAC Engineering and Planning (E&P) Subcommittee was formed to replace the Regional Wastewater Services Plan Subcommittee. The E&P Subcommittee and its predecessor have worked closely with the County and its consultants throughout the planning period in identifying and selecting the pilot rehabilitation projects, developing draft standards, and, most recently, reviewing pilot project results.

Flow Monitoring

The I/I team conducted an initial flow monitoring study between November 1, 2000, and January 15, 2001. This monitoring occurred during the region's driest winter in more than 40 years, a condition that could not have been predicted in autumn 2000 when planning for the monitoring effort took place. Following discussions with MWPAAC members, a second study was conducted between November 1, 2001, and January 15, 2002, a period during which record-setting rains occurred and excellent results were obtained. The flow monitoring identified I/I contributions to the County system by basin. Figure 5-2 shows the maximum rate of I/I entering the sewer for each "mini" basin (subdivisions of basins), providing a relative measure of I/I contribution, expressed as gallons per acre per day.

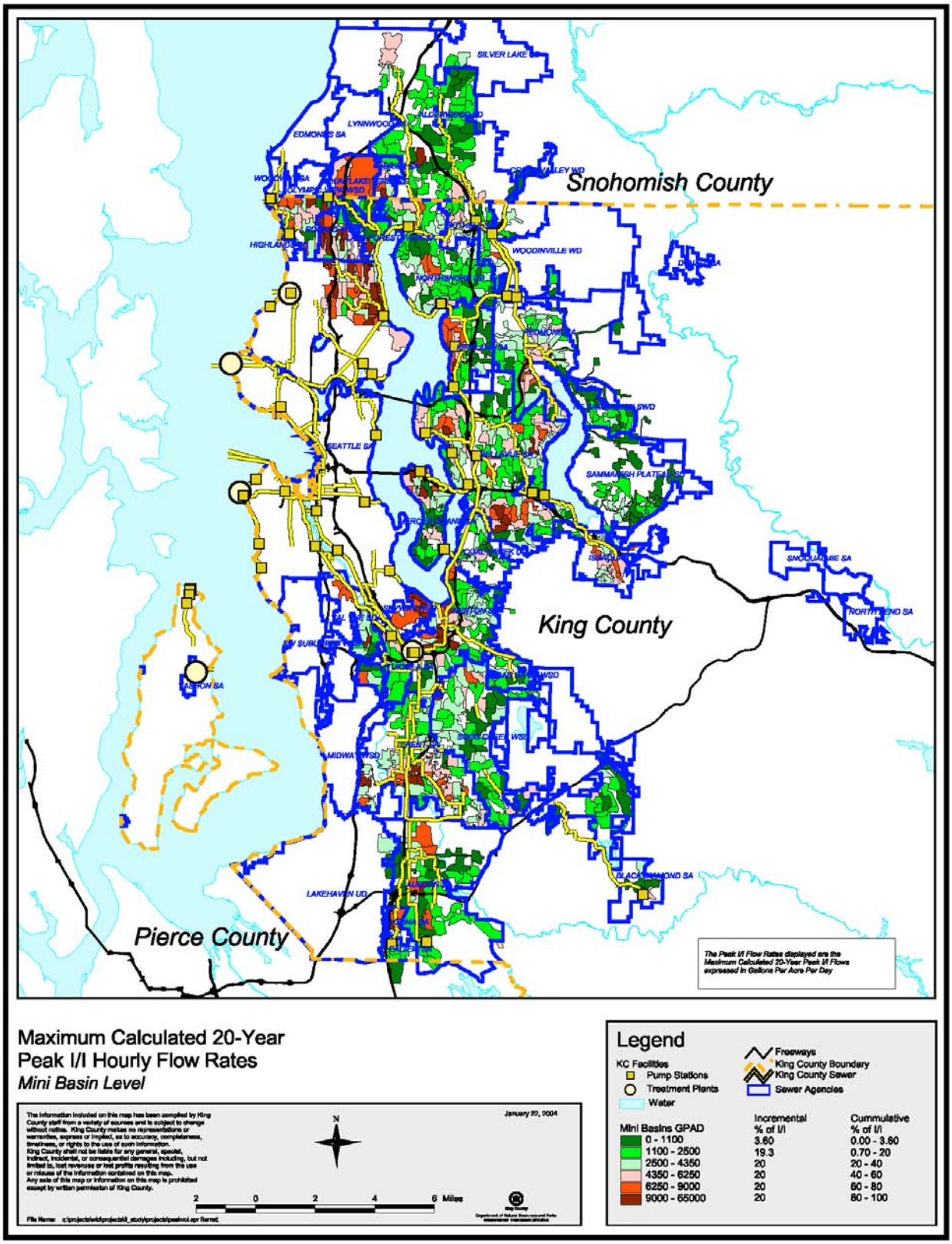


Figure 5-2
Inflow and Infiltration Flow Rates by Mini Basin

Assessment of Public Awareness

Public opinion surveys conducted in 1997 for development of the RWSP indicated that the public considers I/I control as a high priority. Focus groups conducted in 2001 to assess the level of public awareness about I/I, however, indicated that while most participants were initially unaware of the problems caused by I/I, many were skeptical as to the seriousness of the problem. These findings suggest that before the public will support the I/I control program, education is needed about the volume of I/I, the cost of processing wastewater and stormwater, and the methods for correcting the problems.

Standards, Procedures, and Policies

The County worked with MWPAAC's Regional Wastewater Services Plan Subcommittee (now called the Engineering and Planning Subcommittee) to develop model standards, procedures, and policies for use by the local agencies in controlling I/I in their systems. The subcommittee recommended that these draft standards, procedures, and policies be used in the pilot projects where applicable as a means to test their effectiveness. The draft standards, procedures, and policies were accepted by the King County Council and Executive in December 2002 and were applied to the pilot projects. Those that are found to be effective will be finalized and documented in the Alternatives/Options report due to the County Council in December 2004.

Pilot Projects

In May 2002, MWPAAC members used a set of agreed-upon criteria to select 10 pilot I/I control projects for design and construction. The primary purpose of the pilot projects was to test various conveyance system rehabilitation methods. In the second half of 2002, the program's consulting team performed sewer system evaluation surveys (SSESs) for the projects. The surveys involved cleaning mainlines and manholes, and using closed-circuit TV and smoke testing to inspect mainlines, side sewers, and laterals. SSES information was used to support selection and detailed design of I/I control measures.

In 2003, design and construction were completed for the 10 pilot projects. The rehabilitation work was performed in 12 basins: City of Auburn, City of Brier, Skyway Water and Sewer District (formerly known as Bryn Mawr), Coal Creek Utility District, City of Kent, City of Kirkland, City of Lake Forest Park, City of Mercer Island, Northshore Utility District, City of Redmond, Ronald Wastewater District (formerly known as Shoreline Wastewater Management), and Val Vue Sewer District. The methods tested included replacing manholes, rehabilitating manholes using chemical grouting or epoxy injection and adjusting frames and covers, lining pipes using a cured-in-place material, replacing pipes by pipe bursting or open-cut methods, and installing cleanouts. See Appendix B-3 for details on the pilot projects.

Post-pilot-project flow monitoring occurred during winter 2003–2004. The information from this monitoring will be modeled to determine the effectiveness of the pilot projects.

Outlook Through 2006

The analysis of flow monitoring data for the pilot projects and cost comparisons with traditional methods for providing capacity will be completed by the end of 2004. MWPAAC's E&P Subcommittee will then review the effectiveness of each pilot project in controlling I/I. In addition, the subcommittee will revisit the draft standards, procedures, and policies following their use in the pilot projects and will modify them, where appropriate, to reflect actual working conditions and lessons learned.

Pilot results and the final standards, procedures, and policies will be included in the Alternatives/Options report to be submitted by the County Executive to the Council in December 2004. By December 2005, target I/I levels for local systems, along with long-term measures to meet the targets, will be recommended. And, by June 2006, recommendations will be made regarding a possible I/I surcharge on agencies not meeting adopted target levels.

Integration of Inflow and Infiltration Control with Conveyance

As information becomes available on the cost-effectiveness of I/I control, the County will assess the benefits of I/I measures versus identified conveyance improvements. If I/I measures are deemed more cost-effective in specific areas of the system, related conveyance projects may be delayed, reduced in scope, eliminated, or divided into phases (see "I/I Control Program" earlier in this chapter). The cost saving opportunities resulting from I/I control will be determined before final decisions are made on sewer rates and capacity charges for funding projects affected by I/I control.

Local Agency Coordination

Obtaining broad support for an I/I control program is critical because local agency systems are the major sources of I/I. Implementation of an I/I control program will affect each local agency differently. King County will continue to address these different interests as the program develops.

Proposed Sanitary Sewer Overflow Policy

At the time of RWSP adoption, the Environmental Protection Agency (EPA) was in the process of defining a proposed sanitary sewer overflow policy. The policy is still being developed. A key component of the policy—the Capacity Management, Operations and Maintenance (CMOM) Program—appears to be sufficiently defined such that the County has modified its procedures to ensure that the I/I control program meets the policy's requirements. Because changes to this draft policy could have significant implications for wastewater operations, any further developments will be monitored closely and additional County response will be developed if needed.

Costs[8]

In 1999, the I/I control program was estimated to cost $39 million. The program is currently estimated to cost $40 million. Costs have increased for several reasons:

- King County opted to conduct a second year of flow monitoring because of a drought the first year.
- The data from the additional year of monitoring required an upgrade of the permanent database system.
- The extra year of flow monitoring required an extension of the consultant contract and associated costs for continuing local agency coordination, workshops, public education/coordination, leases, and so forth.
- The scope for sewer system evaluation surveys was greater than expected because local agency information was found to be incomplete.
- More effort than originally estimated has been needed to work with the local agencies on development of acceptable design and rehabilitation standards, procedures, and policies.

King County funded all of the costs of the initial flow monitoring and SSES efforts and 100 percent of the costs of 6 of the 8 pilot projects that it is managing. The total cost of the pilot projects, including agency contributions, is $7.7 million. A breakdown of pilot project costs by agency is presented in Table 5-1.

Table 5-1
Construction Cost Estimates for Inflow/Infiltration Pilot Projects

Pilot Project	Estimated Cost (2003$ with local sales tax)
Manhole Pilot Project: Coal Creek, Northshore, and Val Vue	200,000
Auburn	353,600
Kent	993,200
Lake Forest Park	793,500
Brier	370,800
Redmond	825,000 (80,000 local contribution)
Kirkland	842,700 (10,400 local contribution)
Mercer Island	802,250
Skyway (managed by local agency)	1,395,200 (900,000 County contribution)
Ronald (managed by local agency)	1,071,700 (900,000 County contribution)
Total	**7,648,300** **(includes local agency contributions)**

[8] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 6
Reducing Combined Sewer Overflows

During periods of heavy rainfall when flows exceed the capacity of the conveyance system or the West Point plant, untreated discharges of wastewater and stormwater from combined sewers in Seattle are released via outfalls directly into marine waters, lakes, and rivers. These releases are called combined sewer overflows (CSOs). In 1999, an average of approximately 1.6 billion gallons per year was discharged through CSO outfalls.

King County is responsible for 38 CSO outfalls; the City of Seattle is responsible for over 100 (Figure 6-1). CSO sites that meet the Washington State standard of "an average of no more than one untreated discharge per year per outfall" (WAC 173-245) are referred to as "controlled." CSO sites that do not meet this standard are referred to as "uncontrolled."

This chapter summarizes how policies have guided implementation of the program specified in the Regional Wastewater Services Plan (RWSP) to bring all County CSOs into compliance with the standard by 2030. It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of program costs. Appendix B-4 lists the assumptions underlying the CSO control program and provides more information on implementation of policies and performance measures for CSO control projects.

Overview of Policy Accomplishments

At this time, no changes are recommended in the policies for CSO control set by the King County Council in adopting the RWSP. Any changes to policies will be developed through the CSO program review and CSO plan update to be completed late in 2005.

Although they are much more diluted and therefore present a milder risk than sanitary sewer overflows, CSOs also can result in public exposure to disease-causing organisms and in water quality degradation. Policies that guide CSO control affirm the County's commitment to meeting the control standard established by the state. The list of CSO control projects reflects both the priorities defined in the policies—to protect human health, bathing beaches, and endangered species—and the need to ensure that projects make sense in terms of regulations, costs, and benefits.

The policies emphasize the need for clear roles and collaboration in managing stormwater. Planning for stormwater management in relation to the SR 99-Alaskan Way Viaduct and Seawall Replacement Project and other needs within the City of Seattle have prompted the City and County to explore possibilities for collaboration within the framework of RWSP policies.

As a pilot for joint approaches to pollution prevention, the County is working with Seattle Public Utilities and Public Health–Seattle and King County in controlling sources of pollution from CSOs and storm drains as part of sediment cleanup in the Lower Duwamish Waterway. Successes

in the Lower Duwamish area can then be applied to other areas in a coordinated manner that avoids redundancies.

Fundamental to the RWSP's policy approach to CSO control is the call for a comprehensive program review. This review is just beginning and is being conducted in conjunction with the 2005 CSO control plan update, scheduled for submission to the King County Council and the Regional Water Quality Committee by late 2005. The purpose of the review is to assess program benefits and to make any needed mid-course corrections to ensure that resources and public funds are being used for maximum benefit. A thorough review of CSO policies is also occurring as part of the 2005 CSO control plan update. Any recommendations for policy changes will be made then and will be reported in the 2007 RWSP update report.

CSO Control Program

This section describes the CSO control program defined in the RWSP. The program has changed very little since 1999. It remains within the 1999 policy framework. Some of the original planning assumptions have changed, particularly regarding the status of the City of Seattle's CSO control program. (See "Implementation Highlights Through 2003" in this chapter for a description of changes in assumptions.)

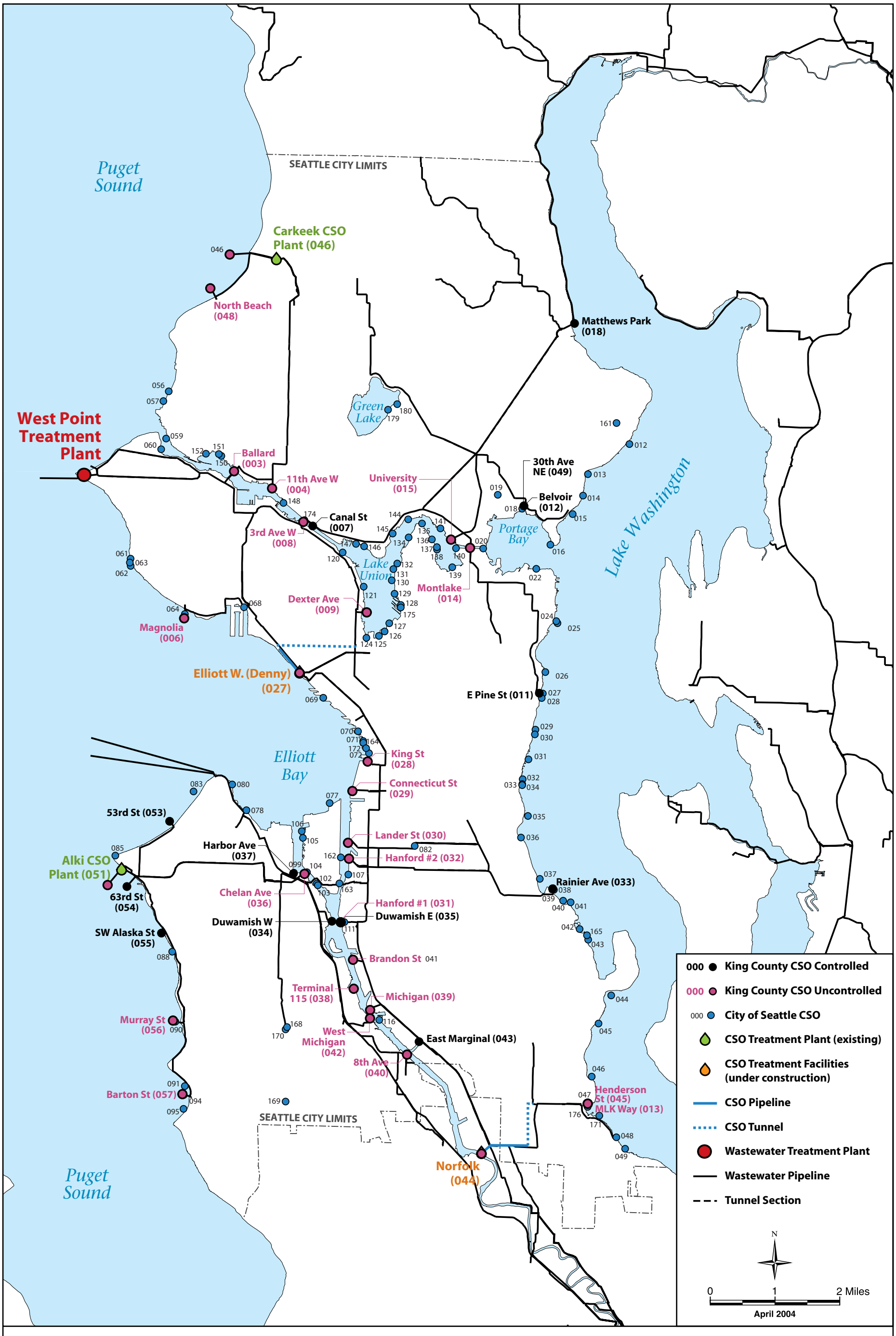
The RWSP assumes that by 2030, the County will achieve the Washington State standard of one untreated overflow per year on average at each CSO outfall. It recognizes, however, that the standard, and therefore the County CSO control program, may change in the future in response to Endangered Species Act (ESA) listings or other water quality problems that come to light.

The schedule to implement projects is designed to give priority to CSO discharges that present the highest potential to impact human health, bathing beaches, and/or species listed under ESA. These priorities are based on water quality and contaminated sediment assessments.

CSO Control Projects

During development of the RWSP, two large CSO control projects—Denny Way/Lake Union and Henderson/Martin Luther King—were already under way. The Denny Way/Lake Union project, a joint project with the City of Seattle, will control most overflows into Lake Union and will control the County's largest CSO in Puget Sound at Denny Way, near Myrtle Edwards Park. The Henderson/Martin Luther King project (now called Henderson/Martin Luther King/Norfolk) will control two CSOs in Lake Washington and one on the Duwamish River at Norfolk. These projects are scheduled to be complete in 2005.

The RWSP defined 22 more projects to bring the remaining uncontrolled County CSOs into control by 2030. These projects focus on capturing the overflows and diverting them either to a storage tank or to a CSO treatment facility. The storage tanks hold the flow until the storm has passed and room is available in the pipelines to transfer the flow to the West Point Treatment Plant for treatment, often to full secondary levels. The small, local CSO treatment facilities provide the equivalent of primary treatment—physical screening and settling, followed by disinfection—before discharge to water bodies. Table 6-1 lists CSO control projects that are included in the RWSP or are currently under way, and indicates changes that may be considered in the 2005 CSO program review and plan update (see "CSO Control Plan Updates" below). Locations of the projects and their assigned priorities are illustrated in Figure 6-2.



King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Data Sources: Standard KC Datasets 10/02
File Name: 0404rwsp_fig06-01.pdf wgab
Prepared by: KC WLR Visual Communications & Web Unit

Figure 6-1
King County and City of Seattle Combined Sewer Overflow (CSO) Locations
RWSP 2004 UPDATE

Table 6-1
Description of CSO Control Projects

RWSP Project	Water Body	Online	Comments/Changes
Henderson/Martin Luther King—storage and treatment tunnels	Lake Washington	2005	In progress before adoption of the RWSP (now called Henderson/Martin Luther King/Norfolk).
Denny Way/Lake Union—storage and treatment tunnels	Puget Sound/Lake Union	2005	In progress before adoption of the RWSP. A joint project with the City of Seattle.
Norfolk—0.8-MG storage tank	Duwamish River	2009	Project need met through the Henderson/Martin Luther King project; CSO will be controlled by 2005.
South Magnolia—1.3 MG storage tank	Puget Sound	2010	Application has been made for low-interest State Revolving Fund loans.
SW Alaska—0.7-MG storage tank	Puget Sound	2010	Modeling for the 2000 update indicates that this project may not be needed. Verification is under way and will be reported in the 2005 CSO plan update.
Murray—0.8-MG storage tank	Puget Sound	2010	Application has been made for low-interest State Revolving Fund loans.
Barton—pump station expansion and upgrade	Puget Sound	2011	Application has been made for low-interest State Revolving Fund loans.
North Beach—storage tank and pump station upgrade	Puget Sound	2011	Application has been made for low-interest State Revolving Fund loans.
University/Montlake—7.5-MG storage tank	East Ship Canal	2015	Potential for coordination with City of Seattle Windermere projects will be evaluated in the 2005 CSO plan update.
Hanford No. 2—3.3-MG storage/treatment tank	Puget Sound	2017	No change recommended.
West Point Improvements to enhance CSO treatment	Puget Sound	2018	No change recommended.
Lander—1.5-MG storage/treatment tank	Puget Sound	2019	No change recommended.
Michigan—2.2-MG storage/treatment tank	Duwamish River	2022	No change recommended.
Brandon—0.8-MG storage/treatment tank	Duwamish River	2022	No change recommended.
Chelan—4.0-MG storage tank	Puget Sound (Elliott Bay)	2024	No change recommended.

(continued on next page)

Table 6-1 (continued)
Description of CSO Control Projects

RWSP Project	Water Body	Online	Comments/Changes
Connecticut—2.1-MG storage/treatment tank	Puget Sound (Elliott Bay)	2026	Schedule may be changed to coordinate with the SR 99-Alaskan Way Viaduct and Seawall Replacement Project.
King Street—conveyance to Connecticut	Puget Sound (Elliott Bay)	2026	Schedule may be impacted by the SR 99-Alaskan Way Viaduct and Seawall Replacement Project.
Hanford at Rainier—0.6-MG storage tank	Duwamish River	2026	No change recommended.
8th Ave S—1.0-MG storage tank	Duwamish River	2027	No change recommended.
W Michigan—conveyance expansion	Duwamish River	2027	No change recommended.
Terminal 115—0.5-MG storage tank	Puget Sound (Elliott Bay)	2027	No change recommended.
Ballard—1.0-MG storage tank	West Ship Canal	2029	At the request of the City of Seattle, the schedule may be accelerated. Will be evaluated as part of the 2005 CSO plan update.
3rd Ave W—5.0-MG storage tank	West Ship Canal	2029	No change recommended.
11th Ave NW—2.0-MG storage tank	West Ship Canal	2030	No change recommended.

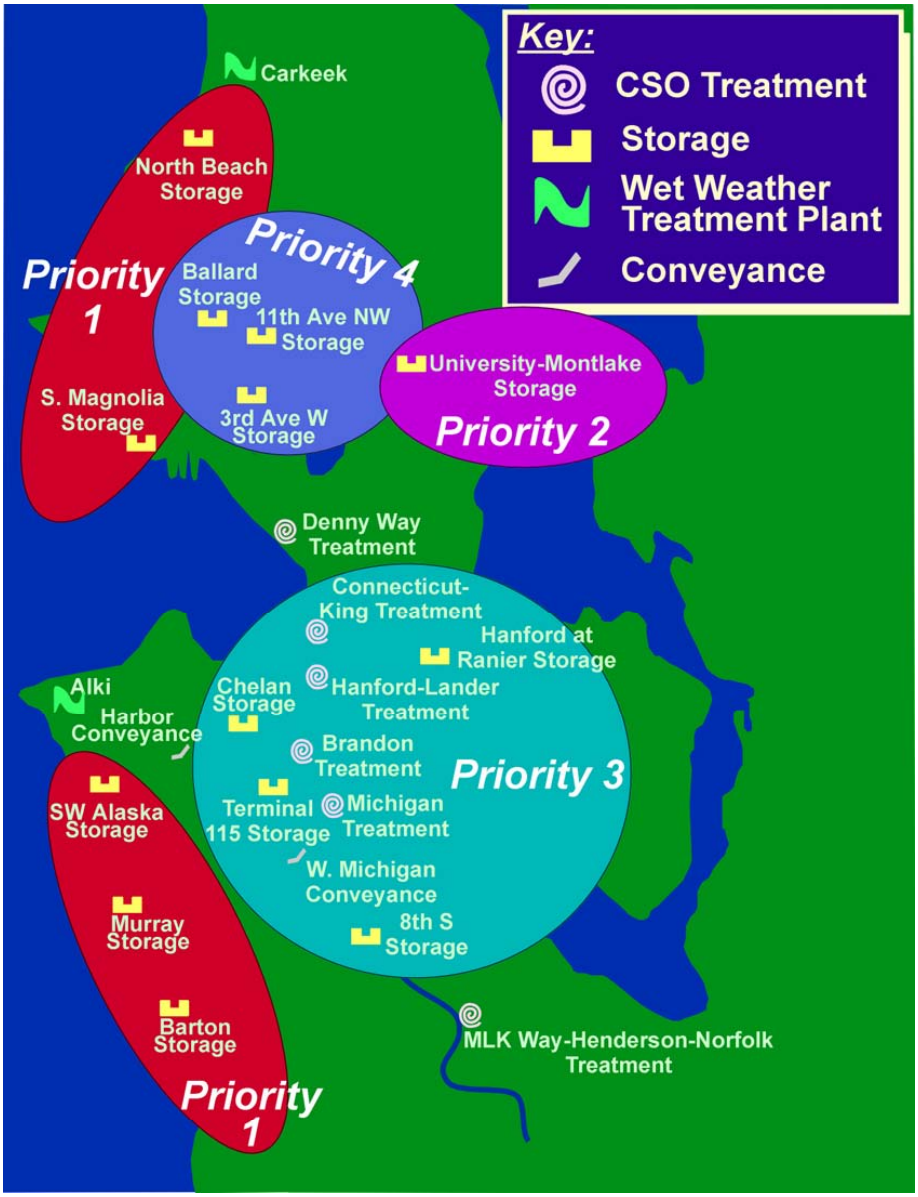


Figure 6-2
Prioritized RWSP CSO Projects

CSO Control Plan Updates

The CSO plan described in the RWSP undergoes periodic review by the Washington State Department of Ecology (Ecology) under National Pollutant Discharge Elimination System (NPDES) requirements. The plan is also reviewed by the Council to ensure that CSO control projects make sense in the context of other programs and priorities in the region.

The RWSP calls for updates to the CSO control plan in conjunction with renewal of the NPDES permit for the West Point plant in 2000 and in 2005.[9] The 2000 plan update identified environmental and human health concerns related to historically contaminated sediments at CSO discharge locations and identified some emerging technologies to be considered during predesign of future CSO control projects. No changes to the CSO control plan were recommended under the 2000 plan update, primarily because the NPDES permit renewal application for West Point was due to Ecology only six months after adoption of the RWSP.

The RWSP also directs the King County Executive to review the potential benefits of CSO control projects, along with other pollution control projects developed by the County and other agencies in the area, and to present recommendations in the 2005 CSO plan update report. No new CSO projects (other than the two projects that were under way at the time of RWSP development) will begin prior to this CSO program review, unless approved by the Council. Specifically, the review includes the following items:

- Maximizing the use of existing CSO control facilities
- Identifying the public and environmental health benefits of continuing the CSO control program
- Ensuring that projects comply with new regulatory requirements and objectives such as the ESA and the Habitat Conservation Plan (see Chapter 13)
- Analyzing program impacts on sewer rates
- Ensuring that the program honors and is consistent with long-standing commitments
- Assessing public opinion
- Integrating the program with other water and sediment quality improvement programs for the region

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. The RWSP specified nine policies to guide CSO control. Policies are being implemented successfully. Work has continued on the CSO control projects under way at the time of RWSP adoption. No new projects have been initiated, pending completion of the program review and CSO plan update in 2005.

Appendix B-4 provides more detail on implementation of policies and performance measures through 2003.

Coordination with the City of Seattle CSO Program

A primary assumption underlying the RWSP CSO control program was that the City of Seattle had controlled its CSOs. Further, it was assumed that implementation of the City's drainage

[9] The CSO program review and plan update will be completed in 2005 as scheduled in the RWSP. The update will be submitted to Ecology in 2008. This later schedule results from Ecology's delay in renewing the West Point NPDES permit.

ordinance not only would avoid introducing new stormwater flows to the combined sewer system but also would decrease the current peak volume as redevelopment occurred over time.

Since the RWSP was adopted, the City of Seattle monitored all of its CSO locations. The results of this monitoring showed that, contrary to the assumption made in the RWSP, many of the City's CSOs were not controlled. The City was therefore required to develop an amendment to its 1988 CSO control plan to bring all sites into control. The amendment, completed late in 2001, focused on six priority areas: North Lake Washington/Windermere, Puget Sound/Magnolia, Longfellow Creek/Delridge, Duwamish River/Diagonal, South Lake Washington/South Genesee Street, and South Lake Washington/South Henderson Street. It also included two areas from an earlier plan: Ballard and Fremont/Wallingford.

The amendment identified 14 storage and conveyance projects, as well as pipe cleaning and facility repair projects, to bring the priority areas into control. These projects will be done by 2014 at a cost of $62 million. The City will investigate other overflow areas in the next plan amendment required by Ecology in 2006. Any projects developed from future plan amendments are expected to be complete by 2020 for an additional $20 to $40 million.

The rationale behind the City's control approach is to store its CSOs until room is available in the County system and then to transfer the CSOs to the County conveyance system for transport to West Point for treatment. The City has committed to build its storage facilities large enough to hold these new flows until room is available in the County system so that no increase in County overflows occurs.

A method to reimburse the County for the expense of conveying and treating these new flows will need to be developed. Currently, the County collects revenue from its contracting local agencies according to the number of customers that they serve. Monthly rates are uniformly assessed on all residential customers; commercial and industrial customers pay on the basis of residential customer equivalents (RCE), where 750 cubic feet of wastewater per month equals one RCE. This approach does not account for the costs to manage new flows resulting from stormwater. In 1992, amendments were made to the contract between Seattle and the County that enabled collection of additional fees to manage new stormwater flows, but fees have not yet been levied.

The City of Seattle has also asked the County to consider accelerating the start of the Ballard CSO control project from 2023 to as early as 2006 because this project is a high priority in the City's program. The County will consider this proposal during the 2005 CSO plan update process. The County and City will continue to pursue possibilities for joint projects that could save costs and minimize community disruption.

Coordination with the SR 99-Alaskan Way Viaduct and Seawall Replacement Project

The SR 99-Alaskan Way Viaduct (AWV) and Seawall Replacement Project, a joint project between the Washington State Department of Transportation (WSDOT) and the City of Seattle, presents an opportunity to re-plumb the Seattle waterfront and provide new capacity for redevelopment and for serving the growing cruise line industry. If funding for the project is obtained, construction could begin as early as 2008 and take six to eight years to complete.

The County's King Street CSO project, which is currently scheduled to begin in 2020, may need to begin sooner to accommodate the AWV project. Acceleration of some elements of the King Street project will need to be negotiated with WSDOT and the City of Seattle. The City of Seattle has asked the County to consider an alternative for this project that would allow the City to put separated stormwater that currently discharges directly to Elliott Bay into the combined sewer system. The stormwater would then be transferred to the West Point plant. If the Elliott Bay Interceptor to West Point is full, the stormwater would go to the Denny Way/Elliott West CSO treatment facility or to the proposed Royal Brougham CSO treatment facility (under the combined Connecticut and King CSO control projects in the RWSP). Implementation of this plan would require the acceleration of the Connecticut and King CSO projects to align with the AWV project schedule.

The request to discharge stormwater to the County's wastewater system for treatment stems from the City's desire to reduce the costs and liability associated with treating stormwater at its waterfront discharge points. The City believes that waterfront stormwater flows can be more cost-effectively treated along with combined flows. Acceptance of these flows is a complex issue that has the potential to affect operation and maintenance of County facilities. The decision to do so could set precedents for future City of Seattle drainage projects.

County policy CSOCP-4 states that facilities shall not be designed for the interception, collection, and treatment of clean stormwater. This policy responds to the general thrust of federal and state regulation and guidance away from combined systems and toward separated systems. This regulation and guidance have developed in recognition of the challenges of managing such variable rainfall-driven wastewater flows.

As mentioned above, a methodology to reimburse the County for managing these flows will need to be developed if the County agrees to accept the City's stormwater. The AWV project is currently assessing the environmental impacts and benefits of both the CSO treatment approach and the traditional best management practices approach. It will present its conclusions in the water quality discipline report prepared for the project's draft environmental impact statement. This information, as well as consideration of the policy implications, will need to inform the decision through the 2005 CSO plan update process.

Sediment Management Program

The sediment management program was formed to implement the sediment management plan (SMP) called for in the RWSP and to implement any new projects developed after the SMP within the broader context of wastewater planning. The program addresses sediment quality issues near CSO discharges and treatment plant outfalls, evaluates and addresses emerging wastewater treatment sediment quality issues, and incorporates sediment quality considerations into comprehensive planning.

The SMP was completed in 1999. It assessed areas near seven County CSOs that were listed on the Washington State Contaminated Sites list for their risk, preferred cleanup approach, partnering opportunities, and potential for recontamination after remediation. Table 6-2 shows a summary of the SMP-recommended projects and their current status.

Table 6-2
Recommended Projects in the Sediment Management Plan

Nearby CSO	Cleanup Priority	Recommended Cleanup Approach	Partnering Opportunity	Cost ($millions)[a]	Scheduled Completion
Duwamish/ Diagonal[b]	High	Dredging and Capping	Conducted by the County under direction of EBDRP[c]	8.9[d]	2004
King	High	Capping	WSDOT and Seattle	2.5	2008
Hanford	Medium/ High	Dredging and Confined Aquatic Disposal (CAD)	Port of Seattle	15.4	2007
Lander	Medium/ High	With Hanford	U.S. Army Corps of Engineers	3.4	2007
Denny A & B[e]	Medium	Dredging and Capping		2.2	2006
Denny C & D	Medium	Capping		0.9	2009
Chelan	Low/ Medium	Dredging and CAD		2.7	2010
Brandon	Low	Capping		0.5	2012

a. Cost estimates were given in 1998 dollars for the sediment management plan (SMP). These original estimates are being presented in 2003 dollars in this update report so that they can be compared with current estimates.

b. This project was added after the SMP.

c. These costs were not included in the SMP; it was assumed that they would be paid by the Elliott Bay/Duwamish Restoration Program (EBDRP).

d. EBDRP administers projects funded under a 1990 settlement of litigation by the National Oceanic and Atmospheric Administration (NOAA) for natural resource damages from City of Seattle and King County CSOs and storm drains.

e. This is a City of Seattle storm drain; King County's Hanford No. 1 CSO shares this outfall.

Maintaining sediment remediation schedules in the SMP is and will continue to be a challenge because of the high level of regulatory review, approval requirements, and environmental permitting associated with these projects. In addition, regulatory mandates under the ESA or the CERCLA (also known as Superfund) [10] at other CSO sites could affect the County's ability to meet the SMP schedule.

Sediment Cleanup Under Superfund

Since preparation of the SMP, the Harbor Island Superfund site was extended across the East Waterway of the Duwamish River to include the Port of Seattle's dredging project near the

[10] Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA Title 42 U.S.C. Chapter 103), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law provides broad federal authority for cleaning up abandoned or uncontrolled hazardous waste sites.

County's Lander and Hanford CSOs. The County is negotiating with the Port on forming a partnership for cleanup in the East Waterway area.

Also since preparation of the SMP, the Lower Duwamish Waterway was listed as a federal Superfund site. King County's sediment management program was assigned to develop and negotiate the County's response to the Superfund listings along the Lower Duwamish Waterway. A Memorandum of Agreement was signed with the City of Seattle, Port of Seattle, and Boeing (together known as the Lower Duwamish Waterway Group) to jointly complete the initial remedial investigation and feasibility study (RI/FS). An Administrative Order on Consent was entered into with the Environmental Protection Agency (EPA) and Ecology for much of this work, and Phase I of the RI has been completed. The following contaminated sites were identified for early action:

- Diagonal/Duwamish
- River Mile 2.3, west shore
- Slip 4
- Boeing Plant 2
- Terminal 117
- River Mile 3.8, east shore
- Norfolk

Remediation has been completed or is under way at early action sites where sufficient information is available to move forward ahead of RI/FS results. The Norfolk site cleanup was completed by King County, the City of Seattle, and the Elliott Bay/Duwamish Restoration Program (EBDRP).[11] King County is the lead agency with participation by the City of Seattle on a 7-acre sediment remediation project under way near the Duwamish and Diagonal outfalls that drain a large basin extending east and north from the outfalls in the Lower Duwamish Waterway. This project is funded by the EBDRP. Another project—an early action source control project to clean sediment from inside the Diagonal Storm Drain/CSO pipe—was led by the City of Seattle and partially funded by King County.

In 2002, the agencies involved in the Lower Duwamish Waterway Superfund site initiated the Lower Duwamish Waterway Source Control Project. The goal of this project is to minimize the potential for chemicals in sediments to exceed the Sediment Management Standards (WAC 173-204) and the Lower Duwamish Waterway sediment cleanup goals after cleanup.

Inspectors from King County Industrial Waste, King County Hazardous Waste, Public Health–Seattle and King County, and Seattle Public Utilities will be inspecting businesses that discharge to sanitary sewers, combined storm and sanitary sewers, or Seattle Public Utilities storm sewers. Concurrently, inspectors from the Port of Seattle will inspect Port tenants and inspectors from Ecology will inspect other waterfront properties. Inspectors will enforce existing regulations and identify best management practices that businesses can use to prevent pollution.

[11] The Elliott Bay/Duwamish Restoration Program administers projects funded under a 1990 settlement of litigation by the National Oceanic and Atmospheric Administration (NOAA) for natural resource damages from Seattle and County CSOs and storm drains.

The project began in 2003 with training for more than 30 inspectors from six different agencies. The goal is for inspectors to be knowledgeable about a variety of different regulations so that each business need only be inspected once.

Coordination of Sediment Remediation and CSO Control Projects

Until recently, it was assumed that sediment remediation should be undertaken after a CSO had been controlled to avoid recontamination of the site. However, SMP modeling of uncontrolled CSOs suggests that significant recontamination from uncontrolled CSOs would occur only at the Denny Way site and that current overflows are less problematic than in the past when CSOs may have been a significant source of contamination. It was concluded, therefore, that sediment cleanup, combined with a strong source control program, could be implemented ahead of CSO control projects with minimum risk of later recontamination.

Because the SMP modeling used a far-field model, its conclusions cannot be applied to the small localized area immediately in front of an outfall. A project is currently under way to develop a near-field model to answer remaining questions about the potential for post-remediation sediment recontamination. This project is expected to be complete in 2004.

The listing of the Lower Duwamish Waterway as a Superfund site and the extension of the Harbor Island Superfund site across the East Waterway may generate increased interest in accelerating CSO projects near sediment remediation sites on the Duwamish River. Currently, Duwamish River CSO control projects are scheduled for completion by 2027. The rationale for setting this schedule was the belief that these CSOs represented a lower public heath risk than others and that CSO control improvements would be lost as pollution from upstream sources continued to impact water quality in the area.

The sediment management program may experience pressure to conduct studies beyond the scope needed to develop alternatives, to clean up nearby contamination caused by others, or to add sites to the schedule as the result of regulatory actions. The near-field sediment recontamination model that is being developed will help the County to better understand the impact of current CSO discharges on sediments and therefore the timing of CSO control projects in relation to sediment remediation. The County will remain proactive in its participation with EPA, Ecology, and other stakeholders in defining remediation projects that make sense and are cost-effective. The results of these efforts will be reported in the 2007 RWSP update report.

Effect of EPA's CSO Control Policy

EPA's CSO Control Policy was codified as the Wet Weather Water Quality Act of 2000 (H.R. 4577, 33 U.D.C. 1342(q)). The requirements of this act are incorporated in the NPDES permit for the West Point plant. To comply with these requirements, the most recent permit application included a public notification program and additional documentation of program compliance. The public notification program, developed jointly with the City of Seattle and approved by Ecology, includes the provision of signs, brochures, and a public hotline.

Outlook Through 2006

The CSO program review and plan update will be completed in 2005. Regional focus groups will be convened to provide public input for the 2005 CSO plan update.

After the 2005 CSO plan update review and approval by Council, predesign for the first RWSP CSO control projects can begin. NPDES permitting for the pre-RWSP Denny Way/Lake Union and Henderson/Martin Luther King/Norfolk CSO projects will be done in 2004–2005, before these projects come online in 2005.

The Duwamish/Diagonal sediment remediation project and the RI/FS for the Lower Duwamish Waterway Superfund process will be completed during this period. Permitting for the cleanup of contaminated sediments in front of the old Denny Way CSO outfall structure will begin. Work may begin on the Hanford and Lander sediment remediation projects in conjunction with the Port of Seattle dredging project. Additional sediment cleanup projects in the Lower Duwamish Waterway may be identified.

Coordination with the City of Seattle on CSO control, stormwater management, and sediment remediation will continue to be important throughout the next few years.

Costs[12]

In 1999, the CSO control program was estimated to cost $417 million; the program is now estimated to cost $366 million. The change in cost reflects the incorporation of the Norfolk project into the Henderson/Martin Luther King project, elimination of the SW Alaska project, and deletion of dollars originally earmarked for the Denny project (now part of the Denny Way/Lake Union project), which started ahead of the RWSP to take advantage of federal grant dollars. Current information indicates that the SW Alaska CSO is already controlled. Verification will occur under the 2005 CSO plan update.

Applications for State Revolving Fund loans for the next four CSO control projects have been submitted to Ecology. Awards will be announced in August 2004. The County will continue to look for grant or loan funding and joint project opportunities to reduce costs to ratepayers.

Costs for the projects identified in the sediment management plan were not included in the RWSP. At the time the plan was prepared in 1999, the cost for sediment cleanup projects was projected to be $29 million using optimistic disposal costs. The cost for these cleanup projects is now estimated to be $32 million. The cost estimate has increased with the addition of the Lower Duwamish Waterway RI/FS (approximately $4 million) to the sediment management program budget. Costs for any additional projects required as a part of the Lower Duwamish Waterway Superfund effort will not be defined for several more years. Every effort will be made to ensure that the County's share will be cost-effective and reasonable.

[12] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 7
Recycling Biosolids

Biosolids are a nutrient-rich organic material that results from solids processing at King County's wastewater treatment plants. On average, the County produces approximately 128,000 wet tons of Class B biosolids each year—all of which are recycled for use in forestry, compost, and agricultural applications. A byproduct of biosolids production is methane (digester gas). Both the West Point and South plants recover this gas for energy production.

This chapter summarizes how policies have guided implementation of the biosolids program specified in the Regional Wastewater Services Plan (RWSP). It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of biosolids program costs. Appendix B-5 lists the assumptions underlying the RWSP biosolids program and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for the biosolids program set by the King County Council in adopting the RWSP. The policy framework appears to be achieving its intent. The policies are supporting a strong biosolids program that meets the County's goals.

The RWSP policies emphasize that the existing biosolids program is working well and should be continued. In continuing the program, with its recycling and resource recovery orientation, the County has remained consistent in promoting environmental stewardship. County treatment plants produce high quality Class B biosolids[13] that meet or exceed all requirements for protecting public health and the environment.

The RWSP polices also recognize the challenges to biosolids recycling and call for a program that is sensitive to shifting markets and ready to respond to change. In meeting the intent of these policies, the County has developed relationships with a variety of customers, particularly farmers, whose demand for biosolids exceeds the current supply. Recognizing that different markets may be available to King County if the more highly treated Class A[14] biosolids were produced, the County continues to explore new production technologies.

Through participation in national organizations such as the National Biosolids Partnership and local organizations such as the Northwest Biosolids Management Association and the Clean Water Coalition, the County is partnering to promote public understanding of the risks and benefits of biosolids and to assure the public of the safety of Class B biosolids. This participation enables the County to stay aware of trends in biosolids management.

[13] Class B biosolids are processed to significantly reduce disease-causing microorganisms (pathogens) to levels that are safe for land application, with appropriate site management and a period of limited public access.

[14] Class A biosolids have been further treated (beyond Class B) to a level of no detectable pathogens and can be sold in bags or used for landscaping and home gardens.

The County will continue to monitor the effectiveness of the biosolids program policies and will propose changes if needed.

Biosolids Recycling Program

This biosolids program as defined in the RWSP has changed very little since 1999. It remains within the 1999 policy framework, and the assumptions used to define the program are relevant today. The County strives to recycle 100 percent of its biosolids and recover digester gas for energy production. Solids produced at Brightwater will be managed under the same standards.

The South plant refines and sells digester gas to Puget Sound Energy for distribution in its natural gas system. The plant has recently installed a digester-fired boiler and will soon use this gas to fuel turbine generators and a fuel cell to produce electricity for plant processes. West Point uses the gas to fuel engine generators that produce electricity and power influent pumps. The electricity produced at West Point is used to offset electricity purchased from Seattle City Light.

The Technology Assessment Program evaluates technologies to improve the biosolids process and product. Evaluation criteria include product quality and marketability, production noise, odor, reliability, amount of land required, number of truck trips needed to transport the biosolids, and impacts on sewer rates.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003 (see Appendix B-5 for more details).

Ten policies addressing goals for recycling, energy recovery, and technology assessment were specified in the RWSP. All biosolids recycling policies are being implemented successfully. Two RWSP biosolids performance measures are ongoing to ensure compliance with the policies: (1) continue to produce Class B biosolids at existing treatment plants, and (2) evaluate new biosolids processing technologies. Two additional performance measures were completed in 2003: (1) determine whether digesters at West Point could be replaced or the number of digesters reduced, and (2) evaluate and select a solids processing technology for Brightwater.

Biosolids Quality

There is an increasing trend, nationally and locally, toward implementing technologies at treatment plants to improve biosolids quality (for example, eliminating pathogens and reducing odor). Metals concentrations in County biosolids have been reduced and are consistent with regulatory requirements. The County is now evaluating opportunities to reduce pollutants that are on the Washington State Department of Ecology (Ecology) list of Persistent, Bioaccumulative, and Toxic (PBT) compounds. Ecology's initiative to reduce these compounds is currently focusing on eliminating the release of mercury into the environment. King County's Industrial Waste and Hazardous Waste Programs implemented one of the first programs in the nation for reducing the amount of mercury in discharges to the wastewater system, including a program for reducing the amount of mercury in dental amalgam discharged by dental offices.

Plastics from commercial products disposed through sewers are becoming a problem in producing and marketing biosolids. New influent screens will be installed at West Point in 2006 to capture plastics before they enter the treatment process.

In response to regulations and public concerns and in an effort to increase its biosolids markets, King County continues to evaluate the safety and environmental benefits of its biosolids program through a combination of research, demonstration, and monitoring projects and to evaluate new uses that may provide additional environmental benefits. Public outreach and education strategies are evaluated and updated annually.

Technology Assessment Program

The Technology Assessment Program is evaluating new technologies that have the potential to increase the efficiency or reduce the potential impacts of solids processing, improve biosolids quality, and produce Class A biosolids. Over 40 types of biosolids-related technologies have been evaluated and seven biosolids-related pilot studies have been completed. Numerous technical reports have been prepared, ranging from an evaluation of methods to reduce noise and odor from biosolids trucks to identification of specific microorganisms that are associated with "healthy" digesters.

The West Point Settlement Agreement[15] required completion of a study to determine the feasibility of replacing the digesters at the West Point plant with other solids processing technology. The desired outcome was the elimination of digesters at the plant. In December 2000, the West Point Citizen's Advisory Committee[16] submitted a final "Report and Recommendation" to the Executive and Council. The Advisory Committee's report states:

> Staff has conducted a very comprehensive program to reach the conclusion that, given the constraints and objectives at the West Point Treatment Plant, there are no safe and reliable alternative solids treatment processes that could readily be substituted for digesters at the West Point Treatment Plant. The Citizen's Advisory Committee concurs with this conclusion…
>
> The Citizen's Advisory Committee strongly believes King County should continue its efforts to increase treatment efficiency and minimize impacts resulting from treatment plant operation through the Wastewater Treatment Division's Technology Assessment Program.

The Agreement required that King County set aside funds to be paid to the City of Seattle Shoreline and Park Improvement Fund (for use in Discovery Park) in the event that the digesters could not be removed. Payment of these funds will be made in 2004.

In 2003, solids processing technologies for the new Brightwater Treatment Plant were evaluated as a part of the analysis for the project's Final Environmental Impact Statement. The plant will

[15] The West Point Settlement Agreement is an agreement made with community, civic, and environmental groups that allowed the upgrade of the West Point plant to secondary treatment to go forward.

[16] The West Point Citizen's Advisory Committee was formed to advise King County on methods to reduce impacts associated with biosolids handling and transport.

produce Class B biosolids; space will be reserved for Class A production facilities if needed in the future.

Production and use of digester gas continued at both treatment plants. In addition, investigation of new uses and technologies has progressed. As an outcome of that investigation, two new uses for digester gas will be implemented at the South plant. The first is a methane-fired boiler, which will provide heat for some plant facilities and operating processes. The second is a fuel cell demonstration project, which will use 20 percent of the plant's gas production and will produce 1 megawatt of electricity. Construction of both projects was completed in early 2004 and startup testing is under way.

West Point converted to "high-solids" dewatering centrifuges in 2002; South plant will convert in 2004. These centrifuges are expected to reduce the number of biosolids truck trips, thus reducing the impacts to the community and the costs to transport biosolids.

West Point Digester Improvements

As a condition of the West Point Settlement Agreement, strategies to minimize solids management impacts on the community were pursued. Several strategies were implemented to reduce noise and minimize the number of required biosolids truck trips. Strategies included improving dewatering efficiency and purchasing new biosolids trucks and trailers. These improvements enabled King County to reduce truck trips to 4.1 per day in 2003.

As a result of these efforts to honor the intent of the agreement, the West Point plant is operating with a minimum number of digesters that are operating at their upper limits. Biological processes such as anaerobic digestion are more susceptible to problems under increasing demand. Three digester "upsets" or "pre-upset" conditions have occurred at West Point in recent years. A digester upset can be caused by a variety of conditions and is usually characterized by increased odor production, decreased gas production, and decreased or lost capacity to convert and stabilize solids.

A study completed in 2003 identified a number of improvements necessary to increase digester efficiency. These improvements include (1) modifying piping to allow the blending storage tank (Digester 6) to serve as an emergency backup digester and to provide continuous feed to all active digesters, and (2) improving the mixing systems in Digesters 4 and 5. Design of these improvements will begin in 2004 and will take approximately 4 years to fully implement. The County will continually monitor the effectiveness of these measures and will implement further modifications if needed.

Environmental Management System Demonstration

King County is one of 45 utilities that have agreed to participate in an Environmental Management System (EMS) demonstration program conducted by the National Biosolids Partnership (composed of the Environmental Protection Agency, Water Environment Federation, and Association of Metropolitan Sewerage Agencies). The purpose of the demonstration project is to formalize a system to promote continual improvement of biosolids quality, assure program compliance, and gain public input and support for biosolids recycling. The County will undergo an audit of its biosolids EMS program in spring 2004 to receive EMS certification.

Outlook Through 2006

King County will continue to produce high quality Class B biosolids for recycling in agriculture, forestry, and composting. Improvements will be made to solids facilities at the West Point plant to ensure that the plant can manage its full rated capacity.

Following an 18-month review of biosolids regulations, a National Academy of Sciences (NAS) panel report maintains that recycling biosolids is the best, most practical alternative. However, the report recommends that additional research be conducted, that the Environmental Protection Agency (EPA) human health/ecological risk assessments for biosolids be updated, and that EPA provide additional oversight for biosolids programs. King County will need to respond to any new EPA requirements resulting from the NAS report.

The examination of new technologies will continue. Possible future test programs could include alternative digestion approaches, alternative thickening approaches, and Class A technologies. In addition, the Technology Assessment Program is working with the University of Washington to develop and assess innovative means of evaluating and monitoring the health of existing anaerobic digesters to provide early warning systems that may help prevent digester upsets in the future.

Several other research studies are planned or are in progress:

- In response to a proviso to the 2004 County budget, a study will examine technologies that have the potential to reduce odors caused by digester upsets at the West Point Treatment Plant.
- University of Washington research faculty are designing a research project to evaluate the environmental effects of the use of products derived from biosolids in reclaiming gravel mines. One objective of the project is to establish safe and cost-effective methods for using biosolids in local restoration projects.
- The County is partnering with the University of Washington and the U.S. Department of Agriculture in the development of biofuels from canola plants grown in Yakima using biosolids as fertilizer. It is hoped that biosolids haul trucks can operate on these fuels in the future, bringing the process full circle.

Costs

Only costs associated with providing solids management facilities at Brightwater were allocated in the RWSP. These costs are now included in Brightwater costs discussed in Chapter 3.

Chapter 8
Exploring and Increasing Water Reuse

Reclaimed water is wastewater treated to a level that allows it to be used safely and effectively under state regulations for irrigation, industrial process water, and other nonpotable applications. King County currently produces reclaimed water at the West Point and South Treatment Plants for onsite and offsite use. Although the Puget Sound region currently enjoys adequate supplies of potable water, the demand for reclaimed water will increase as populations grow, more water is needed to protect and restore salmon populations, and water supply options become increasingly expensive. The goal of the County's Water Reuse Program, therefore, is to provide reclaimed water to help meet the water resource needs of the region's residents and the environment.

This chapter summarizes how policies have guided implementation of the water reuse program specified in the Regional Wastewater Services Plan (RWSP). It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of water reuse program costs. Appendix B-6 lists the assumptions underlying the RWSP water reuse program and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for water reuse set by the King County Council in adopting the RWSP. The policy framework appears to be achieving its intent. The policies reaffirm the County's commitment to protecting public health and the environment.

Underlying the RWSP water reuse policies is the call for thoughtful decisions about regional water use. The provision of a clean and reliable water supply is ultimately a public health issue; the use of groundwater and surface water for these water supplies is also an environmental issue. King County places a high priority on both issues.

Recognizing the important but often competing needs for water, the County Council recommended exploration of reclaimed water to supplement current potable supplies. Initial County efforts focused on convening forums with stakeholders in the region, including the Washington State Departments of Ecology, Health, and Fish and Wildlife, U.S. Army Corps of Engineers, National Oceanographic and Atmospheric Administration (NOAA) Fisheries, U.S. Fish and Wildlife Service, regional water suppliers, tribal governments, local water and wastewater districts, cities, local health departments, watershed forums, and environmental and community groups.

A work plan was developed that calls for siting and construction of a demonstration satellite water reclamation plant. The County worked with an advisory task force to develop criteria for reviewing proposals. The process culminated in the selection of the Sammamish Valley Reclaimed Water Production Facility.

Environmental stewardship and recognition of reclaimed water as a valuable resource are being promoted through an extensive public involvement program that provides the public and community leaders with the information they need to help make decisions about water reuse, including the siting of the Sammamish facility.

To ensure that water reuse is developed in a way that not only does no harm but also protects and benefits the environment, scientific studies are being done as a part of the Sammamish-Washington Analysis and Modeling Program (SWAMP) to understand the potential impacts of reclaimed water irrigation on groundwater, surface water, and endangered salmon species. SWAMP is scheduled to be completed in 2005.

Water Reuse Program

This section describes the water reuse program defined in the RWSP. The program has changed very little since 1999. It remains within the 1999 policy framework, and the assumptions used to define the program are relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few changes in assumptions.)

In 1999, projections indicated that potable water purveyors in the area would need an additional 30 mgd to meet demands to 2026. The County considers reclaimed water to be a significant new source of water that will allow the region to defer developing additional water supplies from already strained surface water and groundwater sources. Increased use of reclaimed water offers the following potential benefits:

- Reduce potable water use, thus reducing the need to develop more sources
- Improve water use efficiency, leaving highest quality water for higher value uses
- Leave water in the environment, thus reducing water withdrawal impacts on fish habitat and allowing more natural stream/aquifer function
- Reduce impacts from treated effluent discharge
- Encourage waste reduction awareness
- Demonstrate technologies for the future

Currently, it is not clear when new potable water supplies will be needed in the region. The City of Seattle and other water purveyors have recently indicated that water conservation has been more successful than assumed when King County was developing the RWSP. The County will continue to work with purveyors to monitor trends, facilitate the use of reclaimed water for nonpotable uses, and thereby free up surface water for salmon recovery.

Elements of the Program

At the time of development of the RWSP, King County had not yet formalized a water reuse program. The County recognized that such a program needs to take into account the uncertainties and challenges of using reclaimed water in the region. Public perception, costs, regulatory restrictions, jurisdictional coordination, and water rights were challenges then and continue to be challenges now. A critical component in the RWSP is the water reuse work plan, developed in coordination with regional water suppliers. The plan outlines the tasks and schedule for

developing a water reuse program, lists potential pilot projects and their associated costs, and identifies a process for coordinating with affected tribal and local governments, the state, and area residents.

The RWSP and work plan call for continued water reuse at existing treatment plants, exploration of opportunities for expanded use at these plants, and exploration of water reuse at new treatment facilities. Other elements of the RWSP focus on incrementally increasing production and distribution of reclaimed water:

- Funding pilot-scale and demonstration projects including satellite treatment plants
- Coordinating with water suppliers to implement water reuse projects
- Developing a public education and involvement program to gauge attitudes toward the expanded use of reclaimed water
- Building flexibility into existing and new facilities for the production and use of reclaimed water
- Evaluating water reuse opportunities and markets during siting and design of the North Treatment Plant (now called Brightwater)
- Assessing the economic and environmental feasibility of discharging reclaimed water to freshwater systems such as the Lake Washington and Lake Sammamish watersheds and the Ballard Locks

Reclaimed Water Production at Brightwater

Evaluation of reuse opportunities and markets has been a part of the siting and predesign of the Brightwater System. A study was conducted of water reuse markets for both sites (Unocal and Route 9) considered for the treatment plant. The selected Route 9 site appears to offer many potential markets for reclaimed water. The choice of treatment technologies for the Brightwater plant also creates opportunities for reclaimed water production. The plant will use membrane bioreactor (MBR) technology instead of secondary clarifiers to remove solids after biological treatment. Effluent resulting from the MBR process is expected to be significantly higher in quality than effluent produced from conventional activated sludge treatment. Additional disinfection is all that will be needed to produce water suitable for reuse.

The Brightwater budget includes $2.1 million (in 2003 dollars) for facilities to produce 5 mgd of reclaimed water for on-site use. Land will be reserved on the site for expansion of reclaimed water production if needed in the future. Such reclaimed water can be delivered to customers in the Sammamish Valley and other areas through a distribution system separate from, but connected to, the Brightwater conveyance system. This option and other options are being considered as part of an integrated system with the Sammamish Valley Reclaimed Water Production Facility, as is discussed in the April 15, 2004, report to Council (see “Outlook Through 2006” later in this chapter). Any future decision by King County to distribute reclaimed water beyond the Brightwater plant boundaries will be preceded by additional engineering analyses and appropriate environmental review.

To provide flexibility for future offsite water reuse, “purple pipe” will be installed from the Brightwater Treatment Plant to the North Creek Portal (Portal 41), located southwest of the plant

site in Bothell. Purple pipe distinguishes reclaimed water conveyance lines from wastewater lines. The cost to install this section of pipe now in coordination with construction of Brightwater conveyance lines will be significantly less than the cost to install it later

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Fifteen policies were specified in the RWSP to guide water reuse. Policies are being implemented successfully. All performance measures scheduled for this period were met. Work also began on all ongoing performance measures. Appendix B-6 gives more detail on implementation of policies and performance measures through 2003.

Exploration of Current and Future Markets

Reclaimed water continues to be used for process water and for landscape irrigation at the existing treatment plants. Opportunities for expanded use continue to be evaluated. SWAMP is conducting studies to understand the effects on existing and future conditions, including potential risks to aquatic life, of using reclaimed water for irrigation in the Cedar-Sammamish watershed. In addition, a water reuse public education and involvement program was launched during this period. Initial efforts focused on siting and design of the Sammamish Valley Reclaimed Water Production Facility. The program is coordinated with water conservation and other public involvement programs.

Water Reuse Work Plan

A five-year water reuse work plan was transmitted to the King County Council on schedule in December 2000. The plan focuses on developing practical experience in providing reclaimed water for new nonpotable water supplies and in integrating reclaimed water use with regional water supply planning. Emphasis is on implementing small-scale pilot and demonstration water reuse projects and on gaining a better understanding of institutional and regulatory conditions. Assessment of the feasibility of discharging reclaimed water to freshwater systems has been postponed for at least 10 years until a clearer picture of needs emerges and environmental assessments are completed.

Coordination with Water Supply Plans

King County is working with the City of Seattle and other purveyors to coordinate the County's water reuse program with water supply and basin plans. The County and City are developing a memorandum of understanding (MOU) that will define water reuse projects and the process for evaluating their cost-effectiveness, environmental benefits, and other related issues. Discussions are also under way regarding a possible amendment to the City's comprehensive water plan to include a chapter on reuse opportunities.

The need for this type of coordination was further supported in 2003 when the state Legislature amended Section 12 of RCW 90.48.112 to require that all water and wastewater plans describe how water reuse will be integrated into these programs.

Pilot and Demonstration Projects

The purpose of water reuse pilot and demonstration projects is to increase operating experience and to supply growing markets for reclaimed water. Through such projects, the County hopes to learn more about available technologies and suppliers, to negotiate interagency roles and agreements, to prepare for regulatory requirements, to help the public to understand the risks and benefits of water reuse and to test marketing strategies.

A reuse technology pilot project ran from 2001 to 2002. The project—located at the West Point Treatment Plant—evaluated the effectiveness, operability, and cost of seven wastewater treatment technologies that could be used to produce highest quality (Class A) reclaimed water at small upstream satellite plants for commercial and irrigation uses. Several treatment technologies were combined into small-scale operational process systems to assess their ability to meet process objectives and to potentially eliminate the need for primary treatment, secondary clarification, and tertiary filtration. Two of the innovative technologies evaluated (MBR and ballasted sedimentation) are being included in the Brightwater design.

The County worked with an advisory task force to develop criteria for reviewing proposals for a demonstration project. The process culminated in selection of the Sammamish Valley Reclaimed Water Production Facility, which will serve as a demonstration satellite treatment plant.

Outlook Through 2006

Dialog with the County Council, the Regional Water Quality Committee, and regional water purveyors on water reuse issues will continue.

In a proviso to the 2004 County budget, the Council required the submittal of a report by April 15, 2004. The report reviews the consistency of the Sammamish Valley Reclaimed Water Production Facility with the adopted goals and policies of the RWSP, accounts for life-to-date expenditures, reviews the proposed schedule, and outlines a revised scope and budget for a smaller, more portable facility. The report also discusses the relationship and integration of this facility with future reclaimed water production at the Brightwater plant. If approved as proposed in the report, the facility will produce up to 0.5 mgd of reclaimed water for irrigating King County soccer fields in the area. Construction is anticipated to begin in 2006 and to be completed in 2007.

New customers, including the Foster Golf Course and Baker Commodities, will begin using reclaimed water from the South plant.

Coordination with the City of Seattle will continue. It is expected that the water reuse MOU will be completed during this period.

Costs[17]

The RWSP included a $28 million placeholder for the water reuse program until the work plan could be developed. In addition, $300,000 per year was allocated for 2000–2004 for a variety of water conservation efforts. The reuse program placeholder was based on the assumption that the program would cost slightly over $1 million per year, plus inflation, for 20 years.

The estimate for program cost that was developed for the work plan and then modified in mid-2003 is $17.9 million. This estimate is lower than the RWSP placeholder, primarily because of a reduced scope for development of a demonstration satellite facility. The estimate includes the following elements:

Future Reuse	$3 million
Technology Assessment	$1 million
Demonstration Satellite	$13.9 million
Total	$17.9 million

The budget for the demonstration satellite facility consists of $4.3 million spent to date on planning, predesign, and siting and another $9.6 million to complete the project as proposed in the report to Council on April 15, 2004.

The almost universal experience from other regions is that reclaimed water will become more cost competitive as increased water quality requirements make treated water more valuable and as the limits on development of new supplies increase the cost of water from traditional sources.

[17] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 9
Water Quality Protection

In addition to providing wastewater management services, King County performs many other activities to protect and improve water quality. These activities include monitoring water quality in lakes, streams, and marine waters; educating the public about water quality issues; and providing grant funds for local water quality projects. Water quality sampling and monitoring efforts began in 1962 to track cleanup progress in Lake Washington and to measure the impacts of diverting wastewater effluent from the lake to deep-water outfalls in Puget Sound. Monitoring programs and scientific studies have since remained key elements in informing County decisions on wastewater service and water quality management activities and in evaluating the effectiveness of these actions.

The Regional Wastewater Services Plan (RWSP) was designed to continue and to improve these services. In adopting the RWSP, the King County Council required the development of an Annual Plan Review Report, also known as the RWSP Water Quality Report, to document the effectiveness of the RWSP in protecting water quality and to identify any needed changes in the program. This chapter draws from these reports. The 2004 RWSP Water Quality Report is included as a separately bound appendix (Appendix D) to this update report.

This chapter summarizes how RWSP policies have guided implementation of the County's water quality protection program. It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of program costs. Appendix B-8 lists the assumptions underlying the RWSP water quality protection program and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for water quality protection set by the King County Council in adopting the RWSP. The policy framework appears to be achieving its intent and continues the County's commitment to protecting public health and the environment.

Management of wastewater was one of the first regional tools used to restore and protect the environment. As recently as the 1950s, wastewater from a rapidly growing population was degrading the water quality of County beaches, lakes, and streams. Collectively, the citizens of the region created a special-purpose government to tackle the problem and create a regional wastewater system. Communities now enjoy high quality waters for recreation and commerce.

RWSP policies for water quality protection affirm the value of these past water quality gains and call for actions to maintain them. The County regularly checks the quality of its treatment plant effluent to ensure that regulations are being met and that discharges do not contribute to pollution of our waters. This testing extends to the waters in areas near County outfalls and to other water bodies in King County.

The County works collaboratively with regional watershed partners to identify solutions to water quality problems and to ensure that the problems are resolved. The RWSP policies recognize the

importance of using good scientific information to assess needs, risks, and potential impacts of actions. Special water quality studies undertaken by the County are providing sound scientific data in support of joint efforts to keep County waters clean. These studies also support current County wastewater programs, capital projects, and decisions for future efforts. In this way, projects can be scoped to meet needs without wasting resources.

Studies, for example, are providing valuable data for current County programs to improve water quality through control of combined sewer overflows (CSOs) and cleanup of contaminated sediments near CSO outfalls. Further, County scientists are exploring the use of reclaimed water as a means to supplement regional water supplies and are providing information to aid the Washington State Department of Ecology (Ecology) in its development of Total Maximum Daily Loads (TMDLs), which will determine future regulations for County discharges. And a Habitat Conservation Plan (HCP) is being developed as a framework for managing wastewater within the dictates of the Endangered Species Act (ESA) and for streamlining the permitting for future projects.

The RWSP Water Quality Report for 2003 found that water quality remains quite good in our region and that County programs are effective and well coordinated with those of other entities. RWSP Water Quality Reports will be developed annually to enable early identification of any needed changes to policies.

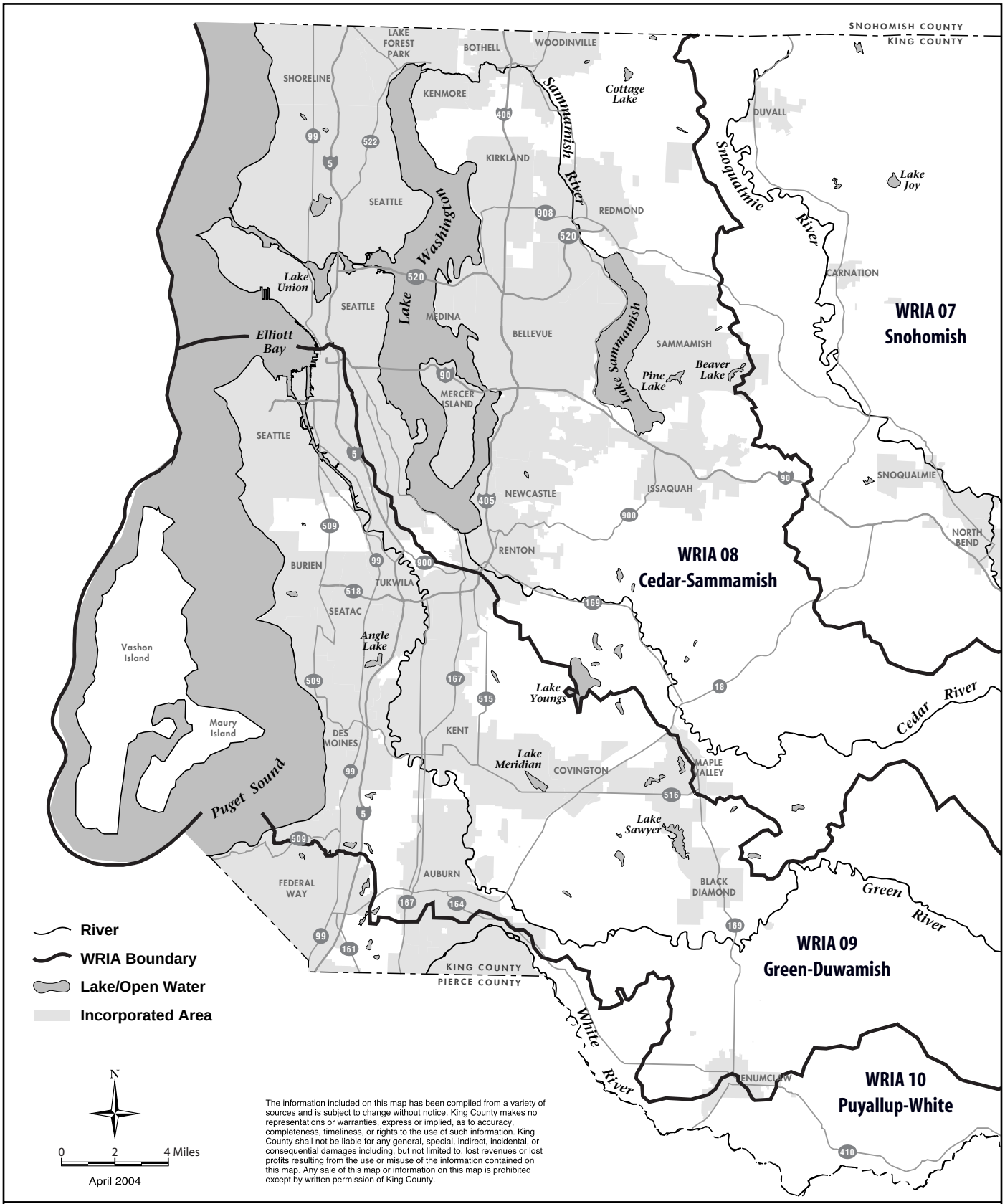
Water Quality Protection Program

This section describes the water quality protection program being implemented for the RWSP. The program has become more defined since adoption of the RWSP, as described in the RWSP Operational Master Plan (OMP), but remains within the 1999 policy framework. The assumptions used to define the policies are relevant today. (See “Implementation Highlights Through 2003” in this chapter for a description of a few minor changes in assumptions.)

In its role as an environmental steward, King County takes a keen interest in the quality of the waters within its boundaries. The wastewater service area of western King County includes major freshwater streams and lakes and the marine waters of Puget Sound. The fresh waters are grouped by watersheds designated as Water Resource Inventory Areas (WRIAs). WRIAs were established by the State of Washington for the purpose of resource planning and management within a watershed’s boundary. WRIA 08 is the Cedar-Sammamish watershed and WRIA 09 is the Green-Duwamish watershed. These two watersheds make up the majority of King County’s wastewater service area. Figure 9-1 shows the boundaries and the major water bodies of each WRIA.

King County’s wastewater management program supports and relies on several programs to implement water quality protection policies:

- Ongoing freshwater and marine water monitoring programs.
- Four major special studies: the Green-Duwamish Water Quality Assessment (G-DWQA), the Marine Outfall Siting Study (MOSS), the Sammamish-Washington Analysis and Modeling Program (SWAMP), and the Habitat Conservation Plan. (The HCP is described in Chapter 13.)
- Monitoring programs in support of capital projects.



The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

File Name:
0404rwsp_fig09-1.pdf wgab

Figure 9-1

Major Water Bodies in King County WRIAs

RWSP 2004 UPDATE

Ongoing Water Quality Monitoring

Although nearly all wastewater is now either treated with an onsite septic system or sent to treatment plants, water quality monitoring is still an important tool to help ensure continued wastewater system integrity and to identify any threats to the gains that have been made in water quality. King County regularly assesses the impact of its operations by measuring the quality of the effluent from each of its wastewater treatment facilities, the surrounding water, and nearby beaches to ensure that its facilities are meeting regulatory requirements. Data from ongoing monitoring are also used to support other efforts, including cooperative actions that will result in effective watershed management practices, educational activities in the watersheds, and special studies.

Green-Duwamish Water Quality Assessment

The primary goal of the Green-Duwamish Water Quality Assessment project is to develop analytical tools for evaluating current and future water quality issues in the Green-Duwamish watershed. The scope of work includes water quality and hydrologic monitoring, land use and land cover modeling, water quality and quantity modeling, best management practice evaluation, and ecological and human health risk assessment. The project supports a number of Wastewater Treatment Division and external planning efforts, such as wastewater capital planning (including the CSO program), habitat conservation planning, WRIA 09 salmon conservation planning and stormwater management, and Ecology's TMDL program.

At the time of RWSP adoption, The G-DWQA was scheduled to be complete in 2003. Project completion has since been moved to 2006 in order to refine project elements that are of use and benefit to the wastewater program and to ensure that public funds are being used responsibly. The later completion date also enables alignment with the SWAMP project and the larger freshwater program, resulting in a more integrated and coordinated approach to freshwater system characterization and modeling. The freshwater program is an integrated assessment of lakes, rivers, and streams that may be influenced by wastewater facilities and operations.

Marine Outfall Siting Study

The Marine Outfall Siting Study collected and assessed data on a variety of physical, biological, and chemical parameters at sites in Puget Sound near the northern boundary of the County service area. MOSS incorporated this information into fate and transport models to determine the best location for the Brightwater outfall.

Sammamish-Washington Analysis and Modeling Program

The Sammamish-Washington Analysis and Modeling Program was initiated soon after adoption of the RWSP and development of the OMP. One of the original purposes of SWAMP was to investigate the effluent quality needed to support discharge of effluent from Brightwater to the Lake Washington system for "indirect potable" reuse. Consideration of this use has now been delayed for at least 10 years (see Chapter 8). The current focus for SWAMP is to provide

integrated, comprehensive analysis and modeling of current water quality and quantity, sediment quality, and biological and physical conditions in the lakes, rivers, and streams in the Cedar-Sammamish watershed. The scope also includes identification of current and future risks to aquatic life (including threatened and endangered species), wildlife, and people.

SWAMP provides support to and coordinates with other County programs, such as MOSS, habitat conservation planning, and G-DWQA, and with U.S. Army Corps of Engineers projects and Ecology's TMDL development. It is also helping to assess the effects of using reclaimed water for irrigation.

As with the G-DWQA, the schedule for SWAMP completion has been extended to refine the program's goals and integrate it with similar studies. The project scope and costs were not defined when the RWSP was adopted. SWAMP has now been integrated into the larger freshwater program and is scheduled to be completed in 2005, instead of 2004.

Wastewater Capital Project Monitoring

Under the RWSP, water quality monitoring is done in support of alternatives development, siting, permitting, and construction of capital projects. Usually the monitoring involves pre-construction baseline characterization followed by post-construction monitoring to identify project effectiveness and continued integrity.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Eight policies were specified in the RWSP to guide water quality protection. Policies are being implemented successfully. All performance measures are being met, except for delays in the schedules of three of the special studies (SWAMP, G-DWQA, and HCP). These delays will allow for better integration and coordination of information and for more effective communication with stakeholders. Appendix B-8 provides more detail on implementation of policies and performance measures through 2003

The County Executive has submitted annual RWSP Water Quality Reports to the Council each year since adoption of the RWSP. The reports document the sampling and monitoring efforts of the previous year, the impacts of CSOs and the benefits of abating CSOs, biosolids quality, and any research activities undertaken during that year. The 2004 report is included as Appendix D (bound separately) to this update report.

Ongoing Water Quality Monitoring

Ongoing monitoring programs have continued. The monitoring programs have produced several reports, including annual water quality status reports for marine waters and reports prepared for wastewater treatment plant National Pollutant Discharge Elimination System (NPDES) permit compliance. Other accomplishments include implementation of a new technology for deep-water sediment sampling to more accurately determine potential impacts from outfalls and an evaluation of the effectiveness of the County's sampling program around marine outfalls.

Special Studies

During this period, the G-DWQA selected a modeling procedure and produced reports that documented existing conditions and identified data needs in the watershed.

MOSS was completed in 2003, on time and on budget. The project included oceanography studies, submarine geophysical studies, water column sampling, beach water quality sampling, sediment sampling, and biological surveys in central Puget Sound. MOSS helped to identify viable alternative locations for an outfall in Puget Sound for discharge of Brightwater effluent. On December 1, 2003, County Executive Ron Sims chose the Route 9–195th Street System, which includes an outfall extending from Point Wells for discharge 5,200 feet offshore at a depth of 600 feet.

SWAMP developed sampling and analysis plans for field studies, installed remote sensing data collectors, conducted several biological and habitat surveys, and produced a number of reports.

See Chapter 13 for a discussion of the Habitat Conservation Plan.

Capital Project Monitoring

Monitoring for four capital projects began during this period, as described below.

Brightwater Outfall Studies

Post-MOSS studies are focusing on supporting design and permitting of an outfall for Brightwater.

Sediment Characterization for the Denny Way/Lake Union CSO Control Project

The Denny Way/Lake Union CSO control project is a joint effort between King County and Seattle Public Utilities to control City and County CSO discharges into Lake Union and County CSO discharges through the Denny Way CSO into Elliott Bay. Initial monitoring to characterize sediments offshore of Denny Way was done in late 2003 and early 2004 in anticipation of the remediation that will be done when the CSO control project is completed in 2005. These sediments were collected as part of a long-term monitoring program for the Denny Way CSO improvement, required under provisions of the Biological Opinion issued for the project under the ESA.

Sediment Remediation Monitoring for the Norfolk CSO Control

Sediment remediation at the Norfolk CSO site, done jointly with the City of Seattle and the Elliott Bay/Duwamish Restoration Program, was completed in late March 1999. Under a hydraulic permit issued by the Washington State Department of Fish and Wildlife, a five-year post-remediation monitoring plan is being implemented to assess cap stability and possible recontamination over time. This monitoring will be completed in 2004.

Diagonal/Duwamish Remediation Dredging

Contaminated sediment in areas off the City of Seattle's Diagonal storm drain and the County's Duwamish Pump Station CSO is being remediated through dredging and capping as an early action project in response to the Superfund listing of the Lower Duwamish Waterway (see Chapter 6). The project is a joint effort between the County, the City, and the Elliott

Bay/Duwamish Restoration Program. Sampling is being conducted before, during, and after dredging to monitor for any spread of the contaminated sediments during dredging and to document final improvement over original conditions. After capping is completed in early 2004, a 10-year post-remediation monitoring program will begin to document cap stability and the occurrence of any chemical recontamination of the cap surface.

Outlook Through 2006

Ongoing monitoring programs will continue, adapted as necessary to address new regulatory or informational needs.

G-DWQA will complete water quality and hydrologic monitoring, loadings calculations, land use analysis, land use and land cover modeling, water quality and quantity modeling, microbial source-tracking, and ecological risk assessment. The assessment is scheduled to be complete in 2006.

SWAMP will continue with the modeling effort and studies that support the modeling effort. A computer model will be developed for Lake Washington, Lake Sammamish, and Lake Union and their inflowing rivers and streams. Coupled with these models will be a broader watershed model that simulates streamflow and water quality based on historical, current, and future land use scenarios in King County watersheds. This program will be completed in 2005.

The HCP will be completed in 2006. See Chapter 13 for more information.

Monitoring will continue to be done in support of wastewater capital project decision-making, siting, permitting, and construction.

Costs[18]

The RWSP did not identify specific water quality protection programs nor did it set aside funds for such programs. The County programs discussed in this chapter have been either identified since the RWSP or developed to implement RWSP policy direction.

At the time the RWSP was adopted, the estimate for G-DWQA was $7 million; project scope and costs for SWAMP had not been defined. Since adoption of the RWSP, costs for both G-DWQA and SWAMP have been integrated into the larger freshwater program, which is estimated to cost $12 million. HCP costs are discussed in Chapter 13.

MOSS was completed in 2003 for a cost of $9 million, as anticipated at the time of RWSP adoption. Its costs are included under Brightwater conveyance costs.

[18] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

Chapter 10
Environmental Mitigation

The Washington State Environmental Policy Act (SEPA) requires proponents of a project to seek ways to mitigate significant adverse environmental impacts of their proposal. In accordance with SEPA (WAC 197-11-768), King County routinely seeks ways to mitigate adverse impacts at each stage of a project. Environmental criteria are used in selecting viable project sites and in designing facilities for these sites. During project permitting, mitigation agreements are made with affected local communities. During construction and operation, proven methodologies, including best management practices and careful monitoring, are used to protect the environment.

This chapter summarizes how policies have guided implementation of environmental mitigation as specified in the Regional Wastewater Services Plan (RWSP). It describes the environmental mitigation program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of environmental mitigation program costs. Appendix B-10 lists the assumptions underlying environmental mitigation and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for environmental mitigation set by the King County Council in adopting the RWSP. The policy framework appears to be achieving its intent. In adopting the RWSP, the King County Council highlighted the importance of having a community-focused environmental mitigation process for construction projects. The Council recognized that taking a proactive stance in managing project impacts can serve to minimize and even sometimes transform the impacts into benefits to the community.

The policies confirm the County's commitment to protecting public health and the environment through the pledge that projects meet all federal, state, and local regulations, including SEPA and the Endangered Species Act (ESA). Design documents and contracts include the necessary steps to ensure that contractors acting for the County fulfill these obligations.

Projects are framed through early and open discussions with the communities that may host the facilities. Extensive public involvement programs were carried out for siting Brightwater and other projects such as the Sammamish Valley Reclaimed Water Production Facility. For Brightwater, affected community leaders and their constituents have contributed at every stage of the four-year siting process, from helping to form criteria, including environmental criteria, for screening potential sites, to providing comments on the Draft EIS, to participating in conversations on how best to mitigate impacts. Similar processes, scaled to the complexity and potential impacts of the project, are being conducted for all other projects.

As RWSP projects have advanced to construction, the County has worked with communities to ensure that their neighborhoods are left in as good as, or better, condition than before project

implementation. Negotiated mitigation agreements have been developed and executed for the North Creek Storage project and for the repair of Section 1 of the Eastside Interceptor.

The County also made a specific commitment in the policies to dedicate at least 10 percent of a project's costs to mitigation. Approximately $88 million, for example, has been set aside for Brightwater mitigation.

As more projects move into permitting and construction, the effectiveness of the policies will continue to be assessed.

Environmental Mitigation Program

This section describes the environmental mitigation program defined in the RWSP. The program has changed very little since 1999. It remains within the 1999 policy framework, and the assumptions used to define the program are relevant today.

Under the RWSP, King County enters into mitigation agreements with communities that could experience significant adverse environmental impacts from the expansion or addition of major regional wastewater conveyance and treatment facilities. These agreements are executed during project permit review. Mitigation directly addressing facility impacts is designed and implemented in coordination with the local community and costs at least 10 percent of project costs.

Mitigation measures identified through the SEPA process are incorporated into design plans and construction contracts to ensure full compliance. The siting process and mitigation for new facilities are consistent with the Growth Management Act, SEPA, ESA, and the lawful requirements and conditions established by the jurisdictions governing the permitting process.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Five policies were specified in the RWSP to guide environmental mitigation. Policies are being implemented successfully.

All performance measures are being met. Two performance measures were scheduled for this period:

- The Final Environmental Impact Statement (Final EIS) for the Brightwater System was completed in November 2003, five months later than the June 2003 schedule given in the RWSP (see Chapter 3). The extra time allowed staff to hold three technical seminars and to respond to over 5,000 comments received on the Draft EIS.
- The combined SEPA and predesign processes for the Brightwater System, started during this period, will be completed on schedule in 2004.

SEPA review and mitigation for other projects, such as the Sammamish Valley Reclaimed Water Production Facility, have been completed as needed. Table 10-1 lists environmental mitigation activities completed through 2003. Appendix B-10 gives implementation highlights for policies and performance measures through 2003.

Table 10-1
Environmental Mitigation Activities Completed Through 2003

Project	Environmental Mitigation Activities
Treatment Improvements	
Brightwater Treatment Plant	Final EIS issued November 19, 2003
Conveyance Improvements	
Brightwater Treatment Plant conveyance	Final EIS issued November 19, 2003
Kenmore Interceptor flapgate sensors	Categorical Exemption completed February 9, 2000
Eastside Interceptor Section 1 capacity restoration	Negotiated Mitigation Agreement, Determination of Non-Significance (DNS) issued April 21, 2000
6-MG offline storage in north end of service area (part of the North Creek project)	Negotiated Mitigation Agreement, DNS issued November 17, 2000
Pacific Pump Station	Checklist/DNS issued May 27, 2000
Inflow and Infiltration Reduction	
Local system inflow and infiltration control	Categorical Exemption for Northshore Manhole Rehabilitation Pilot Project completed September, 26, 2002 Checklist/DNS for Skyway Pilot Project issued December 24, 2002 Checklist/DNS for Ronald Pilot Project issued January 31, 2003 Programmatic Checklist/DNS for other pilot projects issued March 26, 2003
Water Reuse	
Water Reuse Technology Demonstration project	Categorical Exemption completed April 11, 2001
Sammamish Valley Reclaimed Water Production Facility	Checklist/DNS issued February 5, 2003

Outlook Through 2006

Table 10-2 lists environmental mitigation activities planned through 2006.

Table 10-2
Environmental Mitigation Activities Planned Through 2006

Project	Environmental Mitigation Activities
Treatment Improvements	
Brightwater Treatment Plant	Memoranda of understanding are being developed to define the process for identifying appropriate mitigation measures; community meetings will be held
Carnation Treatment Plant	SEPA review will be completed in 2004
Conveyance Improvements	
Brightwater Treatment Plant conveyance	Negotiated mitigation agreements will be done in 2004; community meetings will be held
Juanita Bay Pump Station modifications	Checklist/Determination of Non-Significance (DNS) will be prepared early 2004
Hidden Lake/Boeing trunk upgrade improvement	Checklist/DNS will be prepared early 2004
Bellevue Pump Station	Checklist/DNS will be prepared early 2004
South Green River conveyance system improvements (Soos Creek Pump Station D)	SEPA review will be completed in 2004
Combined Sewer Overflow Controls	
2005 CSO plan update	SEPA process will be conducted as required
CSO control and improvement	SEPA process will begin in 2006 for Puget Sound CSO projects
Water Reuse	
RWSP water/wastewater conservation program	SEPA review will be conducted as required

Memoranda of understanding (MOUs) with the local jurisdictions affected by Brightwater are being developed. These MOUs set out the processes under which specific mitigation measures will be developed. As they are developed, these measures may be further specified in supplemental agreements or be made conditions of permits.

King County must acquire a large number of federal, state, and local permits. It is likely that in the near future, natural habitat (especially habitat for species listed under the ESA) will become an even more important factor in project planning and implementation. The County strives to be proactive with regulatory agencies by involving them early in the process and negotiating interagency agreements so that agencies have the resources to process approvals according to schedule. The County will complete an ESA Section 7 consultation and a Biological Opinion for Brightwater and is developing a Habitat Conservation Plan to help streamline the permitting process for future projects.

Costs

Mitigation costs are included in the capital project costs. Mitigation funded through wastewater revenues will be consistent with RCW 35.58, King County Charter Section 230.10.10, agreements for wastewater disposal entered into between King County and local agencies, and other applicable County ordinances and state laws.

For Brightwater and the expansion of the South plant, RWSP policies set a target for mitigation of at least 10 percent of individual project costs or a cumulative total of $10 million (in 1998 dollars) for each plant, whichever is greater. (See Chapters 3 and 4 for a discussion of these projects.) Application of this policy has resulted in estimated Brightwater mitigation costs of $88 million.

Two completed RWSP projects, the Eastside Interceptor Section 1 and North Creek storage, developed mitigation agreements with host agencies that incorporated 10 percent mitigation to address community impacts. Both projects came in at or below their RWSP cost estimates.

Chapter 11
Public Involvement

The Wastewater Treatment Division's ongoing public involvement program is intended to inform and engage the public and local agencies in planning, designing, and operating decisions that affect them.

This chapter summarizes how policies have guided implementation of the public involvement program specified in the Regional Wastewater Services Plan (RWSP). It then describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of public involvement program costs. Appendix B-11 lists the assumptions underlying the RWSP public involvement program and provides more information on implementation of policies and performance measures.

Overview of Policy Accomplishments

No changes are recommended in the policies for public involvement set by the King County Council in adopting the RWSP. The policies have shaped programs that are effectively engaging the community and achieving the County's objectives.

King County places a high priority on involving the public in the decisions that affect them. The RWSP policies direct the County to "engage" people, not just to inform them. The County strives to help the community understand wastewater management needs and to involve the community in the decision process for meeting these needs.

Achieving these goals is challenging in a culture that is fast paced and constantly changing and in which people are flooded with a range of information competing for their attention. The public involvement policies, therefore, send County staff into the community to bring them the information that they need. As a foundation to all targeted public involvement efforts, the County has created an ongoing outreach and presence in the community. Television spots that promote environmental awareness are aired, articles on water quality topics and County programs appear in local newspapers and magazines, booths with demonstrations of recycling and green products are sponsored at community fairs and events such as the Northwest Flower and Garden Show and the Seattle Home Show, and speakers discuss local environmental concerns and County programs in community and service organization forums.

With this foundation in place, the RWSP policies chart the course for informing and seeking the opinions of citizens on specific programs and projects, including inflow and infiltration control, water conservation and reuse, and Brightwater siting. The effectiveness of this approach is evidenced by high turnout at public meetings and seminars for the Brightwater siting process and the over 5,000 comments received on the Draft Environmental Impact Statement (EIS).

Public Involvement Program

This section describes the public involvement program. The program has become more defined since adoption of the RWSP, while still remaining within the 1999 policy framework. The assumptions used to define the program are relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few minor changes in assumptions.)

After issuance of the draft RWSP in 1997, King County conducted a public involvement process to help elected officials decide on a wastewater management strategy. The process accomplished this goal and provided information on preferences that served as a basis for developing the public involvement program for the RWSP. Citizens, representatives from tribes and agencies, and other interested parties indicated, for example, that they wanted the County to maintain its current level of service, distribute costs and impacts equitably, and accommodate changes in population, regulations, technology, and public opinion.

The RWSP calls for development of public involvement programs to support County wastewater projects and programs. Specific objectives are as follows:

- Involve public officials and citizens of affected jurisdictions early and actively in the planning and decision-making process for capital projects.
- Inform affected residents and businesses in advance of capital construction projects.
- Disseminate information and provide education to the general public, private sector agencies, and governmental agencies regarding the status, needs, and potential future of the region's water resources.
- Support regional water suppliers and purveyors in their efforts to educate the public about water conservation.
- Develop and implement a public information and involvement program for the water reuse program.
- Develop and implement a public awareness and information program regarding the costs and environmental impacts of inflow and infiltration in the local and regional conveyance system.
- Develop and implement a comprehensive public involvement program for siting Brightwater, including formation of committees to aid in developing screening criteria and the siting process.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies and performance measures through 2003. Eight policies were specified in the RWSP to guide public involvement. They are being implemented successfully. Appendix B-11 gives implementation highlights for policies and performance measures through 2003.

All performance measures have been met. Four performance measures were scheduled for implementation during 2000–2003: (1) create a Brightwater siting advisory committee, (2) create a comprehensive Brightwater public involvement program, (3) develop a water conservation education program, and (4) develop an inflow and infiltration public awareness program. Two

other performance measures are ongoing: (1) create task forces and work groups for various programs and (2) develop community relations plans for construction projects.

To aid in the completion of performance measures, public involvement guidelines for Wastewater Treatment Division (WTD) projects were developed to help staff develop and implement public involvement programs and coordinate public outreach activities for multiple WTD projects in the same geographic area. In addition, a comprehensive centralized database was developed that tracks public contacts and outreach activities to increase coordination and efficiency of outreach efforts.

Techniques and partnerships were developed to reach out to diverse communities (translation services, partnerships, implementation of the Americans with Disabilities Act standards). For example, the Henderson/Martin Luther King/Norfolk combined sewer overflow (CSO) control project involved working with teachers and students at Rainier Beach High School to translate project construction information and to expose students to career opportunities in engineering and science.

Public Involvement for Brightwater Siting

In August 2000, King County developed a public involvement program for Brightwater. Citizens were involved throughout the siting process. Activities during Brightwater siting included advisory committees, task forces, regulator workshops, public meetings, and technical seminars. The Brightwater Siting Advisory Committee (later called the Executive Advisory Committee)—consisting of representatives from tribes and cities in the Brightwater siting area and of environmental, labor, and business leaders—helped to develop policy siting criteria and provided advice on a variety of regional policy issues and concerns. Two community task forces were also formed during the planning process to involve community members who lived near the two potential treatment plant sites. Additional information is available from the following documents:

- King County Wastewater Treatment Division. 2001. Public Involvement Summary for Phase 1 Siting Process.
- King County Wastewater Treatment Division. 2001. Public Involvement Summary for Phase 2.
- King County Wastewater Treatment Division. 2001. Public Involvement Supplement for Phase 2.
- King County Wastewater Treatment Division. 2002. Public Involvement Summary for the First Part of Phase 3.

The public involvement program for Brightwater siting won the 2003 Project of the Year Core Values award from the International Association for Public Participation. This achievement acknowledges the way public participation core values were incorporated throughout the siting process. These core values include making a promise that the public's contribution will influence the decision and then communicating to participants how their input affected the decision.

Public involvement activities will continue through project permitting, design, and construction.

Water Conservation Education

During this period, water conservation education began on multiple fronts. Activities included participating in the Water Conservation Coalition of Puget Sound, airing television spots, and writing articles for publications and the Web. WTD entered into a partnership with the King County Housing Authority to retrofit over 80 percent of the authority's washing machines and toilets with water-conserving models. In 2002, the partnership installed low-flow toilets as a part of several major renovations. Water audits of King County's downtown facilities were completed. Improvements ranged from fixing valves to installing low-flow toilets and waterless urinals. These improvements included educational signage.

Public Outreach for Inflow and Infiltration Control

In 2001, King County conducted an assessment of the level of public awareness about inflow and infiltration (I/I). Public awareness was enhanced through existing communication vehicles, including the Web and WTD publications. Eight workshops for local agency representatives were held. These workshops were designed to educate local agencies about I/I issues and to involve them in the design of all key aspects of the I/I control program (see Chapter 5). In addition, the County partnered with local agencies to conduct public outreach for I/I pilot projects.

Task Forces and Work Groups for Wastewater Programs

The Sammamish Valley reclaimed water stakeholder task force helped King County to solicit and rank nominations from private and public parties interested in implementing water reuse demonstration projects. A work group was formed to provide input on the design of the Sammamish Valley Reclaimed Water Production Facility.

Two stakeholder groups were formed for preparation of the Habitat Conservation Plan, one for non-government organizations and one for agencies and tribes, to discuss issue papers being developed on significant topics. These two groups were also active in scoping the National Environmental Policy Act (NEPA) process for the draft Habitat Conservation Plan (see Chapter 13).

The Lower Duwamish River Citizens Coalition, a public outreach group convened by the Environmental Protection Agency, discusses outreach efforts for sediment cleanup projects being conducted in the Lower Duwamish Waterway under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) (see Chapter 6). A large public meeting to introduce the early action sites was held in August 2002. King County has provided resources to this group for translation, editing, and media outreach services.

Community Relations for Construction Projects

Community relations plans were prepared for each construction project undertaken during this period. The public was notified via fliers, signs, direct contact, and 24-hour project hotlines. Staff was available to respond immediately to questions and concerns. Procedures were in place to

document and track complaints and claims and to ensure prompt response. Evaluations were conducted to identify procedures that worked well on projects and to apply them to other projects.

Outlook Through 2006

King County will continue to form task forces and work groups, as needed, for WTD programs and will prepare and implement community relations plans for individual construction projects. The County will implement and refine the public involvement guidelines and database systems to support successful implementation of all WTD efforts, will evaluate the effectiveness of public outreach efforts, and will incorporate lessons learned into future projects.

The need for public involvement support is increasing. Large numbers and types of infrastructure improvements are planned in the region (transportation, drainage, water, solid waste, and other utilities). King County needs to coordinate with other agencies to minimize community disruption and confusion. Many of the County's existing pipelines and pump stations are more than 30 years old and require rehabilitation and upgrading to ensure safe and reliable operations in the future. At the same time, WTD is developing new facilities to serve the needs of the region's growing population. Multiple wastewater projects in the same areas require coordination to prevent public confusion and increase program efficiency and effectiveness.

The complexity and volume of scientific and technical information to be communicated to diverse stakeholders is a growing challenge, while changes in lifestyle mean that people are often too busy to attend public meetings. King County increasingly needs to work through existing community groups and established communication channels to conduct effective outreach. This approach is time-intensive but will help to build long-term relationships with communities.

Growth in the region means more people live close to County facilities. They will need to hear about County operations and services and have the opportunity to participate in decision-making.

Costs

Public involvement costs are included in capital project costs.

Chapter 12
Siting New Facilities

The Regional Wastewater Services Plan (RWSP) calls for expanding existing wastewater facilities and siting many new ones, including the new North Treatment Plant (now called Brightwater) and its associated conveyance system. This chapter summarizes the principles developed for siting Brightwater facilities and then presents siting highlights through 2003 and planned activities through 2006. Although the discussion focuses on the siting of Brightwater, the principles are being applied to the siting of all wastewater facilities. Appendix B-12 lists the assumptions underlying the siting principles and provides more information on implementation of performance measures.

Siting Principles

This section describes the approach to siting new wastewater facilities that was established in the RWSP Operational Master Plan. This approach has changed very little and remains within the 1999 policy framework established under the various wastewater program elements described in this update report. The assumptions used to develop the approach are relevant today.

The siting approach is consistent with the King County comprehensive water pollution abatement plan and the Washington State Growth Management Act. Siting takes into consideration factors such as efficiency of operation, equitable distribution of facilities among communities, and undue impact on racial, cultural, or class groups. The County strives to locate wastewater facilities that are designed to serve new growth where that growth is occurring and where there is maximum flexibility to respond to population growth and changing regulations.

The RWSP calls for providing expanded capacity by constructing a new treatment plant (Brightwater) in north King County or south Snohomish County on a site large enough for a facility that can accommodate ultimate population buildout in the north end of the service area. The treatment plant will have a capacity of 36 mgd and will come online by 2010, or as soon as possible after that, to handle wastewater flow from a new north service area defined in the plan. It will provide secondary treatment and will discharge treated effluent via an outfall in Puget Sound. Pipelines will convey flow to and from the plant. To facilitate production of reclaimed water at the plant, the RWSP also calls for evaluating the possibility of providing advanced treatment and constructing a freshwater outfall (see Chapter 3).

The following principles guided the Brightwater siting process:

- Siting is completed within approximately 3 years.
- The siting process is flexible.
- Partnerships are sought with other jurisdictions adjacent to the County's service area to maximize the use of facilities.
- Criteria for a site would comprehensively evaluate environmental, technical, financial, and community needs.

- Costs are kept within guidelines.
- All parties with a significant interest in the siting process are involved in the decision process.
- Communities help develop the criteria by which a site is selected and help identify ways to mitigate impacts and enhance the community when a plant is built.
- All agreements made with local communities are met.
- Citizens in the region and in local communities have access to relevant information.
- Local community efforts to participate in the siting process are supported.
- The County listens and responds to input from citizens and communities.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP performance measures through 2003. No policies were specified in the RWSP to guide facility siting. However, the Wastewater Treatment Division made a series of presentations to the Council and the Regional Water Quality Committee detailing the goals, objectives, constraints, criteria, and evaluation results for siting the Brightwater System.

The performance measures for siting new facilities centered on the siting process for Brightwater facilities. All measures were completed on schedule, except for the delay of issuance of the Final Environmental Impact Statement (Final EIS) in order to respond to over 5,000 comments on the Draft EIS. The principles established for siting Brightwater were used to site other wastewater conveyance facilities and to site inflow and infiltration pilot projects. Appendix B-12 provides more detail on implementation of performance measures.

Following adoption of the RWSP, King County began the four-year, three-phase process to define and develop the Brightwater proposal. Beginning early in 2000, King County developed a public involvement program for the project. A Siting Advisory Committee (later called the Executive Advisory Committee) helped to inform the siting process. The committee was made up of high-level officials representing tribal governments, local jurisdictions, businesses, and environmental groups. Community members participated in nominating treatment plant sites and developing screening criteria. Other public involvement activities included focus groups, workshops with regulators from local jurisdictions and from state and federal agencies, and public meetings throughout the siting area.

A pool of 95 potential land areas was identified from a variety of sources. These land areas were validated by applying a broad set of engineering and environmental constraints to identify serious problems that would limit the construction or operation of a wastewater facility (for example, steep slopes, flood zones, presence of parks, or Superfund sites). This initial screening revealed 38 unconstrained sites that could be brought forward for further review.

During this initial screening process, the Brightwater team developed policy site screening criteria to further refine the proposal and evaluate the unconstrained sites. To guide this process, the team first developed a set of project goals based on King County policy established in the RWSP. Then a set of draft policy site screening criteria was developed in consultation with Snohomish County,

all affected jurisdictions in King and Snohomish Counties, and members of the community. In September 2000, the King County Executive forwarded the policy criteria to the King County Council for review. In February 2001, the Council amended the policy criteria and adopted a refined set of policy site screening criteria for use in Phase 1 of the siting process. The amended policy site screening criteria were adopted in Ordinance 14043.

The policy criteria were used in concert with environmental, engineering, community, and cost factors to screen the 38 unconstrained sites and advance potential sites for further consideration and environmental review. The King and Snohomish County Executives recommended seven candidate sites to the King County Council for continued evaluation in Phase 2 of the siting process (Table 12-1). In its site review, the Council adopted modifications to the policy site screening criteria (now called "policy site selection criteria") to ensure that sites were evaluated for opportunities to recycle biosolids, methane gas, and reclaimed water. These goals required that sites be at least 60 to 90 acres, an increase from the minimum of 18 acres used to identify the 95 sites. The Council also added a new policy criterion, which stated, "King County shall select north treatment plant sites that do not displace existing facilities that are used for law enforcement and public safety training and, as a practical matter, are difficult to site elsewhere."

Table 12-1
Phase 1 Proposed Candidate Sites for Brightwater

Site Name	Total Area (acres)	Estimated Useable Area (acres)	Jurisdiction	Current Land Use
Unocal	53	43	City of Edmonds, Snohomish Co.	Unocal operations; inactive tank farm
Point Wells	98	29	Unincorporated Snohomish Co.	ChevronTexaco Asphalt Plant
Gun Range	80	80	Unincorporated Snohomish Co.	Kenmore Gun Range
Gravel Quarry	69	68	City of Bothell & Unincorporated Snohomish Co.	Gravel Quarry and Undeveloped Land
Thrashers Corner	144	63	City of Bothell, Snohomish Co.	Low Density Residential and Open Space
Route 9	108	104	Unincorporated Snohomish Co.	Businesses and Light Industrial
Woodinville[a]	44	44	City of Woodinville, King County	Undeveloped – residential proposed

a. Eliminated from further consideration because the site was slated for affordable housing.

In addition to finding potential land areas, King County initiated a comprehensive study to provide basic scientific information on Puget Sound to support the siting of the outfall and its subsequent design and permitting. This study, called the Marine Outfall Siting Study (MOSS),

evaluated seabed geology, currents, marine life, and chemical and bacteria conditions in Puget Sound.

Phase 2 of the Brightwater siting process began in June 2001 following the King County Council's selection of six candidate sites and eight marine outfall zones for further study and adoption of the policy site selection criteria. The Phase 2 process was broadened to evaluate complete "candidate systems" for each site; that is, conceptual systems that included a general plant layout, two options for construction methods (tunneling and open cut) for conveyance pipes serving the plant, and two options for construction methods (tunneling and open cut) for the marine outfall.

During Phase 2, the Brightwater team evaluated the six candidate sites and eight marine outfall zones to determine which of the sites and outfall zones best satisfied the policy site selection criteria. Of the six sites evaluated, only the Gun Range site failed to meet all of the mandatory policy criteria because the site supports public safety and law enforcement training. The Thrashers Corner site was found to be the least suitable site because extensive onsite wetlands fragment the useable area. The remaining four sites—Point Wells, Unocal, Gravel Quarry, and Route 9—were found to be consistent with the policy site selection criteria and could serve as feasible alternatives for future environmental review.

After considering the four candidate systems, the King County Executive found that two systems rose above the rest: Unocal and Route 9. The systems also met regional policy goals and needs for efficient use of urban land, provision for affordable and multimodal transportation options, revitalization of land, and/or the balancing of urban land uses with environmental protection. Based on these policy considerations, the Executive recommended that the Unocal and Route 9 sites be advanced for continued evaluation in Phase 3. For conveyance, the Executive recommended that both the open-cut and tunnel construction methods and four of the outfall zones continue forward for evaluation in Phase 3. The Council approved the Executive's recommendations.

The selection of two alternative treatment plant sites allowed for the identification and refinement of potential conveyance routes. This process mirrored the treatment plant site selection process. As a result, three Brightwater systems ("alternatives") were developed for analysis in the Draft EIS; the Executive identified the Route 9–195th Street System as the preferred alternative. The three alternatives were as follows:

- **Route 9–195th Street System (Preferred Alternative).** A treatment plant at the Route 9 site; an influent pipeline from Kenmore to the plant site and an effluent pipeline from the plant site to Puget Sound, placed in underground tunnels primarily under NE 195th and NE 205th Streets in King County; and a marine outfall pipeline extending off Point Wells into Puget Sound.
- **Route 9–228th Street System.** Same as the Route 9–195th Street System, except that the effluent pipeline would be installed primarily under 228th Street SE/SW in Snohomish County.
- **Unocal System.** A treatment plant at the Unocal site; an influent pipeline in an underground tunnel that extends from Bothell to the Unocal site, primarily under SR-522 and SR-104; and an outfall pipeline starting near Point Edwards and extending into Puget

Sound. The Unocal System included two sub-alternatives: (1) building a structural lid to support a multimodal transportation facility, and/or (2) expanding treatment plant capacity to accommodate flows from two existing treatment plants in Edmonds.

The Draft EIS was issued November 6, 2002. It analyzed in detail the characteristics, probable significant impacts, and mitigation measures for the Brightwater alternatives. During the 75-day comment period on the Draft EIS, over 5,000 comments were received. King County also held three technical seminars in summer 2003 to present information on studies performed as part of the ongoing predesign process and to provide the public with the opportunity to comment on this information.

The Final EIS was issued November 19, 2003. On December 1, 2003, County Executive Ron Sims selected the Route 9–195th Street System for the Brightwater System (Figure 12-1). As shown in the figure, five "portal" sites have been identified where the tunnel will be accessed.

For additional information on the Brightwater siting process, refer to *Final Environmental Impact Statement—Brightwater Regional Wastewater Treatment System* (2003).

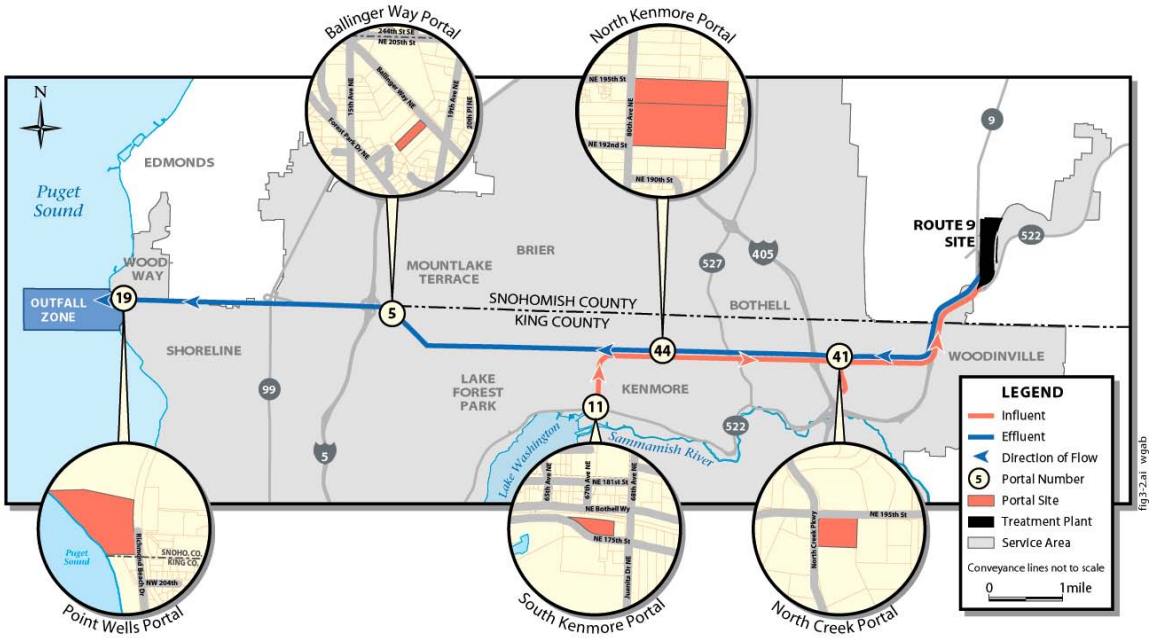


Figure 12-1
Brightwater Treatment System

Outlook Through 2006

Siting of other wastewater facilities, such as pump stations, will occur and will use the Brightwater siting principles and process, adapting them as needed to meet specific project and community requirements.

Costs

Siting costs are included in capital project costs.

Chapter 13
Habitat Conservation Plan

Preparation of a Habitat Conservation Plan (HCP) allows development-related activities to proceed in a manner that promotes conservation of listed species under the Endangered Species Act (ESA). King County's Wastewater Treatment Division (WTD) decided to voluntarily prepare an HCP under Section 10(b) of the ESA to gain greater certainty regarding necessary actions under the ESA and to expedite permitting of improvement projects. The plan will address, on a programmatic level, the probable effects of the wastewater program on listed species, including bull trout and chinook salmon. It will define special measures and/or modifications to counter any adverse effects and, ideally, will contribute to species recovery by improving habitat quality in general or conditions in a particular project area.

This chapter summarizes the HCP process that was specified in the Regional Wastewater Services Plan (RWSP) Operational Master Plan and presents implementation highlights through 2003 and planned activities through 2006. Appendix B-13 lists the assumptions used in defining the HCP and provides more information on implementation of performance measures.

Process to Develop the HCP

The Operational Master Plan (OMP) identified the HCP as a primary means of implementing water quality protection policies (see Chapter 9). Because the HCP is intended to support many RWSP elements, it occupies its own section in the OMP. Definition of the HCP has evolved since preparation of the OMP but remains within the 1999 RWSP policy framework set for wastewater program elements. The assumptions used to define the HCP are relevant today. (See "Implementation Highlights Through 2003" in this chapter for a description of a few minor changes in assumptions.)

The HCP provides for a programmatic response to the ESA as an alternative to project-by-project assessments of ESA compliance that could significantly delay project implementation and increase project costs. Projects authorized or funded by a federal agency, however, will still require an ESA Section 7 consultation with the National Oceanographic and Atmospheric Administration (NOAA) Fisheries (formerly National Marine Fisheries Service) and the U.S. Fish and Wildlife Service (USFWS), collectively know as "the Services." While the HCP will make the Section 7 process more streamlined and predictable, the Services may require project-specific information, including preparation of a Biological Assessment.

The HCP is being developed with input and assistance from, and ultimate approval by, the Services. It is being prepared in two phases. Phase 1 addresses current wastewater operations (operations, maintenance, and construction activities that are related to secondary treatment plants and their discharges, sewers, force mains, pump stations, and storage facilities, and limited to facilities owned and operated by WTD). Phase 2 will address other elements of the RWSP, including CSO control projects, inflow and infiltration control, water reuse, and biosolids recycling.

The HCP process and the Brightwater planning effort are separate but closely coordinated. King County, the Services, and the U.S. Army Corps of Engineers (the Corps) can use the analyses, underlying data, and related information accumulated for the HCP as a foundation and framework for the ESA Section 7 consultation on the proposed Brightwater facilities.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP performance measures through 2003. Appendix B-13 gives more information on implementation of performance measures through 2003. No policies guiding preparation of the HCP were specified in the RWSP.

Completion of both phases of the HCP as described in the performance measures is still in progress. Phase 1 is expected to be complete in 2004, and Phase 2 in 2006 (see "Outlook Through 2006" below). Between 2000 and 2003, the County has accomplished the following actions:

- Engaged in technical and policy-level negotiations with the Services since early 2000
- Examined the WTD activities included in Phase 1 of the HCP
- Developed technical memoranda regarding impacts on threatened or endangered species
- Completed a Water Quality Effects process that examined WTD discharges and their potential direct effects on certain species
- Developed statements of progress signed by all parties identifying areas of agreement and issues remaining
- Issued a draft Phase 1 report
- Completed the scoping process under the National Environmental Policy Act (NEPA).

An additional benefit of the HCP process is that the County has been able to engage the Services in discussions on specific capital projects that otherwise would not have occurred. These discussions have helped to resolve issues that have posed time-consuming and costly hurdles to project completion in the past.

Information on Salmon Numbers and Migration Patterns

WTD, in cooperation with the USFWS, Washington Department of Fish and Wildlife, and the Corps, has developed new information on the migration patterns of fish. In addition, as part of the HCP effort, WTD comprehensively assessed the direct impact on listed species of its wastewater discharges into Puget Sound. However, some uncertainty remains regarding the possible indirect effects of persistent, bioaccumulative, toxic, and endocrine-disrupting chemicals contained in WTD discharges. Much of this uncertainty comes from a lack of scientific data and will be addressed in the HCP through an adaptive management strategy—an iterative planning process that uses existing information and then modifies the plan as new information becomes available.

Coordination Between EPA and the Services

The Environmental Protection Agency (EPA) and the Services have signed a National Memorandum of Agreement (MOA) that identifies a process for integration of the water quality standards under the Clean Water Act and the water quality requirements for species listed under the ESA. However, no mechanism for coordinating at the regional level has been finalized.

The MOA will also define the process by which EPA and the Services will agree on water quality standards to protect salmon and bull trout.

Outlook Through 2006

The HCP is expected to be completed during this period. Primary activities will include completion of Phases 1 and 2 and preparation of a NEPA EIS. A critical topic for negotiation between the County and the Services will be how to implement an adaptive management strategy and the level of conservation required for direct and indirect impacts.

The schedule in the RWSP calls for completion of Phase 1 of the HCP in 2001 and Phase 2 in 2003. The schedule has been extended by three years to accommodate the unanticipated complexity of the effort. Under the updated schedule, Phase 1 will be completed in 2004 and Phase 2 in 2006. The additional time will allow the County to address issues raised during discussions with the Services and to complete the public process, which was delayed to allow for completion of the Brightwater EIS. Although the HCP will cover Brightwater, King County agreed with the Services to complete an ESA Section 7 consultation and a Biological Opinion for that project.

Costs[19]

While the RWSP policies call for implementation of water quality monitoring and studies, the RWSP did not identify specific water quality protection programs or set aside funds for such programs. The County developed the HCP as one element to implement RWSP policy direction. Concurrent with the adoption of the RWSP in 1999, preparation of the HCP was estimated to cost $6 million. The cost estimate to prepare the HCP is now $10 million.

The cost estimate has increased for the following reasons:

- At the time the RWSP was adopted, experience developing similar HCPs was limited; few historical costs were available to use as a basis for estimating.
- Costs were estimated before consultant input, which led to a more comprehensive scope of work.
- The HCP schedule was extended three years to accommodate the more comprehensive scope.

[19] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

- Informational requirements of federal agencies and the uncertainty of existing science were greater than anticipated.
- Unanticipated activities and services were required, including use of outside legal services, hiring of a NOAA Fisheries staff person to ensure timely processing of submittals, preparation of a chinook salmon study, and use of additional County staff.
- Preparation of an EIS is required. It had been assumed at the beginning of the project that a shorter environmental assessment would be sufficient.

Chapter 14
Financing the RWSP

This chapter summarizes how policies have guided financing of the Regional Wastewater Services Plan (RWSP). It describes the program and gives implementation highlights through 2003 and planned activities through 2006. The chapter concludes with a discussion of sewer rate and capacity charge projections. Appendix B-14 lists the assumptions underlying RWSP financing and gives additional information on implementation of the policies. Previous chapters provide details about specific program costs.

Overview of Policy Accomplishments

No changes are recommended in the policies for RWSP financing set by the King County Council in adopting the RWSP. The policy framework appears to be achieving its intent.

A key principle of financing the RWSP is "growth pays for growth." One of the main instruments to achieve this goal is the capacity charge that new customers pay for connecting to the system. At the time the RWSP was adopted, state law capped the capacity charge and restricted the growth-related costs that the capacity charge could collect. Legislative changes were implemented in 2000 that transferred authority to the County to set a capacity charge for new connections to the system.

Since adoption of the RWSP, the Wastewater Treatment Division (WTD) has maintained excellent bond ratings (Moody's A1 and Standard & Poor's AA-) in spite of an energy crisis and a sustained economic downturn. These ratings are in part the result of financial policy changes adopted in 2001. These policies increased the minimum debt service coverage to a more comprehensive 1.15 on all debt, while maintaining coverage of 1.25 on parity debt.[20] In addition, WTD established an emergency capital asset reserve of $15 million and increased its cash liquidity reserve to 15 percent of operating expenses.

Finance Program

This section describes the approach to financing defined in the RWSP, as amended by Ordinance 14219. This approach has changed very little since 1999, except for the lifting capacity charge restrictions described later in this chapter under "Implementation Highlights Through 2003." WTD's financing structure remains within the 1999 policy framework, and the assumptions used to define the program are relevant today.

[20] Debt service coverage refers to the legally mandated collection of revenues greater than those needed for operating expenses and debt service payments within a year. This additional revenue, required by bond covenants and County policy, maintains a buffer to insure against unforeseen events. Parity debt consists of long-term general obligation and sewer revenue bonds issued by WTD. Sewer system revenues must be used to pay WTD operating and maintenance expenses first, followed by debt service of payments on the parity debt. All other payments from sewer revenue are made only after these two payments have been made. The wastewater program also has other debt obligations, such as short-term borrowing and state and federal loans.

In 1999, the monthly sewer rate and the capacity charge contributed approximately 87 and 4 percent, respectively, of operating revenues for the WTD program. At that time, the capacity charge was $10.50. To comply with state statute, only costs for projects included in the 1986 comprehensive plan were used to calculate this capacity charge. Continuing the program under these constraints would have resulted in a decreasing capacity charge over time.

During development of the RWSP, the County began a process to address this and other RWSP financing issues. A series of workshops were held that culminated in proposals for new RWSP financing principles. In October 1998, the King County Executive and the Regional Water Quality Committee (RWQC) held a retreat at the Robinswood conference center that resulted in guiding principles for funding the RWSP. The RWQC later agreed to final language on the financing plan and sent a letter to County Executive Sims on November 16, 1998. The letter stated that the wastewater system is a regional system and documented the following specific points of agreement:

- Maintain a uniform monthly sewer rate for both existing and new customers such that, in general, existing customers pay for the existing system and new customers pay for growth.
- Establish a uniform capacity charge for new customers within the service area to cover growth-related costs not captured by the monthly sewer rate.
- Develop a proposed legislative strategy for increasing the capacity charge by including in its calculation the growth-related costs in the RWSP. Build a coalition for supporting the strategy in the Legislature.
- Maintain the current rate structure until the capacity charge is changed.
- Require King County to pay 100 percent of the cost of inflow and infiltration (I/I) assessments and any pilot projects that are done to demonstrate I/I effectiveness.
- Discontinue the combined sewer overflow (CSO) benefit charge (Seattle CSO payment) when changes in state legislation authorizing a higher capacity charge are passed.

Implementation Highlights Through 2003

This section presents an overview of progress made in meeting RWSP policies through 2003. Twelve policies were adopted in the RWSP to guide financing of the RWSP capital program. The policies were amended in 2001 and are being implemented successfully; no additional changes are recommended to policies at this time. Appendix B-14 presents details of policy implementation through 2003.

In the 2000 state legislative session, King County successfully pursued changes in state law to attain greater flexibility in setting the capacity charge. In June 2000, the Governor signed legislation transferring control of the rate setting authority from the state to the County. New policies providing a detailed methodology for calculating the capacity charge were adopted by the County Council on October 1, 2001, in Ordinance 14219. The methodology went into effect on January 1, 2002. It provides for the following actions:

- All customers with new connections will pay a uniform capacity charge.

- System costs will be defined over a 30-year period.
- Costs will be allocated among three categories: growth-related, existing, and shared.
- Customers with new connections will pay both the monthly sewer rate and the capacity charge.
- Rate and capacity charge revenues will recover 95 percent of total growth costs during the period.

To honor the Robinswood Agreement, the Seattle CSO benefit charge was discontinued once the new capacity charge methodology went into effect. As a result, WTD operating revenues were reduced by approximately $2 million per year.

Figure 14-1 illustrates the relationship between the monthly rate and the capacity charge.

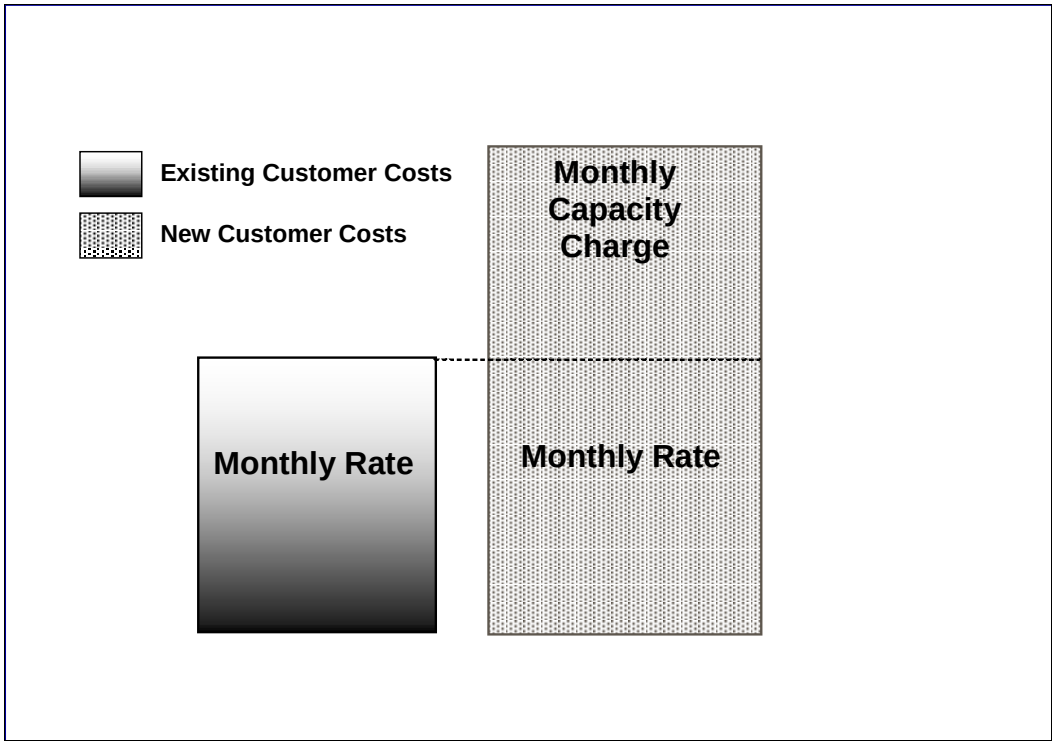


Figure 14-1
Relationship Between Monthly Rate and Capacity Charge

Outlook Through 2006

The current cost estimate for building the Brightwater System (treatment and conveyance) is $1.35 billion, which is approximately 48 percent higher than the $913 million estimated in the RWSP.[21] The difference in costs results from a number of factors that differ from original RWSP assumptions. These factors include selection of a larger treatment plant site, selection of a site that

[21] While original RWSP costs were expressed in 1998 dollars, they have been escalated here at 3 percent per year to 2003 dollars for comparison with current estimates. Past estimates in both 1998 and 2003 dollars, along with current costs, are presented in Table 14-1 in Chapter 14.

is farther inland and requires a longer conveyance system, and specification of a higher level of odor control. The increase in Brightwater costs, among other factors, has led to projections of higher sewer rates and capacity charges. Cost control measures are being evaluated throughout the capital program. Measures include re-evaluating site design elements, delaying project components, reducing the scope of selected projects, and re-phasing of other projects. (See Chapter 3 for a more detailed discussion of cost control measures begin evaluated for Brightwater.)

Along with cost control measures, financial strategies to reduce sewer rate and capacity charge impacts are being evaluated. In long-term WTD financial planning, it is assumed that annual debt service payments associated with a bond issue are constant, consisting of a principal and interest component in all periods of the bond term. New debt forms and structures may allow WTD to defer payments and lower rates. The decision to use these new forms and structures must be balanced with the risks of lowering the bond rating, which would increase borrowing costs and rates. The following are examples of financial strategies that are being considered:

- Change the discount offered to customers who pay their outstanding capacity charge balance in a lump sum to more accurately reflect current WTD borrowing costs. By reducing the current 8 percent discount rate to between 5 and 6 percent, the monthly capacity charge for other customers could be reduced by as much as $1.50.
- Change the capacity charge from a monthly charge paid over 15 years to a lump sum payment. One of the benefits would be greater revenue collection during Brightwater construction. This strategy could reduce the monthly sewer rate by as much as $1.80 per month by 2010. (State legislative changes are required to implement this strategy.)
- Borrow and structure bonds strategically. By altering the debt service payments associated with bond issues, the pattern of monthly rates can be modified. This would allow WTD to take advantage of the 2016 and beyond drop in debt service that results when early-issue bonds mature. For example:
    - Issue deferred-principal bonds. This practice has already been used by the County on prior bond issues to achieve level debt service payments over time. In the 2005 rate ordinance transmittal, additional deferred-principal bonds will be assumed.
    - Selectively issue zero coupon bonds. This option defers both principal and interest payments.

Decisions regarding the type of debt WTD can offer must be made based on the economic and financial conditions at the time the debt is being issued. The degree to which these financial strategies can be applied depends on these factors.

Original and Updated Cost Estimates

Table 14-1 presents a summary of original RWSP and updated cost estimates for the capital program. Cost estimates prepared for the RWSP are refined as projects move from planning through predesign, design, and construction.

Excluding the asset management program, the total estimated cost of the capital program has increased approximately 42 percent since the RWSP was adopted in 1999. Changes in the cost

estimates for the Brightwater project, discussed above and in Chapter 3, account for approximately 57 percent of the increase ($437 million).

Table 14-1
Original and Updated RWSP Cost Estimates for the Capital Program
(1999 through 2030)

RWSP Element	Original RWSP Estimate (1998$ x 1M)	Original RWSP Estimate (2003$ x 1M)	Updated Estimate (2003$ x 1M)	Cost Change (2003$ x 1M)
Total RWSP	**$1,585**	**$1,832**	**$2,601**	**$769**
Wastewater Services				
Asset management costs per year (not included above in total)	$30/year	$35/year	$49/year	$14/year
Brightwater Treatment and Conveyance	$ 788	$ 913	$1,350	$ 437
Brightwater Plant	$ 363	$ 421	$ 548[a]	—[b]
Brightwater Conveyance	$ 398	$ 461	$ 802[a]	—[b]
Total Land and Right-of-Way	$ 27	$ 31	—	—[b]
Total Treatment (Non-Brightwater)	$ 94	$ 109	$ 132	$ 23
Odor Control at South Plant[c]	$ 10	$ 12	$ 4	$ (8)
South Plant Expansion	$ 84	$ 97	$ 97	$ 0
West Point Odor Control	—	—	$ 3	$ 3
Vashon Upgrade	—	—	$ 16	$ 16
Carnation Plant	—	—	$ 12	$ 12
Total Conveyance (Non-Brightwater)[d]	$ 285	$ 326	$ 638	$ 312
RWSP Specific Projects	$ 120	$ 135	—	—
Minor Trunk Improvements	$ 165	$ 191	—	—
Total Current Forecast	—	—	$ 638	—
Inflow/Infiltration (I/I)	$ 34	$ 39	$ 40	$ 1
Combined Sewer Overflows (CSO)	$ 360	$ 417	$ 398	$ (19)
CSO Control	$ 360	$ 417	$ 366	$ (51)
Sediment Management Plan[e]	—	—	$ 32	$ 32
Water Reuse	$ 24	$ 28	$ 18	$ (10)
Technology Demonstration	—	—	$ 1	—
Future Water Reuse	—	—	$ 3	—
Demonstration Projects	—	—	$ 14	—
Water Quality Protection[f]	—	—	$ 15	$ 15
Habitat Conservation Plan	—	—	$ 10	$ 10

Notes:

All costs as of December 31, 2003.

Projects shown under each element are not exhaustive, but are listed to illustrate changes.

a. Current costs for Brightwater treatment and conveyance include land acquisition.

b. Cost change for Brightwater is not broken down by treatment and conveyance because land acquisition costs were presented separately for the original estimate but were folded into costs for the current estimate.

c. Medium- and low-priority improvements, if needed, will add another $13 million to odor control costs at South plant.

d. In the original RWSP estimate, I/I costs were included under conveyance. These I/I costs are listed separately here to allow for comparison with the updated estimate.

e. Includes costs associated with Superfund.

f. Includes costs for the Freshwater Program, which now includes the Green-Duwamish Water Quality Assessment (to be completed in 2006) and the Sammamish-Washington Analysis and Modeling Program (to be completed in 2005).

Conveyance projects other than Brightwater account for 40 percent of the increase in the projected cost of the capital program, or approximately $312 million (Chapter 4). The original RWSP cost estimates for non-Brightwater conveyance projects assumed the installation of parallel conveyance lines as a means of increasing capacity. Because RWSP policies call for continued planning that integrates water reuse, I/I control, and demand management with development of conveyance alternatives, the County conducted a detailed basin-by-basin analysis to identify capacity constraints in each basin and to determine optimal solutions. This analysis, completed between 1998 and 2003, took into account problems identified during the 1996–1997 storms and information collected during I/I flow monitoring. Results indicated that installation of parallel conveyance lines would not work for the actual conditions evaluated and that more complex solutions would be needed. Basin planning involves a managed solution that uses a variety of approaches including integration of County and local-agency projects, consolidation of projects in the same vicinity, flow diversion, and flow storage. As a consequence, the approach for a number of projects was modified and several new projects were added.

Treatment plant projects other than Brightwater account for approximately 3 percent of the increase, largely the result of the addition of the Vashon and Carnation treatment plant projects (approximately $28 million). A portion of the capital costs for the Vashon and Carnation projects will be recovered through a rate surcharge paid by customers who use these systems. Cost increases also reflect higher levels of odor control for the South and West Point plants.

An additional year of flow monitoring increased the costs for the I/I control evaluation by $1 million, from $39 million to a revised cost of $40 million. The estimated cost for the CSO program has decreased by $51 million because of the consolidation of the Norfolk and Henderson/Martin Luther King CSO control projects and the deletion of the SW Alaska project. The estimated cost for the water reuse program has also decreased, primarily because of the change in the size of the demonstration facility, as proposed in the April 15, 2004, report.

The RWSP did not identify new costs for asset management. Instead, it included an annual amount of $35 million. This amount was a preliminary estimate that was developed for the rate analysis process on the basis of an estimate of historical annual asset management expenditures. At that time, it was difficult to estimate these expenditures because asset management functions were part of several program budgets. The updated estimate of $49 million per year is based on a higher level of certainty for required expenditures and on long-term planning assumptions. This long-term estimate differs from asset management estimates used during the annual rate process, which rely on more specific project-level information and known near-term conditions.

Figure 14-2 shows the total WTD capital costs represented in Table 14-1 (with asset management expenditures added) on an annual basis from 1990 to 2030, in 2003 dollars without inflation. The larger amounts in the early 1990s mainly reflect expenditures associated with the upgrade of West Point to secondary treatment. The capital program entered a phase of relatively low activity from the mid-1990s to 2002. Beginning in 2000, RWSP implementation began in earnest with construction of two large CSO control projects and with siting, predesign, and land purchase for Brightwater. A relatively high level of activity continues through 2010 when Brightwater construction is completed.

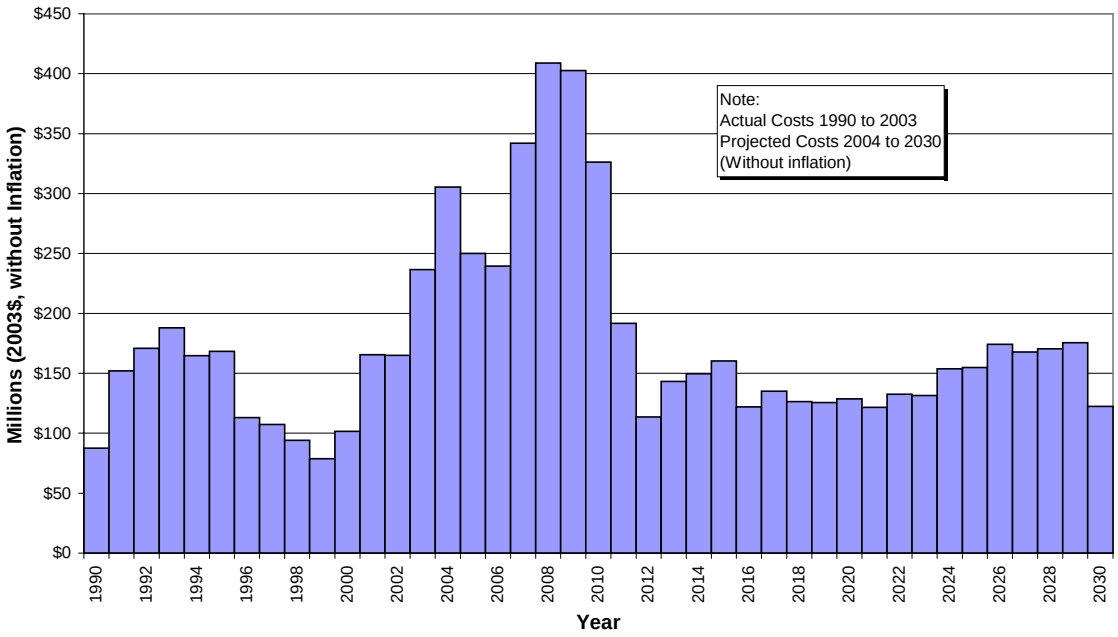


Figure 14-2
Annual Capital Costs for the Wastewater Treatment Division (1990 to 2030)

Sewer Rate and Capacity Charge Projections

This section discusses the updated projections for monthly sewer rates and capacity charges based on current capital program cost estimates.

Sewer Rate

Long-term projections of the monthly sewer rate are not strictly comparable to those presented each year in the annual rate process. The rates presented during the annual rate process incorporate more up-to-date data and assume that not all of the capital improvement program (CIP) budget will be expended during the year. Historically, in a given year, actual capital spending is 10 to 25 percent less than budgeted for the entire program. Much of this is because projects are delayed for a variety of reasons, including permitting issues, unknown geotechnical conditions, and unforeseen construction delays. Accounting for this actual spending lowers the proposed rate compared with assuming a 100-percent expenditure. However, long-term planning must assume that 100 percent of the costs are incurred, because the projects will eventually be completed. Consequently, the rate projections in this section reflect an assumption that 100 percent of the annual CIP budget is expended each year.

Figure 14-3 presents the original RWSP rate projections, the updated rate projections, and the actual rates through 2004 (all rates include inflation). The updated projections do not reflect assessments that are still in progress, including the 2005 sewer rate process, the results of cost control approaches (including value engineering recommendations for the Brightwater project), and the effects of financing strategies under consideration.

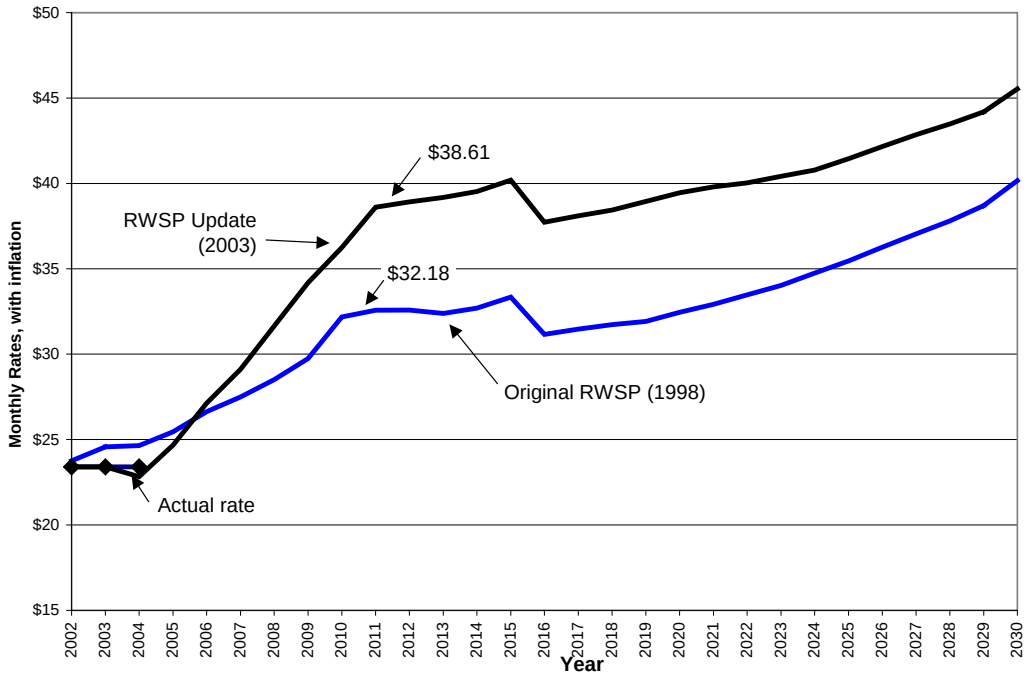


Figure 14-3
Original and Updated RWSP Sewer Rate Projections—with Inflation (2002–2030)

Both the original and updated rate projections show the same basic pattern: the rate of increase in rates peaks in 2010 or 2011, followed by a period of smaller increases and then a marked decrease in 2015–2016. The updated rate projections with inflation peak in 2011 at $38.61, compared with $32.18 in 2010 for the original projections. The buildup to 2010 largely reflects the annual capital spending patterns shown in Figure 14-2. The 2015–2016 decrease reflects a projected drop in debt service requirements as earlier bond series are retired.

Figure 14-4 presents the same projections in constant 2003 dollars, without inflation. The same 2010–2011 near-term peak occurs as in the projections with inflation (Figure 14-2). The updated rate projections without inflation peak in 2011 at $31.39, compared with $26.95 in 2010 for the original projections. After 2010, both the original and updated rates decrease relative to the assumed 3 percent per year inflation as capacity charge revenues increase and capital program activity slows.

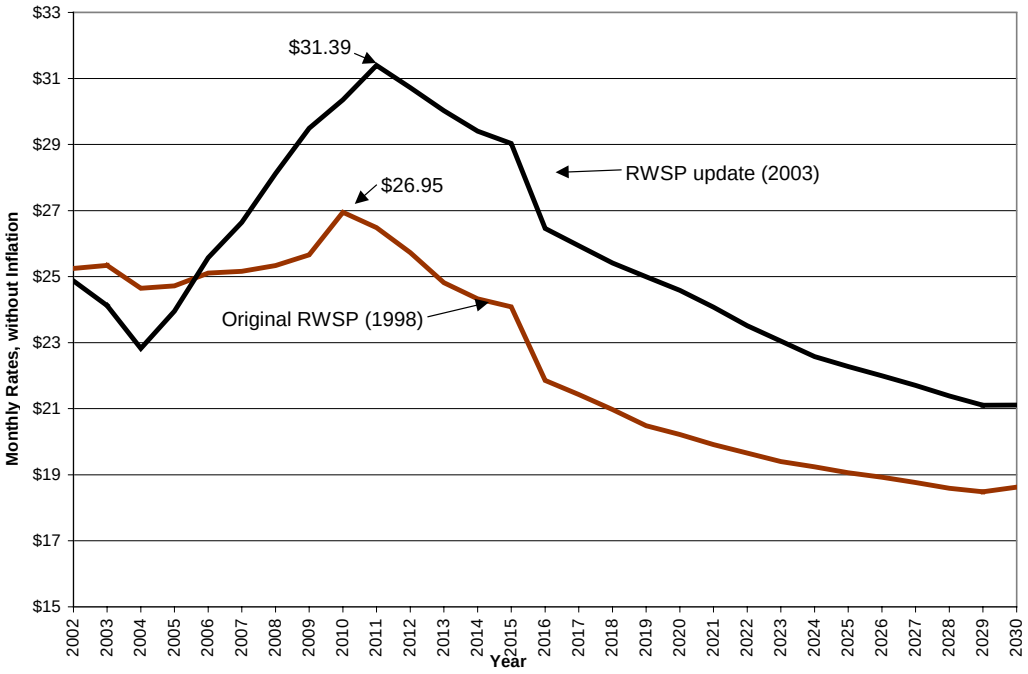


Figure 14-4
Original and Updated RWSP Sewer Rate Projections—2003 Dollars Without Inflation (2002–2030)

Table 14-2 summarizes the major factors contributing to the change between the long-term rates projected in the RWSP and in the update. When adjusted for inflation and levelized (providing a means of comparing two series that fluctuate over a period), the average rate in 2003 dollars increases by approximately $2.70 over the original estimates. Factors contributing to these changes include the following:

- **Revisions to residential customer equivalent (RCE) projections.** The revisions reflect the effects of the economic downturn in 2001–2002, water conservation during drought conditions, and customer adjustments from several agencies. These revisions, discussed in the following section, add approximately $2.05 to the average rate over the forecast period.
- **Changes in estimated capital spending** (shown in Table 14-1). The portion of these costs not covered under the policy of "growth pays for growth" increases the rate by approximately $0.60 over the forecast period.
- **Changes to financial policies** (described earlier in this chapter). These changes add approximately $0.15 to the long-term rates, largely to cover the more stringent debt service coverage requirement and increased reserve requirements.
- **Actual 1998–2003 performance.** This period was marked by lower borrowing interest rates (also resulting in lower investment earnings), productivity savings, an energy crisis, and bond refinancing. This activity decreases rates by approximately $0.10.

Table 14-2
Effects of Major Factors on the Estimated Annual Sewer Rate (2003–2030)

RWSP Original Rate Estimate	**$22.23**	
RCE Change	+$2.05	Effect of RCE decrease
Capital Change, existing system		
Asset Management	+$0.45	Increase in original long-term asset management assumption
Other Capital	+$0.15	Non-asset management capital
Financial Policies	+$0.15	Debt service coverage increase, 2001
1998–2003 Performance	–$0.10	Net effects of utility performance and refinances
RWSP Updated Rate Estimate	**$24.93**	

Note: The average sewer rate is a levelized rate that if increased at the assumed rate of inflation over the period, produces the same present value as the irregular series of projected annual rates. It provides a single number to consistently compare rate series with different patterns over time.

The delineation of the rate impacts of each component in the table is approximate and intended to show the influences that have led to higher rate projections. Changes in all of these variables tend to have interrelated effects between the sewer rate and capacity charge, making strict cause and effect difficult to isolate.

Residential Customer Equivalents

The major factor affecting an increase in near-term rates is the recent decrease in residential customer equivalents in 2002 and slower than originally projected near-term growth. While the number of new connections to the system is higher than had been expected, the number of commercial and industrial customers has decreased during the last two years.

King County uses RCEs as a means to charge local agencies for wastewater services. In the City of Seattle, the charge for individual customers—single-family, multifamily, commercial, or industrial—is based on water consumption, which is converted into RCEs by dividing the monthly water consumption by 750 cubic feet. Outside the City of Seattle, local agencies that do not measure residential water consumption consider each single-family house as one RCE; these agencies use the same method as the City of Seattle for their multifamily, commercial, and industrial customers. Because approximately half of the RCE base is calculated on water consumption, RCEs may vary with population changes, water conservation practices, and, as recent evidence indicates, the level of economic activity.

Table 14-3 shows RCEs by category for 1991 to 2003. RCEs fell by approximately 17,000 in 2002 and remained unchanged in 2003. The main causes of this drop in RCEs were large restatements of customers by several agencies, increased water conservation during a period of drought, and a sustained economic downturn. Additionally, the continued weakness in the economy leads to much lower projections of customer growth in the near term for commercial and industrial customers. It is assumed that RCEs will remain constant at 2003 levels through 2004 before slowly increasing (0.5 percent growth in 2005 and 2006) to the long-term average of approximately 1 percent per year. With the combination of the decrease in base and a period of no-or-slow growth, the revenue base over the projection period will decrease by approximately 8 percent, thus putting upward pressure on rates (as shown by the gap between the two lines in

Figure 14-5). The County will continually monitor for changes in underlying assumptions and will adjust these projections accordingly.

Table 14-3
Residential Customer Equivalents (1991–2003)

Year	Residential	Commercial/ Industrial	Total
1991	284,602	389,935	674,537
1992	293,609	369,493	663,102
1993	293,011	363,737	656,748
1994	296,757	362,300	659,057
1995	299,963	367,829	667,791
1996	303,292	367,894	671,186
1997	307,340	371,514	678,854
1998	310,878	376,426	687,304
1999	315,885	378,212	694,097
2000	320,117	376,705	696,822
2001	325,125	377,235	702,360
2002	329,265	355,830	685,095
2003	334,555	350,578	685,133

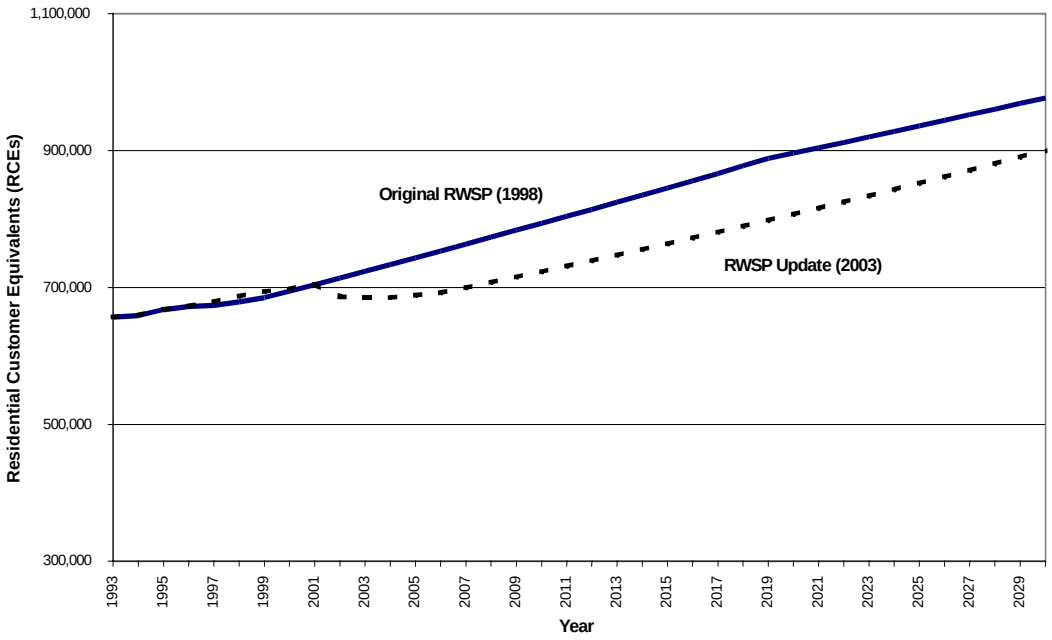


Figure 14-5
Original and Updated Residential Customer Equivalent Projections (1993 to 2030)

Capacity Charge

The increases in capital costs associated with new growth have a direct and significant effect on the capacity charge. As an example of this effect, Table 14-4 compares the original RWSP estimate and the updated estimates for the 2005 capacity charge for both lump sum and monthly payments. Information from evaluations that could reduce costs and possibly reduce the capacity charge (for example, the Brightwater value engineering and flow forecasting efforts) will become available over the course of 2004 and will be incorporated into the capacity charge estimate for 2006.

Table 14-4
Effects of Captial Cost Increases on the Estimated Capacity Charge for 2005

	Capacity Charge		
	Monthly	**Lump Sum Payment[a]**	**Total When Paid Monthly**
RWSP Original Estimate for 2005[b]	**$18.67**	**$2,015**	**$3,361**
Brightwater capital cost increase associated with Route 9 site selection	+$12.35	+$1,332	+$2,223
Non-Brightwater conveyance capital cost increase	+$5.48	+$591	+$986
RWSP Update Estimate for 2005	**$36.50**	**$3,938**	**$6,570**

Note: This table presents the capacity charge in 2005 as an example of the effects of increases in capital costs associated with new growth. It is assumed the charge increases in subsequent years through inflation at 3 percent per year.

a. Current policy discounts lump sum payments at 8 percent.

b. The original estimate is the result of the capacity charge methodology adopted by Council in September 2001 using the original RWSP costs and phasing.

The largest component of change from the original RWSP capacity charge projections is the increase in the capital cost of Brightwater. Because Brightwater is allocated exclusively as a growth cost, the impact to the charge is direct and accounts for approximately 70 percent of the change. Additionally, because a large proportion of the Conveyance System Improvement program is devoted to capacity increases, the change in capital costs for these projects accounts for approximately 30 percent of the increase.

Although total RCEs (new plus existing) have decreased recently, the number of newly connecting customers has maintained or surpassed originally expected levels. While new connections have averaged 9,500 per year since the beginning of the capacity charge program in 1990, they have averaged over 12,000 per year more recently. For example, during 2001–2003, approximately 37,000 new customers connected to the system. Because this recent level of activity is not expected to continue indefinitely, projections for new connections to 2030 have remained the same, averaging 9,300 new connections per year.

The County will continue to pursue cost containment strategies for the Brightwater program. In addition, it is expected that continued implementation of the Productivity Initiative, annual reviews of program priorities and cash flow, and ongoing analysis of financing strategies and policy changes will lower overall program costs.

Appendix A
Glossary

Appendix A—Glossary

Appendix A
Glossary

303(d) list	A list of surface waters in Washington State that do not meet applicable surface water quality standards. The list is prepared by the **Washington State Department of Ecology.**
activated sludge process	See **conventional activated sludge.**
adaptive management	An iterative planning process in which existing information is used to do initial planning, and the plan is then modified as new information comes available.
advanced treatment	A level of wastewater treatment more stringent than secondary treatment.
aeration	The promotion of contact between air and **wastewater** by bubbling air or oxygen through the wastewater.
aerobic	Living or occurring only in the presence of oxygen.
aerobic digestion	The decomposition of organic matter in wastewater **solids** into carbon dioxide and water by **microorganisms** in the presence of oxygen.
aerobic treatment	A **biological treatment process** in which organic matter in **wastewater solids** (**aerobic digestion**) or in **clarified** wastewater (**secondary treatment**) is broken down by **microorganisms** in the presence of oxygen.
agricultural land	Land on which crops are grown, range land, or land used as pasture.
ambient monitoring	Monitoring that is done to determine existing environmental conditions, contaminant levels, rates, or species in the environment, against which future conditions can be compared.
anaerobic	An environment that lacks the presence of atmospheric or **dissolved oxygen.**
anaerobic digestion	The decomposition of organic matter in **wastewater** solids into **methane** and carbon dioxide by **microorganisms** in the absence of oxygen.

aquifer A layer of permeable rock or soil underlain by impermeable material that is capable of storing significant quantities of water and through which **groundwater** flows. The saturated portion of an aquifer is referred to as the **zone of saturation.** An unconfined aquifer is one in which the **water table** defines the upper water limit. A confined aquifer is sealed above and below by impermeable material. A perched aquifer is an unconfined groundwater body supported by a small impermeable or slowly permeable unit.

asset management A planned way of addressing aging infrastructure and growing system demands. Asset management allows decision makers to make the best choices about how, when, and where to expend valuable and often limited resources. Decisions are based on long-term management philosophies and level of service definitions, asset inventory and condition assessments, financial and economic evaluations (life-cycle cost analyses), and risk assessment and consequence planning.

average wet-weather flow (AWWF) The average flow between November and April on days when no rainfall has occurred on the previous day. Composed of the average **base flow** and the average **inflow/infiltration (I/I**).

bacteria Single-cell or non-cellular **microorganisms** that lack chlorophyll. Some cause disease; others aid in pollution control by breaking down organic matter in air and water.

ballasted sedimentation An advanced **primary treatment** process used instead of conventional primary clarifiers in which a combination of coagulants and polymers is added to the wastewater to promote aggregation and settling of **suspended solids.** Ballasted sedimentation removes a higher rate of **solids** and **BOD** than do conventional clarifiers.

base flow **Wastewater** flow (not including **inflow** and **infiltration**) originating from residential, commercial, and industrial sources. In a **combined sewer** system, "base flow" refers to the portion of combined flows that must receive secondary treatment; defined as 2.25 times AWWF.

beach The area along a water body that extends from the extreme low tide line to the **riparian zone.** Also can refer to the present or past accumulation of sand and gravel found within this zone.

benchmarking The process of continuously comparing and measuring a private and/or public organization against recognized leaders and similar organizations to gain information that will help the organization take action to improve its performance.

best management practice (BMP)	A method, activity, or procedure for reducing the amount of pollution entering a water body. The term originated from the rules and regulations developed pursuant to Section 208 of the Federal Clean Water Act (40 CFR 130). Best management practices may include schedules of compliance, operation and maintenance procedures, and treatment requirements.
bioaccumulation	The accumulation of chemicals and **nutrients** in organisms.
biofuels	A fuel produced from dry organic matter or combustible oils produced by plants. For example, biodiesel can be made from rapeseed oil (canola).
biological assessment	A document prepared for the **Section 7 consultation** process to determine whether a proposed major construction activity under the authority of a federal action agency is likely to adversely affect **listed species,** species proposed to be listed, or designated critical habitat.
biological opinion	A document that is the product of formal **Section 7 consultation,** stating the opinion of **the Service** on whether or not a federal action is likely to jeopardize the continued existence of **listed species** or result in the destruction or adverse modification of critical habitat.
biological treatment process	Any **secondary treatment** process that uses **microorganisms** to break down organic materials in **wastewater.**
biosolids	Municipal sewage sludge that is treated to meet standards for land application.
Brightwater System	The combined components necessary to operate and maintain the Brightwater Treatment Plant—including the plant itself, pipelines, pump stations, odor control facilities, ventilation equipment, tunnel access, and outfall. In the 1999 Regional Wastewater Services Plan, this system was called the North Treatment Facility.
buildout	Refers to the development density of the **Urban Growth Area** after essentially all developable land has been developed. For this evaluation, the year 2050 was assumed to be the point of buildout, also known as "saturation."
bypass	A diversion of flow around all or part of the treatment plant in emergencies.
capacity	The **average wet weather flows** that the treatment plant or conveyance system is designed to handle.
capacity charge	A monthly charge levied on new connections, reconnections, and new uses as **mitigation** for growth.

categorical exemption	A type of project that has been exempted from **SEPA** requirements because it is unlikely to have a significant adverse environmental impact or because it was designated exempt by the Legislature.
clarification	The process of removing the **solids** from **wastewater**. Typically, the solids are allowed to settle in **clarifiers**, often aided by centrifugal action and chemically induced coagulation in the wastewater.
clarifier	A settling tank where **wastewater** is held to allow **solids** to sink and be removed from the wastewater. Primary clarifiers are used in **primary treatment;** secondary clarifiers are used as the final step in **secondary treatment**, prior to **disinfection** and discharge. Also referred to as sedimentation tanks.
Class A biosolids	**Biosolids** that are processed beyond the **Class B** standard (usually by some form of heating or composting) to virtually eliminate remaining pathogens. Class A pathogen reduction is required for biosolids that are sold or given away in a bag or container, or that will be used in areas frequented by the public or on home lawns or gardens.
Class B biosolids	**Biosolids** that meet Class B pathogen reduction criteria and are safe for a variety of beneficial uses such as soil amendment or land reclamation. Class B biosolids must be used according to certain site management restrictions.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) as amended by the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500 and PL 93-243). Regulates discharge of pollutants into **surface waters** of the United States.
Code of Federal Regulations (CFR)	A codification of the general and permanent rules published in the Federal Registrar by the executive departments and agencies of the federal government.
combined sewer overflow (CSO)	An overflow of **combined sewers** into **surface waters** when flows in the system exceed the capacity of the wastewater conveyance system. King County categorizes its CSO locations as either controlled or uncontrolled. Controlled CSO locations meet the Washington State Department of Ecology requirement that allows for no more than one untreated discharge per year.
combined sewers	A **conveyance** system designed to carry both **wastewater** and **stormwater**.
component agencies	See **Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC.**

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	Regulates uncontrolled hazardous materials and contamination. CERCLA (42 USC §9601) establishes a process for investigating, documenting, and cleaning up contaminated sites and provides a legal mechanism to assign liability for the costs of investigations and cleanup. Also know as "Superfund."
comprehensive plan	A legal document required under the Washington State **Growth Management Act** to be adopted by local officials, establishing policies and procedures that guide the future physical development of the community.
Comprehensive Water Pollution Abatement Plan	A plan developed pursuant to **RCW** 35.58.200. The RWSP is a major supplement to the County comprehensive water pollution abatement plan.
conventional activated sludge (CAS) process	A biological **secondary treatment** process in which a mixture of **wastewater** and **microorganisms** is agitated and **aerated** to encourage the microorganisms to grow and feed on the organic matter in the wastewater. The activated sludge, made up primarily of microorganisms, is subsequently separated from the wastewater by **clarification** and is either recycled to the head of the aeration process (return activated sludge) or routed to the solids handling systems (waste activated sludge).
conveyance system	A system, consisting of **trunks, interceptors, force mains, pump stations,** and other facilities, that moves wastewater from one place to another.
CSO treatment plant	A **primary wastewater treatment** plant designed to treat combined wastewater and **stormwater** for peak flows that exceed 2.5 times the average wet-weather flow. CSO treatment plants operate intermittently, unlike most wastewater treatment plants, which operate continuously.
demand management	Strategies to reduce wastewater flow and solids by reducing water consumption and/or the input of organic material. These strategies can include conservation or the use of **reclaimed water.**
design	The phase after predesign and before construction in which plans and specifications for a project progress from 30 to 90 percent complete, and when information needed by suppliers and contractors to construct the facility is provided.
design storm	A rainfall event of a given intensity and duration that has a probability based on historical rainfall of occurring in a given period of time (for example, a 20-year storm is likely to occur once every 20 years). The design storm is used to calculate the volume of runoff and the peak flow rate that a wastewater system must handle.

Determination of Non-Significance (DNS)	A determination in the **SEPA** process that a proposal is unlikely to have a significant adverse environmental impact or that all adverse impacts can be **mitigated** to a nonsignificant level.
dewatering	The removal of **groundwater** to reduce the flow rate or diminish pressure. Dewatering is usually done to improve conditions in surface excavations and to facilitate construction work. Can also refer to removing water from a basin, tank, reservoir, or other storage unit, or from solid material such as the **solids** that are a byproduct of **wastewater** treatment.
diffuser	The device at the end of an **outfall** pipe that distributes effluent into the **receiving water** so that maximum dilution is achieved. Can also refer to equipment that bubbles or injects air into an aeration basin.
digester gas	A gas generated when **bacteria** degrade biological material in the absence of oxygen during **anaerobic digestion**. Digester gas (also called biogas) is a mixture of methane and carbon dioxide.
digestion	The decomposition by **microorganisms** of organic matter in **wastewater solids**. Digestion can take place in either **aerobic** or **anaerobic** conditions.
discharge—direct or indirect	The release of treated or untreated **wastewater** into the environment. A direct discharge of wastewater flows into surface waters. An indirect discharge of wastewater enters a sewer system. Also used to describe water from a groundwater **dewatering** operation that enters **surface water** (direct) or a **storm sewer** (indirect) or to describe **stormwater** discharged to surface water.
disinfection	Destruction of **pathogens**. **Wastewater** treatment plants often use ultraviolet light or chemicals to disinfect **effluent**.
drainage basin	Area that is drained by a river and its tributaries.
easement	Rights obtained from a landowner to use a parcel of land for a specific purpose such as for an underground pipeline or utility or for vehicular or pedestrian access to a road or sidewalk.
ecological risk assessment	The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose-response assessments, and risk characterization.
effluent	Treated **wastewater** that leaves the treatment plant.
endangered species	See **listed species.**

Endangered Species Act of 1973, as amended (ESA)	Federal statute that provides protection for species of fish, wildlife, and plants that are **listed** as threatened or endangered.
environmental checklist	A standard form used in the **SEPA** process to collect information about a proposal and its probable environmental impacts.
environmental impact statement (EIS)	A document that discusses the probable significant adverse environmental impacts of a development project or a planning proposal, discusses reasonable mitigation of identified impacts, and evaluates alternatives to the project and/or proposal. EISs are required under certain circumstances by the **National Environmental Policy Act (NEPA)** and/or Washington **State Environmental Policy Act (SEPA).**
essential public facility (EPF)	A facility that is an essential element of the public infrastructure that is typically difficult to site. Examples of EFPs include, but are not limited to, a wastewater treatment plant, airport, solid waste handling facility, correctional facility, mental health home, or group home. Under Washington State's **Growth Management Act,** no local comprehensive plan or development regulation may preclude the siting of EFPs.
Executive Advisory Committee	A committee of representatives from tribes and cities in the Brightwater siting area and environmental, labor, and business leaders which helped to develop policy siting criteria for Brightwater and provided advice on a variety of regional policy issues and concerns. This committee was originally called the Siting Advisory Committee.
filtration	A treatment process for removing particles from water by passing the water through porous media such as sand or a man-made filter. This process is used to purify water to drinking water standards and **effluent** to **water reclamation** standards.
final design	The final phase of project design when contract plans and specifications necessary for bidding are prepared, and information needed by suppliers and contractors to construct the facility is provided. Follows **predesign.**
footprint	The area that a building or other structure will occupy, as shown on a map, photo, or plans.
force main	A pipeline that transports **wastewater** under pressure resulting from pump action.
fuel cell	A device that chemically combines hydrogen and oxygen to make electrical energy without combustion. Fuel cells can operate on a variety of fuels including natural gas, methanol, ethanol, landfill **methane**, coal gas, **digester gas,** propane, gasoline, and pure hydrogen.
gravity sewer	A sloping sewer pipe in which wastewater can flow by gravity.

groundwater	Water that infiltrates into the earth and is stored in the soil and rock within the **zone of saturation** below the earth's surface. Groundwater is created by rain, which soaks into the ground and flows down until it is collected at a point where the ground is not permeable. Groundwater then usually flows laterally toward a river, lake, or ocean. It is often used for supplying wells and springs.
groundwater table	The upper limit in the soil of underlying material permanently saturated with water.
Growth Management Act (GMA)	A Washington State law (Chapter 36.70A RCW), guided by procedural criteria and adopted by the Washington State Department of Community Development, that provides a legal framework and guidance for the preparation of comprehensive plans, development regulations, and other land use planning for local governments.
habitat	The area or environment where an organism or ecological community normally lives or occurs.
Habitat Conservation Plan (HCP)	An agreement between a non-federal landowner and **the Services** whereby the landowner provides habitat protection and other benefits to species covered by the **Endangered Species Act (ESA)** in return for regulatory assurances under ESA. King County is currently developing an HCP with the Services.
hydrologic analysis	The study of the intensity and frequency of rainfall and the subsequent distribution and magnitude of flow into the **wastewater conveyance** system.
hydrologic monitoring	The collection and reporting of data from continuously recording rain gauges and stream gauges for use in **hydrologic analysis.**
indirect potable reuse	Discharging **reclaimed water** to surface or groundwater to compensate for withdrawing water for treatment prior to use as a drinking water source from another location in the same watershed.
infiltration	The water that enters a **wastewater conveyance** system from the ground through means such as corroded or broken pipes, pipe joints, pipe connections from **storm sewers** or **combined sewers**, catch basins, and surface runoff.
inflow	The water discharged into a **wastewater** system from sources such as roof leaders, yard and area drains, foundation drains, cooling water discharges, drains from springs and swampy areas, manhole covers, cross connections from **storm sewers** and **combined sewers**, catch basins, surface runoff, and street wash waters.
inflow/infiltration (I/I)	The total quantity of water from both **inflow** and **infiltration** without distinguishing the source.

influent	Water, **wastewater**, or other liquid flowing into a reservoir, basin, or treatment plant.
interceptor sewer	Large pipelines that collect the flows from **trunk** sewers and carry them to the wastewater treatment plant.
King County service area	The defined geographic area in which King County provides **wastewater services.**
land application	The depositing of **biosolids** onto the ground for use as a soil amendment.
lateral sewers	Pipes that receive **wastewater** from homes and businesses and transport that wastewater to **trunks.**
liquefaction	The process of soil or sand behaving like a dense fluid rather than a solid medium during an earthquake. Saturated soils, sands, and fills are especially susceptible to liquefaction.
listed species	A species, subspecies, or distinct vertebrate population segment that has been added to the federal lists of Endangered and Threatened Wildlife and Plants as they appear in sections 17.11 and 17.12 of Title 50 of the Code of Federal Regulations (50 CFR 17.11 and 17.12).
loading	The amount of material entering a **wastewater** system from all sources.
local agencies	Water and sewer districts that receive wholesale wastewater services from King County.
mainline	See **trunk.**
manhole	A vertical shaft covered by a lid at ground level that provides access for maintenance of an underground pipe.
membrane bioreactor (MBR)	A biological process that uses microporous membranes to filter out particulate matter and bacteria, resulting in treated wastewater that is 7 to 10 times cleaner than wastewater treated with typical **secondary treatment** processes.
methane	A colorless, odorless, flammable gaseous hydrocarbon present in natural gas and formed by the decomposition of vegetable matter or produced artificially by heating carbon monoxide and hydrogen. A byproduct of **solids digestion** in **wastewater** treatment plants.
Metro	The Municipality of Metropolitan Seattle, a special purpose government agency formed in 1958 with water pollution abatement responsibility and other latent powers. King County is the successor to Metro.
Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC)	An organization of local cities and sewer districts that have contracts for wastewater services with King County. These entities were formerly known as the "component agencies" of **Metro.**

microorganisms	Microscopic organisms (bacteria, viruses, protozoans) that are not visible to the unaided eye. Some cause diseases in humans, animals, and plants; some are important because they are involved in breaking down and stabilizing **wastewater** and solid waste.
mitigation	The avoidance of an adverse impact by not taking a certain action or parts of an action; minimizing adverse impacts by limiting the degree or magnitude of the action and its implementation; rectifying an adverse impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating an adverse impact over time by preservation and maintenance operations during the life of the action; compensating for adverse impacts by replacing or providing substitute resources or environments.
monthly sewer rate	The cost, in dollars, charged to a **residential customer equivalent.**
National Environmental Policy Act (NEPA)	Federal legislation establishing national policy that environmental impacts will be evaluated as an integral part of any major federal action. Requires the preparation of an **Environmental Impact Statement (EIS)** for all major actions significantly affecting the quality of the human environment (42 U.S.C. 4321-4327).
National Oceanographic and Atmospheric Administration (NOAA) Fisheries	Federal agency that administers the **Endangered Species Act** for marine species. This agency was formerly called the National Marine Fisheries Service. See **the Services.**
National Pollutant Discharge Elimination System (NPDES)	Section 402 of the federal **Clean Water Act.** Prohibits discharge of pollutants from a point source into (navigable) surface waters of the United States unless a permit is issued by the Environmental Protection Agency, a state, or (where delegated) a tribal government on an Indian reservation. These permits are referred to as **NPDES permits** and, in Washington State, are administered by the **Washington State Department of Ecology.**
nonpotable use	Using **reclaimed water** for nondrinking water applications that may include but are not limited to irrigation, industrial processing, agricultural uses, and stream augmentation.
North Treatment Facility	See **Brightwater System.**
NPDES permit	Permit issued under the **National Pollutant Discharge Elimination System** to regulate discharges from point sources to surface waters of the United States.

nutrient	Essential chemical needed by plants or animals for growth. Excessive amounts of nutrients, such as nitrogen and ammonia, can lead to degradation of water quality and algal blooms. Some nutrients can be toxic at high concentrations.
open cut	A method for installing pipe near the surface, also called "trenching." The open-cut method consists of three stages: digging a trench and stockpiling excavated materials; installing pipe in the trench; and backfilling the trench and restoring the surface.
Operational Master Plan	The plan prepared in 1999 that specified how the **Regional Wastewater Services Plan** would be implemented and defined **performance measures** by which progress could be assessed. This plan was required by Ordinance 13680, which adopted the RWSP.
outfall	The final portion of a pipeline that carries treated wastewater offshore to **discharge** into **receiving waters**.
outfall zone	A broad area where the **outfall** pipeline and diffuser will be located.
pathogen	A **microorganism** that can cause disease in other organisms.
peak flow	The highest **base flow** and **inflow/infiltration** expected to enter a wastewater system during wet weather at a given frequency that the treatment plant and conveyance is designed to accommodate to prevent overflows of untreated sewage to the environment.
performance measures	An indicator that measures the extent to which a desired outcome or goal is being achieved.
pH	A measure of acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity. The pH scale ranges from 0 to 14.
portal	A vertical shaft and staging area constructed and maintained for the purpose of tunneling.
potable water	Water that is safe for drinking and cooking.
predesign	The initial phase of a project design process following planning, in which plans and specifications for a project are developed from about 10 percent to 30 percent of the complete design. For a large project, this initial phase generally would include determination of conveyance alignments, site layouts, or technology options.
preliminary treatment	The stage before **primary treatment** that physically removes pollutants, such as rocks, sticks, and grit, from wastewater through screening and settling processes.

pretreatment	The process used to reduce the amount of pollution in **wastewater** before it enters the conveyance system and treatment plant. Usually occurs at the source, such as an industrial plant.
primary treatment	A stage in **wastewater** treatment in which about 60 percent of the **solids** in the **wastewater** are removed, primarily by allowing the solids to settle via gravity in large tanks called **clarifiers.**
pump station	For **wastewater** purposes, a structure that houses pumps and other equipment for lifting wastewater in pipes to higher elevations so that it can continue to flow by gravity.
purple pipe	A separate pipeline that carries **reclaimed water** and isolates it from other flows. Purple is the color-coding used to identify pipes that carry reclaimed water.
rated capacity	The upper limit **capacity** specifications that have been agreed to by the **Washington State Department of Ecology.** This is often determined before a facility has been constructed and may be based upon theoretical performance projections.
receiving water	Any body of water where treated or untreated wastes are discharged.
recharge	The process of water soaking into the ground to become groundwater. The area on the surface where water soaks in is called the recharge area.
reclaimed water	Effluent that receives advanced treatment (beyond **secondary treatment**) and is used for non-drinking purposes such as landscape irrigation, heating and cooling, and other industrial uses.
reclamation site	Drastically disturbed land that is reclaimed using **biosolids**, including strip mines and construction sites.
Regional Wastewater Services Plan (RWSP)	A set of policies adopted by the King County Council in December 1999 as a major supplement to its comprehensive water pollution abatement plan. The RWSP provides direction for the operation and further development of the wastewater system and its capital improvement program.
Regional Water Quality Committee (RWQC)	A committee to the King County Council composed of members from the Suburban Cities Association, City of Seattle, Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC), and the County Council.
regulator	A structure that controls the flow of **wastewater** from two or more input pipes to a single output. Regulators can be used to restrict or halt flow, thus causing wastewater to be stored in the **conveyance system** until the treatment plant can handle it. Can also refer to a person from a local, state, or federal agency who enforces regulations and issues permits.

remedial investigation and feasibility study (RI/FS)	The first steps of a cleanup plan for a Superfund site. A remedial investigation (RI) gathers data needed to determine the nature and extent of contamination; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The feasibility study (FS) is an analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site.
remediation	Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site.
residential customer equivalent (RCE)	A means by which King County charges for its wastewater services. While all residential customers pay a uniform rate, commercial and industrial customers pay based on residential customer equivalents, where 750 cubic feet of wastewater per month equals one RCE.
Revised Code of Washington (RCW)	A compilation of laws of the State of Washington published by the Statute Law Committee.
right-of-way	A public or private right to use linear portions of properties, typically for roadway, railway, or utility purposes. Rights-of-way may be established through deeds or **easements**.
riparian zone	A transition area between aquatic and terrestrial environments. The microclimate, soil, and vegetation are typically influenced by both **surface water** and **groundwater**.
sanitary sewer	A pipeline that carries household, industrial, and commercial wastewater.
sanitary sewer overflow (SSO)	Untreated or partially treated overflows from a **separated sewer** in a **wastewater conveyance** system.
secondary treatment	A two-phase process that consists chiefly of **clarification** (**primary treatment**) followed by a biological process—with separate **solids** collection and treatment—and by secondary clarification, **disinfection**, and discharge through an **outfall**. Can also be followed by **advanced** treatment. A combination of primary and secondary treatment removes about 85 to 90 percent of the **solids** in the **wastewater.**
Section 7 consultation	A consultation between a federal agency and NOAA Fisheries or the U.S. Fish and Wildlife Service, to ensure that federal agency's actions are not likely to jeopardize the continued existence of **threatened or endangered species** or result in destruction or adverse modification of critical habitat. This consultation is required by Section 7 of the **Endangered Species Act.**

sediment management plan	A plan prepared in 1999 that assessed seven CSO locations where sediment will require cleanup activity. The plan assessed the sites for their risk, preferred cleanup approach, partnering opportunities, and potential for recontamination after remediation. This plan was called for in RWSP policy CSOCP-7**.**
sedimentation	See **clarification.**
separated sewer	A **wastewater** pipe designed to accept and transport household, industrial, and commercial wastewater and to exclude **stormwater** sources.
septage	The material that is pumped out of a septic tank.
Services, the	National Oceanographic and Atmospheric Administration (NOAA) Fisheries and the U.S. Fish and Wildlife Service.
sewage	See **wastewater.**
sewer	A pipe that carries **wastewater** and/or **stormwater** runoff from the source to a treatment plant or **receiving water. Sanitary sewers** carry household, industrial, and commercial wastewater. **Storm sewers** carry runoff from rain or snow. **Combined sewers** are used for both purposes.
Siting Advisory Committee	See **Executive Advisory Committee.**
sludge	The untreated accumulated **solids** that have been separated from liquids during the **wastewater** treatment process.
solids	The organic and inorganic material in **wastewater** that is removed during treatment.
South Treatment Plant	A King County regional wastewater treatment plant, located in the city of Renton.
split flow	Used in combination with **membrane bioreactor** (MBR) technology in which the **average wet-weather** flows are treated using MBR, excess flows are routed to **ballasted sedimentation,** and then both flows are blended and disinfected prior to discharge.
State Environmental Policy Act (SEPA)	A Washington State law (Chapter 43.21C RCW) that requires state agencies and local governments to consider environmental impacts when making decisions regarding certain activities, such as development proposals over a certain size, and comprehensive plans. As part of this process, environmental impacts are documented and opportunities for public comment are provided.
State Revolving Fund (SRF)	The Washington State Water Pollution Control Revolving Fund, which provides low-interest loans for wastewater treatment facilities and related activities.

storm drain	A system of gutters, pipes, or ditches used to carry **stormwater** from surrounding lands to streams, lakes, or other **receiving water.** Also refers to the end of the pipe where the **stormwater** is discharged.
storm sewer	A pipe (separated from **sanitary sewers**) that carries only **stormwater** runoff from buildings and land surfaces.
stormwater	The portion of precipitation that does not percolate into the ground or evaporate. Stormwater flows across the ground surface in channels or ditches, or flows within pipes.
Superfund	See **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).**
surface water	Any water, including fresh water and salt water, on the surface of the earth.
threatened or endangered species	See **listed species.**
total maximum daily load (TMDL)	The maximum amount of pollution that can be assimilated in a water body in a day that will not violate water quality standards. A margin of safety is included so that any variability, regardless of source, would not produce a violation of Washington State **Water Quality Standards**. Can also refer to the study done to determine the maximum pollutant load, as well as the plan implementing a program to restore the water body to meet water quality standards.
trunk	A pipeline that receives flow from many tributary pipes and serves a large territory. Also known as a main sewer.
urban growth area (UGA)	Areas designated by counties in Washington State under the **Growth Management Act** within which urban growth is encouraged and outside of which growth can occur only if it is not urban in nature. Areas must be designated sufficient to accommodate projected growth for a 20-year period, and public services and utilities must be provided to serve the projected growth with the UGA.
Value Engineering (VE)	A technical peer review in which outside experts evaluate a project and develop ideas to improve the project and lower its costs.
Washington Administrative Code (WAC)	The codified regulations adopted by various Washington State agencies through the rule making process.
Washington State Department of Ecology (Ecology)	The state agency designated by the Environmental Protection Agency to be responsible for developing, implementing, and enforcing environmental protection laws and policies, including the state **Clean Water Act** and the Shoreline Management Act. Ecology issues the **NPDES permit**, which allows a **wastewater** treatment plant to operate.

wastewater The water and wastes from homes and businesses that enter pipes and are transported to treatment plants for treatment and disposal.

wastewater revenues Revenues from the monthly sewer rate, capacity charge, grants, and other revenues, such as interest income and charges for services, available for the **wastewater system.**

wastewater service area See **King County service area.**

wastewater services The services to be provided within the **King County service area,** as defined in the **RWSP.**

wastewater system All of King County's water pollution abatement facilities, together with all lands, property rights, equipment, and accessories necessary for those facilities, and any other infrastructure, and all operations and programs provided by King County under chapter 35.58 RCW. The wastewater system includes but is not limited to: 1) conveyance of **influent** from component agencies, 2) treatment of **sewage,** 3) disposal of treated **effluent,** 4) production and recycling of **biosolids,** 5) regulation of **inflow and infiltration**, 6) control of **combined sewer overflows,** and 7) production of **reclaimed water.**

water column The open-water environment, as distinct from the bed or shore that may be inhabited by swimming marine or freshwater organisms.

Water Quality Report An annual report that describes King County's efforts to protect and preserve water quality in Puget Sound and major lakes and rivers, particularly those waters that benefit from, or could be impacted by, the operations of King County's **wastewater system.** This report is required by Ordinance 13680, which adopted the **Regional Wastewater Services Plan.**

water reclamation The reuse of **wastewater** treated meet the Water Reclamation and Reuse Standards, issued by the Washington State Departments of Health and Ecology in 1997. Four classes of reclaimed water were established based on the end uses of the reclaimed water. King County's wastewater treatment plants currently produce Class A reclaimed water for onsite use. 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 nondrinking water (nonpotable) uses.

Water Resource Inventory Area (WRIA) An administrative and planning boundary that represents one of the major watershed basins in the state of Washington. Watershed management activities in the state are generally organized by WRIA.

water reuse See **water reclamation.**

water table	The upper surface of the **zone of saturation** of **groundwater.**
West Point Treatment Plant	A King County regional wastewater treatment plant, located in Seattle's Discovery Park.
zone of saturation	An underground layer in which every available space is filled with water.

Appendix B
Assumptions, Performance Measures, and Policies

Appendix B—Assumptions, Performance Measures and Policies

Details for each RWSP element, including original planning assumptions, accomplishment of performance measures defined in the Operational Master Plan, and implementation of the policies specified in Ordinance 13680, are organized as follows:

Appendix B-1
Treatment Improvements

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions for treatment improvements used in 1999. These assumptions are still valid except where noted.

- King County will build flexibility into its system to respond to uncertain future regulations and need for reclaimed water.
- All activities and any changes in facilities at the West Point plant shall comply with the terms of the West Point settlement agreement. This includes such things as evaluating technologies that reduce plant impacts (for example, truck trips and odor), keeping the plant within the 32-acre limit of the plant footprint, and researching ways to reduce the number of digesters at the plant.
- King County shall design, construct, operate, and maintain its facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering, so as to meet or exceed regulatory requirements for air, water, and solids emissions, as well as ensure worker, public, and system safety.
- King County shall establish goals for odor control at all treatment plants. Odor control facilities and equipment shall be designed and operated to meet these goals**.**

  2003: The County Council adopted new odor control policies on July 14, 2003 as Ordinance 14712.

- The County will accept sewage, septage, sludge, and biosolids from outside the King County service area where it provides a benefit to the region as long as it is consistent with the King County Comprehensive Plan or the comprehensive plan of the source jurisdiction, capacity is available, and no operating difficulties are created.
- King County shall provide secondary treatment to all base sanitary flow delivered to its treatment plants, and may provide treatment beyond the secondary level to meet water quality standards and achieve other goals such as furthering the water reuse program or benefiting species listed under the ESA.

  2003: Brightwater peak flows may receive enhanced primary treatment using ballasted flocculation, followed by blending with secondary effluent from the membrane bioreactor (MBR) technology to meet secondary effluent limits.

- Base sanitary flow is defined for plants serving separated wastewater systems as 1.25 times AWWF. AWWF is the mean flow occurring from November 1 to April 30 of the year plus an allowance for average I/I.
- Base sanitary flow is defined for plants serving combined wastewater systems as 2.25 times AWWF/non-storm.
- Increased treatment capacity will be provided in approximately 10-year increments.

- King County will operate three secondary treatment plants: West Point, South Plant, and a new North Plant.

  2003: Contracted with Vashon in 1999 to operate plant; improvements are underway. Contracted with Carnation in 2002 to construct and operate plant; planning is underway.

- No abandonment of major facilities is planned.
- The potential for expansion at the West Point plant and South plant should be retained for unexpected circumstances which shall include, but not be limited to, higher than anticipated population growth, new facilities to implement the CSO reduction program or new regulatory requirements.
- 36 mgd of new capacity in the north end will be needed by 2010.
- The North plant will be a secondary plant with a marine outfall.

Performance Measure Accomplishment

Treatment Improvement Performance Measures	Scheduled Completion	Date Completed	Comments
Select and set-up Siting Advisory Committee	June 2000	June 2000	Brightwater Siting Advisory Committee (later called the Executive Advisory Committee) (June 2000–ongoing). The committee included representatives from tribes and cities in the Brightwater siting area and environmental, labor, and business leaders. The group helped develop policy siting criteria and continues to provide advice and feedback on a variety of regional policy issues and concerns. Brightwater community task forces (Spring 2002–ongoing). The Unocal site Community Task Force and a Route 9 site Community Task Force were formed to involve community members who live near the potential treatment plant sites in the planning process.
Develop and approve site selection criteria	Dec. 2000	To Council Sept. 2000; amended criteria were adopted Dec. 2001	Interdisciplinary team formed. September 2000, King County Executive Ron Sims forwarded criteria to Council for review. February 2001, Council amended criteria and required a refined set of "site selection criteria" for use in Phase 2 of the siting process. The amended site screening criteria were adopted on December 12, 2001 in Ordinance 14043.
Narrow site selections for North Treatment Plant and outfall (3–5 sites)	Dec. 2001	Dec. 2001	On December 10, 2001, Council approved Unocal system in Edmonds and Route 9 system north of Woodinville for advancement to Phase 3.

Treatment Improvement Performance Measures	Scheduled Completion	Date Completed	Comments
Reevaluate odor goals and recommend policies	Dec. 2001	Jan. 2003	The following documents were issued October 2002: • *Odor Control Systems Inventory and Review of Applicable Technologies* • *Odor Measurement Methods and Regulations* • *Odor Prevention Policy Recommendations* Council adopted new odor control policies on July 14, 2003 as Ordinance 14712.
Complete project level EIS for North Treatment Plant and outfall	June 2003	Nov. 2003	The Draft EIS was completed November 2002. The Final EIS was issued November 2003 in order to adequately respond to the more than 5,000 comments received.
Recommend preferred package (site, conveyance and outfall) for North Treatment Plant to county executive	June 2003	August 2002	King County Executive Ron Sims announced the Route 9 site as the preferred alternative with conveyance routes and a preferred outfall location.
Site and acquire property for the North Treatment Plant and outfall	Dec. 2003	On schedule	The Route 9 site was selected on December 1, 2003. Property acquisition began in 2003 and will be complete in 2004.
SEPA process and predesign for the North Treatment Plant and outfall	2004	On schedule	SEPA was completed November 2003. Predesign will be complete in June 2004. Memoranda of understanding with the local jurisdictions are being developed. These memoranda set out the processes under which specific mitigation measures will be developed.
Complete permits and final design for the North Treatment Plant and outfall	2005	On schedule	Currently on schedule to begin construction late 2005. Some permits may be acquired later to correspond with construction dates for different elements
Commission a 36-mgd North Treatment Plant and outfall	2010	On schedule	Project on schedule for system commissioning. Treatment plant to be online 2010.

Treatment Improvement Performance Measures	Scheduled Completion	Date Completed	Comments
Improve the West Treatment Plant's ability to treat combined sewer overflows while maintaining the Plant's existing capacity	2018	As scheduled	Project planned for 2018 under the CSO control plan.
SEPA process and predesign for South Treatment Plant expansion	2023	As scheduled	Will be accelerated if it is determined that South Plant capacity is needed earlier.
Complete permits and final design for South Treatment Plant expansion	2025	As scheduled	No activity at this time.
Expand the South Treatment Plant to 135 mgd	2029	As scheduled	King County will evaluate "re-rating" the plant by 2007 to ensure its capacity is adequate until Brightwater comes online in 2010. Population and flow trends will be monitored to identify if the expansion will need to be done earlier.

Policy Implementation

Treatment Policies	How is Policy Being Implemented?
TPP-1: King County shall provide secondary treatment to all base sanitary flow delivered to its treatment plants. Treatment beyond the secondary level may be provided to meet water quality standards and achieve other goals such as furthering the water reuse program or benefiting species listed under the ESA.	Brightwater will exceed secondary effluent limits using the membrane bioreactor (MBR) methodology. In the future, peak flows will be split off to receive advanced primary treatment, then blended with the MBR effluent. No needs for higher levels of treatment at the plant have been identified to date. The Brightwater Treatment Plant is reserving space on-site to provide for future water reuse if determined to be needed.
TPP-2: King County shall provide additional wastewater treatment capacity to serve growing wastewater needs by constructing a new north treatment plant in north King county or south Snohomish county and then expanding the treatment capacity at the south treatment plant. The west treatment plant shall be maintained at its rated capacity of one hundred thirty-three mgd. The south treatment plant capacity	King County has chosen the Route 9 site for the Brightwater Treatment Facility, which will initially provide treatment capacity for flows of 36 mgd in 2010 and 54 mgd in 2040. The Brightwater facility will provide capacity for future population growth by preserving expansion potential at the West Point and South Treatment plants for future needs. Scheduled to be online by 2010.

Treatment Policies	How is Policy Being Implemented?
shall be limited to that needed to serve the eastside and south King County, except for flows from the North Creek Diversion project and the planned six-million-gallon storage tank. The potential for expansion at the west treatment plant and south treatment plant should be retained for unexpected circumstances which shall include, but not be limited to, higher than anticipated population growth, new facilities to implement the CSO reduction program or new regulatory requirements.	Changed population and flow projections indicate the South Plant expansion may need to be accelerated. Re-rating the plant to maximize the use of existing facilities is being evaluated. A new schedule may be proposed if further analysis indicates it is needed.
TPP-3: Any changes in facilities of the west treatment plant shall comply with the terms of the West Point settlement agreement.	Compliance with this agreement is part of the basic planning framework for facilities.
TPP-4: King County shall establish goals for odor control at all treatment plants. In order to establish these goals, the executive shall investigate potential technologies and costs for odor control and recommend a policy to the council for inclusion in the RWSP. This investigation shall be completed and a policy adopted in a timely manner so that odors are controlled at existing plants and at any new plant. Odor control facilities and equipment shall be designed and operated to meet these goals. In the case of the south treatment plant, King County's goal shall be to significantly reduce odor below baseline levels established in the development of the 1993 south treatment plant air model. **Amended by Ordinance 14043 on July 14, 2003:** ***1. Existing treatment facilities shall be retrofit in a phased manner up to the High/Existing Plant Retrofit odor prevention level as defined in Table 1 of Attachment A to this ordinance, the odor prevention policy recommendations dated March 18, 2003. This level reflects what is currently defined as the best in the country for retrofit treatment facilities of a similar size. Odor prevention systems will be employed as required to meet the goal of preventing and controlling nuisance odor occurrences;*** ***2. Existing conveyance facilities that pose nuisance odor problems shall be retrofitted with odor prevention systems as soon as such odors occur, subject to technical and financial feasibility. All other existing conveyance facilities shall be retrofitted with odor control systems during the next***	Council adopted new odor control policies on July 14, 2003 as Ordinance 14043.

Treatment Policies	How is Policy Being Implemented?
facility upgrade; ***3. The executive shall phase odor prevention systems implementing the tasks that generate the greatest improvements first, balancing benefit gained with cost, and report to the council on the status of the odor prevention program annually. This report shall include a listing and summary of odor complaints received and detail progress on implementing odor prevention policies and projects;*** ***4. New regional treatment facilities shall be constructed with odor control systems that are designed to meet the High/New Plant odor prevention level as defined in Table 1 of Attachment A to this ordinance, the odor prevention policy recommendations dated March 18, 2003. This level reflects what is currently defined as the best in the country for new treatment facilities of a similar size;*** ***5. New conveyance facilities serving these new regional treatment facilities shall also be constructed with odor control systems as an integral part of their design;*** ***6. Design standards will be developed and maintained for odor control systems to meet the county's odor prevention and control goals;*** ***7. A comprehensive odor control and prevention monitoring program for the county's wastewater treatment and conveyance facilities will be developed. This program shall include the use of near facility neighbor surveys and tracking of odor complaints and responses to complaints and shall consider development of an odor prevention benchmarking and audit program with peer utilities; and*** ***8. New odor prevention and measurement technologies will be assessed and methods for pilot testing new technologies identified when determined by the executive to be necessary and appropriate for achieving the goals of this policy.***	
TPP-5: King County shall undertake studies to determine whether it is economically and environmentally feasible to discharge reclaimed water to systems such as the Lake Washington and Lake Sammamish watersheds including the Ballard Locks.	The reuse work plan determined such a discharge will not need to be considered for at least 10 years.

Treatment Policies	How is Policy Being Implemented?
TPP-6: When there are opportunities to transfer flows between King County's treatment facilities and treatment facilities owned and operated by other wastewater utilities in the region, the county shall evaluate them. Such evaluation shall include, but not be limited to cost, environmental and community impacts, liability, engineering feasibility, flexibility, impacts to contractual and regulatory obligations and consistency with the level of service provided at the county owned and operated facilities.	King County evaluated the option to transfer and treat flows from Edmonds and Lynnwood wastewater treatment plants at the Unocal Site in the EIS process. The opportunity to transfer flows from Everett to Brightwater has also been evaluated, but was not cost-effective.
TPP-7: King County may explore the possibility of constructing one or more satellite treatment plants in order to produce reclaimed water. The county may build these plants in cooperation with a local community and provide the community with reclaimed water through a regional water supply agency. In order to ensure integrated water resource planning, in the interim period prior to the development of a regional water supply plan, King County shall consult and coordinate with regional water suppliers to ensure that water reuse decisions are consistent with regional water supply plans. To ensure costs and benefits are shared equally throughout the region, all reclaimed water used in the community shall be distributed through a regional water supply agency consistent with a regional water supply plan.	The proposed Sammamish Reclaimed Water Production Facility is scheduled to be in construction during this period and to be completed in 2007. The Council, in a proviso to the 2004 County budget, required the submittal of a report by April 15, 2004. The report will review the consistency of the facility with the adopted goals and policies of the RWSP, will account for life-to-date expenditures, will review the proposed schedule, and will outline a revised scope and budget for the facility. The report will also demonstrate the relationship and integration of this facility with future reclaimed water production at the Brightwater plant.
TPP-8: King County shall continue water reuse and explore opportunities for expanded use at existing plants, and shall explore water reuse opportunities at all new treatment facilities.	Implementation is ongoing. Reclaimed water production for in-plant uses is planned at Brightwater. Space is available on-site for any future water reuse facilities, should they be pursued.
TPP-9: A comprehensive public involvement program shall be developed and implemented to provide the public, at a minimum, the opportunity to give input on the criteria and the screening process used for selecting the list of possible sites for the new north treatment plant, its conveyance system and outfall and to comment on the final selection of a site. The King County executive shall establish one or more committees to aid in the siting of a north treatment plant. The committees shall, at a minimum, evaluate siting criteria to be used and propose a narrowed list of sites for	In August 2000, King County developed a public involvement program for the new regional wastewater treatment facility, later called Brightwater. This flexible program was designed around project milestones and able to be adjusted as circumstances changed. It was updated throughout the siting process. Public involvement elements included: • Regular consultation with tribal governments • Opinion leader interviews and briefings to elected officials and other regional

Treatment Policies	How is Policy Being Implemented?
consideration by the executive after consulting with the council as follows: **1. The King County executive shall transmit a motion to the council that establishes the criteria by which sites will be selected; and** **2. The executive shall provide the council with timely reports that detail the sites that meet the criteria and are under consideration and, at a later date, those sites that are final candidates for the siting of the north treatment plant.**	community, business, and environmental leaders • Siting Advisory Committee (later called Executive Advisory Committee) • Newsletters, video, displays in public areas • Web site that includes opportunities to comment on the project • Focus groups (2000 and 2001) • Media outreach leading to press coverage of the process • Speakers bureau and special events such as booths at fairs • Workshops for regional stakeholders (August 2000, May 2001) • Several series of public meetings and hearings throughout the siting area (June 2000, April 2001, June 2002 – scoping meetings, December 2003 – Draft EIS hearings). These meetings were advertised in newspapers including Edmonds Beacon, Mukilteo Beacon, Enterprise Newspapers (Edmonds, Shoreline, Lake Forest Park, Lynnwood, Mill Creek), Eastside Journal, Bothell/Kenmore Reporter, Seattle Times, Woodinville Weekly, Everett Herald • Toll-free phone line and timely response to citizen correspondence • Technical information made available on CDs, at libraries, and on the Web page • Educators workgroup • Two community task forces based around the potential plant sites (2002) • Design workshops for communities near potential plant sites (Summer 2002). These were advertised in newspapers from the list above • Conveyance workshops for communities near potential conveyance routes (Summer 2002). These were advertised in newspapers from the list above. Many of the above-listed activities provided people with multiple opportunities to get involved in the project in the manner that best met their individual needs. Members of the public have had opportunities to nominate sites for consideration, help develop the criteria by

Treatment Policies	How is Policy Being Implemented?
	which sites would be evaluated, comment on candidate sites before specific ones were selected for the EIS, comment on proposed conveyance routes, help develop guidelines for architects designing the facilities, and comment on the scope and draft of the EIS, among other things.
TPP-10: Based on criteria approved by the council, the King County executive shall have the final decision on the site for a north treatment plant.	King County Council approved the amended siting criteria on December 12, 2001, as Ordinance 14043. King County Executive Ron Sims announced Route 9 as the site for the Brightwater plant on December 1, 2003.

Appendix B-2
Conveyance System Improvements

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid except where noted.

- No abandonment of major facilities is planned.
- Peak flow is based on current peak inflow/infiltration (I/I) plus a 7 percent I/I increase every 10 years, per acre.
- The 20-year design storm at 2050 shall be used as the design standard for the County's separated wastewater system.
- Facility sizing shall take into account the need to accommodate buildout population**.** Conveyance facilities are sized for 2050 saturation values with phasing in consideration of the facility's and equipment's useful life.
- Additional capacity scheduled to be on-line when the 20-year peak flow exceeds the capacity of the existing facility.

  2003: To achieve cost control in conveyance projects, modification of the timing part of the design standard to provide new capacity when the 5-year peak flow will be exceeded is being considered. If thetiming change is adopted any future application of the 5-year standard will be made on a project-by-project basis, considering site-specific public health and environmental risks and the timing of other improvements being made by local agencies.

- To protect public health and water quality, King County shall plan, design, and construct County wastewater facilities to avoid sanitary sewer overflows.
- Conveyance capacities will need to be re-evaluated based on the I/I study results.
- King County shall assess the risk to human health and the environment from wastewater treatment and conveyance activities, and use this information in evaluating water pollution abatement control options.
- The results of the CSO Water Quality Assessment found that there would be no significant adverse impacts to aquatic life from an East Plant Discharge to the Green River 1 to 2 times per year on average in lieu of building another Puget Sound outfall.
- The South Treatment Plant effluent transfer system has a 5-year design storm standard. This will result in up to 1 to 2 Green River discharges per year by 2030.

Conveyance Basin Planning

Planning Area	Progress 1999 Through 2003	Planned Work For Next 3 Years
Hidden Lake	The Hidden Lake and Boeing Trunk improvements will construct a new Hidden Lake Pump Station, an upstream storage facility, and pipeline replacement. Predesign was completed in February 2003 and final design is underway.	Final design will be completed in spring 2004. Additional improvements may be needed in the future depending on the success of I/I control.
Northwest Lake Washington (Includes the Matthews Park and Thornton Creek drainage basins in the area of the north and west Lake City Trunks)	The issues in this basin include capacity limitations in the McAleer Trunk during large storms, flow restrictions in the Kenmore Interceptor Section 5, and hydraulic jumps in portions of the Thornton Creek Trunk.	Two Thornton Creek Interceptor sections enter predesign in 2005. Capacity issues will be investigated again after I/I control results are in.
North Lake Washington (Includes the areas north and east of the Kenmore Interceptor in King and southern Snohomish Counties—an area that encompasses the Brightwater service area)	Problems in this basin include overflows from heavy rains and failures resulting from power loss. Improvements have been made to minimize overflows until Brightwater is online. This is also an area of high population growth. North Treatment Plant (Brightwater) conveyance and outfall sited. Planning determined the need for a North Lake Interceptor could be most cost-effectively addressed as part of the Brightwater conveyance system. North Creek Storage project began construction in 2001 and was completed in 2003. A Memorandum of Agreement was completed with Alderwood Sewer & Water to acquire the North Creek and Swamp Creek Trunks. Swamp Creek Interceptor extension was completed in May 2003.	Brightwater land acquisition and permitting. Construction begins late 2005. North Creek Storage completed end of 2003.

Planning Area	Progress 1999 Through 2003	Planned Work For Next 3 Years
	An agreement was made with the City of Kenmore to contribute to its Swamp Creek control program so as to protect County lines and reduce I/I.	
	Kenmore Lakeline flapgate monitors are being installed to identify when overflows are occurring to Lake Washington. Installation occurred in July 2001 followed by testing through 2003. This work was done in coordination with the City of Lake Forest Park and other cities in the area.	Kenmore Lakeline flapgate monitors will be fully operational in mid-2004.
Northeast Lake Washington	Juanita Bay Pump Station project will build a new pump station to replace the existing aging facility.	Juanita Bay will complete SEPA environmental review and permitting. Final design work is targeted for completion in 2004. Construction completion is expected end of 2006.
	The Bellevue Pump Station project will divert excess flows from the Sweyolocken Pump Station by upgrading the Bellevue Pump Station and constructing a new force main from the pump station to the Eastside Interceptor. Planning was completed in 2000 and design is underway.	Bellevue will complete design in 2004 and construction end of 2006.
North Lake Sammamish (Includes Redmond and the north end of Lake Sammamish)	While there are no significant problems in this high-growth basin, flow management planning was accelerated to coordinate with the Brightwater Treatment Plant siting process because wastewater from this area will ultimately be sent to the new plant. Initial assessment for this area was completed in August 2003.	No work anticipated in this time frame.

Planning Area	Progress 1999 Through 2003	Planned Work For Next 3 Years
South Lake Sammamish	Alternatives for conveyance upgrades, diversions, and projects to attenuate peak flows, such as storage and I/I control, were completed in fall 2002.	Agreement for Sammamish Plateau Sewer and Water to build an extension of County interceptor to the Issaquah interceptor is in development The County would then own and operate the lines. Construction will likely occur by 2006.
Southeast Lake Washington (Includes the Hazelwood and Coal Creek area southeast of Lake Washington)	The primary issue in this basin is a conveyance capacity limitation at the upstream end of the regional system in this area. No short-term capacity needs exist at this time. East Side Interceptor (ESI) Section 1 repair and replacement was completed March 2003. ESI Section 11 – Wilburton 4th siphon barrel is on hold pending new information. King County acquired a pipeline from Coal Creek Water & Sewer	
South Lake Washington (Includes the Madsen Creek area of the Cedar River basin)	Planning effort concluded that there are no major system improvements needed at this time. Fairwood Interceptor (Madsen Creek) began construction.	Fairwood Interceptor (Madsen Creek) will be completed end of 2005.
North Green River	Tukwila Interceptor/Freeway Crossing project completed planning and is on hold awaiting information on the impacts of Sea-Tac Airport industrial waste discharges and proposed development in the Southcenter area.	

Planning Area	Progress 1999 Through 2003	Planned Work For Next 3 Years
South Green River (The area is located at the south part of King County and is divided into three planning zones: Auburn, Kent, and Soos. Soos Planning Zone includes the area served by the Soos Creek Water and Sewer District and all or portions of the cities of Covington, Maple Valley, Black Diamond, and Kent.)	Planning was completed for this area early in 2003. Southwest Interceptor project replaces or defers parts of the RWSP Auburn Interceptor 1, 2, and 3 projects. Soos Creek Water and Sewer District agreed on a local and regional configuration of pumping stations, force mains, and gravity lines that, in total, represent the lowest public cost alternative for service to that area. The County will build, own, and operate most of the significant facilities and will provide for direct connection of Black Diamond to the King County system. A validation study for the Soos Creek Planning Area began in September 2003.	
	Soos Pump Station D and conveyance will be built to a connection point at the South 277th Interceptor. Predesign is occurring in 2004, followed by design through August 2005.	Pump Station D predesign is occurring in 2004, followed by design through August 2005. Construction will run from 2006 into mid-2008.
	The Pacific Pump Station project will construct a new 3.3-mgd pump station to the west of the existing station, which will then be abandoned.	The Pacific Pump Station project will issue Construction Notice to Proceed in spring 2004. Mill Creek Relief Sewer, Stuck River Trunk, and Auburn West Valley Replacement Sewer will enter predesign in 2005.

Performance Measure Accomplishment

Conveyance Improvement Performance Measures	Scheduled Completion	Date Completed	Comments
Increase York Pump Station to 68 mgd	2000	Need will be met in 2010 when Brightwater conveyance is online	Basin planning determined that this project can be cost-effectively consolidated with Brightwater conveyance.
Parallel East Side Interceptor Section 1	2000	2002	In 1965, this section of the ESI was damaged during an earthquake, and repair reduced its capacity. This project restored it to its original design capacity of 224 mgd by constructing 1,800 feet of 72-inch pipeline around the damaged section. Construction was completed at the end of 2003.
Construct 6-MG storage at North Creek	2002	2003	This underground facility, located at the site of the North Creek Pump Station, will store sewage flows from the Bothell-Woodinville and North Creek Interceptors during large storms, providing protection against sanitary sewer overflows into Lake Washington upstream of the Kenmore Interceptor. After the storm, the stored flow will be pumped back into the interceptors. Construction was completed end of 2003. This is a later because it was determined that phasing the project would have financial benefits without increasing risk of overflow.
Parallel Auburn Interceptor Sections 1, 2, and 3	2004	N/A	A new pipeline—the Southwest Interceptor—will divert flow from south Auburn around the Auburn Interceptor and relieve the capacity problems in the existing line, deferring the need for this work into the 2010–20 time frame. A number of minor connection/diversion projects are planned to bring wastewater flow to the Southwest Interceptor.
Construct North Lake Interceptor and pump station	2006	On schedule to complete in 2010 with Brightwater conveyance	Planning for the North Lake Washington basin determined that the function of a North Lake Interceptor could be most cost-effectively addressed as part of the Brightwater influent tunnel conveyance system.

Conveyance Improvement Performance Measures	Scheduled Completion	Date Completed	Comments
Construct 170-mgd Kenmore Pump Station to pump flow to North Treatment Plant	2010	On schedule to complete in 2010 with Brightwater conveyance	The Route 9 Brightwater site requires a pump station in Bothell, instead of Kenmore. Eventual capacity will be 170 mgd.
Construct force main from new Kenmore Pump Station to North Treatment Plant	2010	On schedule to complete in 2010 with Brightwater conveyance	The Route 9 Brightwater site will require an influent gravity tunnel from Kenmore to Bothell, and force mains from Bothell to Route 9.
Construct Tunnel from North Treatment Plant to outfall	2010	On schedule to complete in 2010	The 195th alignment from the Route 9 plant was selected. Predesign will complete end of June 2004 and construction will begin in late 2005. On schedule.
Construct North Treatment Plant Outfall	2010	On schedule to complete in 2010	The Point Wells site from the Route 9 plant was selected where it will discharge 5,200 feet offshore at a depth of 600 feet. Predesign will complete end of June 2004 and construction will begin in late 2005. On schedule.
Increase North Creek Pump Station to 50 mgd	2016	N/A	The Route 9 Brightwater site made this unnecessary.
Modify York Pump Station to pump 35 mgd to North Treatment Plant	2016	Need met in 2010 when Brightwater conveyance online	Basin planning determined that this project can be cost-effectively consolidated with Brightwater conveyance.
Construct forcemain to convey North Creek flow to Kenmore Pump Station	2016	Need met in 2010 when Brightwater conveyance online	Basin planning determined that this project can be cost-effectively consolidated with Brightwater conveyance.
Construct Auburn Interceptor Storage	2020	As scheduled	May be accommodated by other conveyance identified in basin planning.
Expand existing conveyance pipes system-wide to meet developing needs	2000–2030	Ongoing	See CP-1.
Construct 3 – 5 MG storage for South Treatment Plant Effluent Transfer System	2030	As scheduled	Timing will be re-evaluated if the South Plant expansion occurs earlier.

Policy Implementation

Conveyance Policies	How is Policy Being Implemented?
CP-1: To protect public health and water quality, King County shall plan, design and construct county wastewater facilities to avoid sanitary sewer overflows.	Wastewater basin planning is underway in several of the County's regional basins as part of the Conveyance System Improvement (CSI) program. The CSI program integrates with the RWSP, asset management, and I/I control to provide consistency in conveyance planning system-wide and to take advantage of opportunities to address common issues, leverage resources, and minimize customer disruption.
1. The twenty-year design storm shall be used as the design standard for the county's separated wastewater system.	Modification of the timing part of the design standard to provide new capacity when the 5-year peak flow will be exceeded is being considered. Any future application of the 5-year standard will be made on a project-by-project basis, considering site-specific public health and environmental risks and the timing of other improvements being made by local agencies.
2. The South Treatment Plant effluent transfer system shall be designed with a five-year design storm standard. When effluent volumes exceed the five-year design standard and exceed the capacity of the south treatment plant effluent transfer system, secondary treated effluent from the south treatment plant will be discharged to the Green/Duwamish river until the flow subsides such that the flow can be discharged through the south treatment plant effluent transfer system.	No emergency discharges to the Green River have occurred since 1999.
CP-2: King County shall construct the necessary wastewater conveyance facilities, including, but not limited to pipelines, pumps, and regulators, to convey wastewater from component agencies to the treatment plants for treatment and to convey treated effluent to water bodies for discharge. Conveyance facilities shall be constructed during the planning period of this plan to ensure that all treatment plants can ultimately operate at their rated capacities. No parallel eastside interceptor shall be constructed. No parallel Kenmore Interceptor shall be constructed.	Conveyance projects are implemented to meet this policy.

Conveyance Policies	How is Policy Being Implemented?
CP-3: King County shall periodically evaluate population and employment growth assumptions and development pattern assumptions used to size conveyance facilities to allow for flexibility to convey future flows that may differ from previous estimates.	Population and flow have been updated to reflect the 2000 census and resulting Puget Sound Regional Council population forecasts. Average Wet Weather Flow projections have been updated for this report. Twenty-year peak flow projections will be completed second quarter 2004. The County will continue to monitor for changed trends.
CP-4: The King County executive shall prepare and submit to the council recommended policies for achieving uniform financing, construction, operation, maintenance and replacement of all conveyance facilities within its service area.	Snohomish County pipeline acquisitions have occurred. The Swamp Creek and North Creek Trunks were acquired from Alderwood Sewer & Water. Negotiations to acquire pipelines from Cross Valley Sewer & Water are underway. Negotiations to acquire pipeline extension to be built by Sammamish Plateau Sewer and Water are underway.
CP-5: King County shall closely integrate water reuse planning and I/I study results with planning for wastewater conveyance and treatment facilities. Water conservation and demand management assumptions shall also be coordinated with wastewater facility planning.	Water reuse, water conservation, and other demand management data is routinely considered in planning. I/I control alternatives will be considered after the results of the pilot projects are assessed. "Purple pipe" for reclaimed water will be laid to Brightwater Portal 41 during conveyance construction because it is more cost effective to install them now in coordination with Brightwater conveyance construction.
CP-6: King County executive shall prepare and submit to the council a study on the impact of conveyance trenches on groundwater recharge and inflow and infiltration including options and costs for limiting these impacts. Based on the study, the executive shall recommend policies for council review and adoption for limiting these impacts accompanied by a proposed work program and schedule for implementation.	This study has not yet begun.

Appendix B-3
Inflow and Infiltration Control

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- During the 1997 RWSP public involvement process, citizens ranked the control of inflow and infiltration (I/I) as a high priority.
- The overall goal for peak I/I reduction in the service area should be 30 percent from the peak 20-year level identified in the report.
- Approximately 75 percent of peak flows in the separated conveyance system comes from I/I.
- Ninety-five percent of the I/I problem originates in the component agency sewers.
- Peak flow in the separated system is based on current peak I/I plus a 7 percent I/I increase every 10 years, per acre. The exception is for the areas of separated sewer system within the City of Seattle where it is assumed there will be no further deterioration.
- Conveyance capacities will need to be re-evaluated based on the I/I study results.
- King County shall rehabilitate portions of its regional conveyance system to reduce I/I whenever the cost of rehabilitation is less than the costs of conveying and treating that flow or when rehabilitation provides significant environmental benefits to water quantity, water quality, stream flows, wetlands, or habitat for species listed under the ESA.

I/I Control Pilot Projects Detail

In May 2002, the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC) selected 10 pilot projects representing regional interests and geographic balance, potential for testing various rehabilitation methods, and other agreed-upon selection criteria. In summer 2002, the program consulting team performed Sanitary Sewer Evaluation Surveys (SSESs) for the majority of selected pilot projects. This included cleaning lines and manholes, mainline CCTV, smoke testing, and side sewer and lateral inspections.

The pilot projects are described in more detail in the following paragraphs.

City of Auburn

This work is located in the southeastern portion of the Auburn service area adjacent to Auburn Way South. It is primarily residential and includes the Auburn Adventist Academy. Rehabilitation work included pipe bursting of about 2,200 linear feet of main and 1,830 linear feet of side sewers, replacing 8 manholes, and installing 24 cleanouts.

City of Brier

Brier is a residential basin north and south of 228th Street SW. This pilot project involved rehabilitation of the neighborhood system with a cured-in-place lining of about 2,900 linear feet of mains, installing about 339 cured-in-place service connection liners, chemical grouting of 28 manholes, and fiberglass lining of 16 manholes.

Skyway Water and Sewer District (formerly known as Bryn Mawr)

I/I within the southwestern portion of this pilot basin is believed to come from both public and private sources. The area has a high groundwater table that may be allowing water into the system. The entire system was rehabilitated from manholes and mainline sewers to the private residences. This work included pipe bursting and replacing about 9,500 linear feet of mains and 14,350 linear feet of laterals. Skyway implemented this project.

Coal Creek Utility District, Northshore Utility District, and Val Vue Sewer District

Coal Creek, Northshore, and Val Vue consolidated efforts to enable the use of a wider variety of manhole rehabilitation technologies for assessment. The technologies used were chemical grouting, cementitious lining, elastomeric lining, and chimney boots.

In Coal Creek the project involved the repair and rehabilitation of manholes only. Eighty-four manholes were repaired through chemical grouting of leaks, adjusting frames and covers to prevent water infiltration, or coating of the manhole chimneys to eliminate leaks.

In Northshore, 116 manholes were repaired through chemical grouting of leaks, adjusting frames and covers to prevent water infiltration, or coating of the manhole chimneys to eliminate leaks.

Most of Val Vue's manholes were constructed in 1973 and some of the most serious I/I contributors resulted from grouting failures. Thirty manholes were repaired through chemical grouting of leaks, adjusting frames and covers to prevent water infiltration, or coating of the manhole chimneys to eliminate leaks.

City of Kent

Historically, sewer overflows have occurred at the Linda Heights Pump Station during significant rainfall events (1 to 2 times per year). This pilot project is in a residential neighborhood and focuses on rehabilitation of approximately 150 cleanouts and 11,200 linear feet of side sewers and laterals. The original project scope specified a cured-in-place lining system for rehabilitation, however conditions found in the field and actual alignments of the side sewers precluded the use of the specified product. The project scope was amended to allow pipe bursting to ensure completion of the project in time to meet the flow-monitoring schedule.

City of Kirkland

The Kirkland pilot project replaced manholes, sewer mains, and sewer laterals through a combination of pipe bursting and open cut methods. Work included replacement of approximately 4,100 feet of main and 1,450 feet of laterals. This project only rehabilitated those portions of the sewer system located within the right-of-way. The City contributed funds to increase the size of the replaced mains to meet new City standards.

City of Lake Forest Park

This pilot area is part of the old Lake City system and is a residential basin with a few commercial properties. The mains, manholes, and service connections showing significant defects were repaired using a cured-in-place lining for about 9,700 feet of mainline sewers, coating or epoxy injection of 42 manholes, and trenchless rehabilitation of 128 service connections. The area directly connects to the Lake Washington Interceptor line, which has a history of capacity problems.

City of Mercer Island

This pilot is in the East Seattle neighborhood, immediately south of I-90 on the northwest side of the island. Television inspection of the sewer mains revealed significant defects throughout the basin's mains, manholes, and service connections. About15,500 linear feet of sewer mains were rehabilitated using a cured-in-place lining, coating or epoxy injection of 42 manholes, and installation of about 225 cured-in-place service connection liners.

City of Redmond

Pilot project work focused on repairs in the north and west portions of the basin. The project repaired manholes, sewer mains, service connections, and sewer laterals through lining and grouting techniques. Work included using a cured-in-place lining of approximately 6,050 linear feet of main, pipe bursting about 270 linear feet of main, cured-in-place lining for about 300 linear feet of laterals, chemical grouting of 13 service connections, and installing seven cleanouts. This project only rehabilitated those portions of the sewer system located within the right-of-way.

Ronald Wastewater District (formerly known as Shoreline Wastewater Management)

Ronald managed its own pilot project covering a 98-acre basin. Previous smoke tests showed the mains and laterals were in fairly good shape so the District TVed the private lines followed by repair or replacement as needed. The project included pipe bursting about 70 side sewers from the mainline tee, about 170 side sewers from the property line, installing about 220 cleanouts, and repairing several mainline faults. King County has several other wastewater projects in the area and controlling I/I could impact size of some of these projects.

Performance Measure Accomplishment

Inflow and Infiltration Performance Measures	Scheduled Completion	Date Completed	Comments
Executive submits initial list of proposed pilot rehabilitation projects for council review and approval	July 1, 2001	July 16, 2001	Report recommended that due to drought conditions, selection of specific rehabilitation pilot projects be deferred a year to provide time for more monitoring of mini basins.
Executive submits additional list of proposed pilot rehabilitation projects to council	July 1, 2002	April 29, 2002	Prior to Workshop 8, local agencies submitted 66 projects for consideration as candidate pilot basins and projects. The candidates represent the North, East, and South regions of the collection system. The City of Seattle, which comprises the entire West region, submitted no candidates. During three regional meetings, the local agencies reviewed the candidates from their regions and forwarded candidates for final consideration at Workshop 8. The final 29 pilot candidates were presented to King County Council's Regional Water Quality Committee and Utilities Committee and approved by full Council on April 29, 2002. (On April 30, at Workshop 8, MWPAAC representatives picked the pilot projects and staff presented these to RWQC in May 2002.)
King County, in coordination with component agencies, develops design, inspection and enforcement standards for use by component agencies	Dec. 31, 2002	Dec. 2002	The MWPAAC RWSP Committee refined regional design standards, procedures, and policies for new construction and rehabilitation of existing sewer systems, and sewer system maintenance. Discussions were presented to the full MWPAAC committee October 2, 2002, which then recommended these be kept draft until the pilots are completed and the information finalized in the Alternatives/Options Report. The King County Council agreed.

Inflow and Infiltration Performance Measures	Scheduled Completion	Date Completed	Comments
Executive submits report to council defining I/I levels in local systems, options for controlling I/I, and the associated costs. This is known as the Alternatives/Options Report.	Dec. 31, 2003	Propose Dec. 31, 2004	This milestone cannot be met due to the schedule impact of the repeated flow monitoring. This milestone was extended one year by letter to Council dated December 12, 2003.
Executive recommends target I/I levels for local collection systems and long-term measures to meet these targets. This is known as the Executive's Regional I/I Control Plan.	Dec. 31, 2004	Propose Dec. 31, 2005	This milestone cannot be met due to the schedule impact of the repeated flow monitoring. The new milestone is December 31, 2005.
King County shall consider an I/I surcharge on component agencies which do not meet the adopted target levels of I/I reduction	June 30, 2005	Propose June 30, 2006	This milestone cannot be met due to the schedule impact of the repeated flow monitoring. The new milestone is June 30, 2006.
Public Involvement Measure: Create specific task forces/work groups for programs, e.g., I/I, water reuse, & CSOs	Not specified	Completed 2001	See Appendix B-11. Policy met. Ongoing work will continue under the WTD Public Involvement Program.
Public Involvement Measure: Develop and implement I/I public awareness program	Jan. 2001	2001; site-specific work continues with pilot projects through January 2004	See Appendix B-11. Policy met. Ongoing work will continue under the WTD Public Involvement Program.

Policy Implementation

Inflow and Infiltration Policies	How is Policy Being Implemented?
I/IP-1: King County is committed to controlling I/I within its regional conveyance system and shall rehabilitate portions of its regional conveyance system to reduce I/I whenever the cost of rehabilitation is less than the costs of conveying and treating that flow or when rehabilitation provides significant environmental benefits to water quantity, water quality, stream flows, wetlands or habitat for species listed under the ESA.	King County has collected two years of rainfall data and flow data in both local and regional collection systems. Criteria were developed which, along with local agency knowledge, led to the selection and implementation of 10 rehabilitation pilot projects. Each pilot area is receiving post-pilot flow monitoring, and a cost-benefit analysis will be done on the cost effectiveness of rehabilitation for I/I removed from the collection system.
I/IP-2: King County shall work cooperatively with component agencies to reduce I/I in local conveyance systems by the following:	Ongoing effort.
1. By July 1, 2001, the executive shall propose for council review and approval an initial list of pilot rehabilitation projects dealing with the most serious and readily identified I/I problem areas in the local sewer systems. **By July 1, 2002, the executive shall propose an additional list of pilot projects. The pilot rehabilitation projects shall be used to demonstrate the effectiveness of I/I controls in the local sewer systems tributary to the regional system.**	July 16, 2001, submitted report to Council: recommending that selection of specific rehabilitation pilot projects be deferred a year to provide time for more monitoring of mini basins. Repeat flow monitoring was performed from November 1, 2001 through January15, 2002. A list of 29 pilot projects was presented to King County's Regional Water Quality Committee and Utilities Committee and approved by full Council on April 29, 2002. These were narrowed to 10 pilot projects, which were presented to RWQC in May 2002
2. By December 31, 2002, the county, in coordination with component agencies, shall develop model local conveyance systems' design standards, including inspection and enforcement standards, for use by component agencies to reduce I/I within their systems.	MWPAAC recommended the standards, procedures, and policies be considered as draft and be utilized in the pilot projects where applicable. These were accepted by the King County Council and County Executive in December 2002.
3. (A) By December 31, 2003, the executive shall submit to the council a report defining I/I levels in each of the local sewer systems, based on assessments of those systems, and identifying options and the associated cost of removing I/I and preventing future increases. The options should be informed by the results of the pilot rehabilitation projects described in subsection 1 of this I/IP-2. The report shall analyze the options on cost-effectiveness and environmental costs and benefits including but not limited to those related to water quality, groundwater interception, stream flows and wetlands, and habitat of species listed	(A) The Alternatives/Options Report will identify issues, programs, and initiatives that may warrant consideration in development of the Executive's Regional I/I Control Plan. The report will identify specific projects to be considered for funding, provide a screening process for ranking and selecting proposed I/I control projects, and provide alternative funding sources that can be directly applied to the program's implementation. This report will be developed in collaboration with MWPAAC.

Inflow and Infiltration Policies	How is Policy Being Implemented?
under the ESA.	
(B) The report shall include information on public opinion, obtained through surveys and other appropriate methods, on the role of individual property owners in implementing solutions to reduce I/I, having voluntary and mandatory property owner actions, the willingness to pay to reduce I/I, and acceptable community options to reduce the I/I.	(B) An assessment of the level of public awareness about I/I was conducted in 2001. Some follow-up survey or focus group will be done in 2004 to check on changes in awareness of and attitudes toward I/I and to see which messages were most effective to changing behavior (what residents can do to improve I/I from their own property).
4. No later than December 31, 2004, utilizing the report described in subsection 3, the executive shall recommend target levels for I/I reduction in local collection systems and propose long-term measures to meet the targets. These measures shall include, but not be limited to, establishing new local conveyance systems design standards, implementing an enforcement program, developing an incentive based cost sharing program and establishing a surcharge program. The overall goal for peak I/I reduction in the service area should be thirty percent from the peak twenty-year level identified in the report. **The county shall pay one hundred percent of the cost of the assessments and pilot projects.**	Delayed due to drought. Work currently underway.
I/IP-3: King County shall consider an I/I surcharge, no later than June 30, 2005, on component agencies that do not meet the adopted target levels for I/I reduction in local collection systems. The I/I surcharge should be specifically designed to ensure the component agencies' compliance with the adopted target levels. King County shall pursue changes to component agency contracts if necessary or implement other strategies in order to levy an I/I surcharge.	Delayed due to drought. Discussion will begin in late 2005 or early 2006.
CP-5: King County shall closely integrate water reuse planning and I/I study results with planning for wastewater conveyance and treatment facilities. Water conservation and demand management assumptions shall also be coordinated with wastewater facility planning.	Ongoing. See CP-5 in Appendix B-2.

Appendix B-4
Reducing Combined Sewer Overflows

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid except where noted.

- During 1997 RWSP public involvement process, citizens ranked CSO control as a top priority
- King County shall design, construct, operate, and maintain its facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering, so as to meet or exceed regulatory requirements for air, water, and solids emissions, as well as ensure worker, public, and system safety.
- King County will meet the state CSO control standard of one untreated overflow per year on average, recognizing that this may become more stringent in the future due to ESA.
- The City of Seattle has controlled all its CSOs, and no further deterioration in its system is expected.

  2003: The City was required to monitor all of its CSO locations and found that some of its CSOs are not controlled. The City was required to development an amendment to its 1988 plan to bring all sites into control. The control approach chosen by the City is to optimize conveyance and store flows for later transfer to the County for treatment at West Point.

- The RWSP CSO control program includes storage tanks and on-site treatment. Investigation is needed to determine if a roof drain disconnection program conducted by homeowners would be cost-effective before it is used for control.
- King County shall give the highest priority for control to CSO discharges that have the highest potential to impact human health, bathing beaches, and/or species listed under ESA.
- The County will develop CSO programs and projects based on assessments of water quality and contaminated sediments.
- Although King County's wastewater collection system is impacted by the intrusion of clean stormwater, conveyance and treatment facilities shall not be designed for the interception, collection, and treatment of clean stormwater.
- The County will develop a contaminated sediment management plan.

  2003: The plan was completed in 1999 and is being implemented.

Performance Measure Accomplishment

Combined Sewer Overflow Control Performance Measures	Scheduled Completion	Date Completed	Comments
Draft Sediment Management Plan	1999	1999	Plan implementation started and budget adopted in 2000
Year 2000 CSO Update*	2000	2000	This update was required for submittal to Ecology shortly after the adoption of the RWSP; as a result it affirmed the RWSP Plan.
CSO Program Review	2005	Anticipated end of 2005	Currently underway.
CSO Plan Update*	2005	Anticipated end of 2005	Currently underway.
Projects along Puget Sound beaches	2009–2011		
Norfolk 0.8 MG storage tank	2009	2005 with Henderson/ MLK project	This project was consolidated with the Henderson/MLK/Norfolk project to achieve cost savings and efficiencies and to minimize community disruption.
South Magnolia 1.3 MG storage tank	2010	As scheduled	Application has been made for low-interest State Revolving Fund loans.
SW Alaska 0.7 MG storage tank	2010	As scheduled	Modeling for the 2000 update indicates this project may not be needed. Verification is underway in the 2005 update.
Murray 0.8 MG storage tank	2010	As scheduled	Application has been made for low-interest State Revolving Fund loans.
Barton Pump Station Expansion and Upgrade	2011	As scheduled	Application has been made for low-interest State Revolving Fund loans.
North Beach storage tank and Pump Station upgrade	2011	As scheduled	Application has been made for low-interest State Revolving Fund loans.
Projects along Lake Washington Ship Canal, east side	2015		
University/Montlake 7.5 MG storage tank	2015	As scheduled	
Projects along Duwamish River and Elliott Bay	2017–2027		

Combined Sewer Overflow Control Performance Measures	Scheduled Completion	Date Completed	Comments
Hanford No. 2 3.3 MG storage/treatment tank	2017	As scheduled	
Lander 1.5 MG storage/treatment tank	2019	As scheduled	
Michigan 2.2 MG storage/treatment tank	2022	As scheduled	
Brandon 0.8 MG storage/treatment tank	2022	As scheduled	
Chelan 4.0 MG storage tank	2024	As scheduled	
Connecticut 2.1 MG storage/treatment tank	2026	As scheduled	Schedule may be impacted by the WSDOT/Seattle Alaska Way Viaduct and Seawall replacement project.
King Street conveyance to Connecticut	2026	As scheduled	Schedule may be impacted by the WSDOT/Seattle Alaska Way Viaduct and Seawall replacement project.
Hanford at Rainier 0.6 MG storage tank	2026	As scheduled	
8th Ave S 1.0 MG storage tank	2027	As scheduled	
W Michigan conveyance expansion	2027	As scheduled	
Terminal 115 0.5 MG storage tank	2027	As scheduled	
Lake Washington Ship Canal, west side	2029-2030		
Ballard 1.0 MG storage tank	2029	As scheduled	This project will be considered for acceleration in the 2005 update at the request of the City of Seattle.
3rd Ave W 5.0 MG storage tank	2029	As scheduled	
11th Ave NW 2.0 MG storage tank	2030	As scheduled	

* A CSO plan update is due with every West Point NPDES Permit Renewal.

Policy Implementation

Combined Sewer Overflow Policies	How is Policy Being Implemented?
CSOCP-1: King County shall plan to control CSO discharges and to work with state and federal agencies to develop cost-effective regulations that protect water quality. King County shall meet the requirements of state and federal regulations and agreements.	The County has participated in the Department of Ecology process to define the CSO "event." King County is participating in Ecology's deliberations on new water quality standards and 303(d) listing policies. The sediment management program is investigating if proposed levels of CSO control will be sufficient to meet sediment standards and is working to obtain sediment impact zones for current discharges that cannot meet standards until control projects are completed.
CSOCP-2: King County shall give the highest priority for control to CSO discharges that have the highest potential to impact human health, bathing beaches and/or species listed under ESA.	The Denny/Lake Union control project—located at a heavily used public park—and the Henderson/MLK control project—located on Lake Washington near a public beach—are currently in construction and will complete in 2005. The current RWSP project schedule aligns with these priorities. Risk assessments are being conducted as part of some early sediment cleanup actions to determine if there is potential for localized risk from individual CSOs, or if there are sediment impacts to ESA-listed species.
CSOCP-3: Where King County is responsible for stormwater as a result of a CSO control project, the county shall participate with the City of Seattle in the municipal stormwater national pollutant discharge elimination system permit application process.	King County WTD has been participating in the discussions on renewal of the NPDES municipal stormwater permit Ecology has clarified that the Lander storm drain does not require the County to be a co-permittee with the City of Seattle, but that the Densmore drain project does. City drainage ordinance exempting the City from responsibility for source control in combined areas raised awareness that there is a gap in stormwater pollution prevention services in the combined areas. The City and County are currently in discussion to address this need.
CSOCP-4: Although King County's wastewater collection system is impacted by the intrusion of clean stormwater, conveyance and treatment facilities shall not be designed for the interception, collection and treatment of clean stormwater.	Discussions are underway with the City of Seattle and WSDOT regarding possible discharge of stormwater and dewatering water to the County system. The County is reviewing the industrial waste dewatering water policies.

Combined Sewer Overflow Policies	How is Policy Being Implemented?
CSOCP-5: King County shall accept stormwater runoff from industrial sources and shall establish a fee to capture the cost of transporting and treating this stormwater. Specific authorization for such discharge is required.	The Industrial Waste program recovers costs for such discharges.
CSOCP-6: King County, in conjunction with the city of Seattle, shall implement stormwater management programs in a cooperative manner that results in a coordinated joint effort and avoids duplicative or conflicting programs.	Management programs are being jointly conducted in basins discharging to sediment cleanup sites to identify potential sources of recontamination and control those sources. King County is negotiating with the City of Seattle regarding which agency should be responsible for stormwater pollution prevention activities in the combined sewer areas of the City.
CSOCP-7: King County shall develop a long-range sediment management strategy to prioritize clean up of contaminated sediments at specific CSO locations.	Completed in 1999 and in implementation.
CSOCP-8: King County shall use the results of the 1998 water quality assessment to assess CSO control projects and priorities before issuing the year 2000 CSO update required by the county's national pollutant discharge elimination system permit. Prior to the year 2005 CSO update, the executive shall evaluate the benefits of CSO control projects along with other pollution control projects developed by King County and other agencies. This CSO program review will include, but not be limited to the following: maximizing use of existing CSO control facilities; identifying the public and environmental health benefits of continuing the CSO control program; ensuring projects are in compliance with new regulatory requirements and objectives such as the ESA and the Wastewater Habitat Conservation Plan; analyzing rate impacts; ensuring that the program review will honor and be consistent with long-standing existing commitments; assessing public opinion; and integrating the CSO control program with other water/sediment quality improvement programs for the region. Based on its consideration of the CSO program review, the RWQC may make recommendations for modifying or amending the CSO program to the council.	Water quality assessment (WQA) results are used in development of cleanup actions and in decisions about when the sediment management program will need to be involved in other initiatives. The CSO program review and 2005 Update process are just beginning and will be reported on in the 2007 RWSP 3-year update report. Regional focus groups are planned to assess public opinion for the 2005 CSO plan update.

Combined Sewer Overflow Policies	How is Policy Being Implemented?
CSOCP-9: Unless specifically approved by the council, no new projects shall be undertaken by the county until the CSO program review has been presented to the council for its consideration. CSO project approval prior to completion of CSO program review (beyond those authorized in this subsection) may be granted based on, but not limited to, the following: availability of grant funding; opportunities for increased cost-effectiveness through joint projects with other agencies; ensuring compliance with new regulatory requirements; or responding to emergency public health situations. The council shall request advice from the RWQC when considering new CSO projects. King County shall continue implementation of CSO control projects underway as of the effective date of this section, which are the Denny way, Henderson/Martin Luther King, Jr. way/Norfolk, Harbor and Alki CSO treatment plants.	No projects beyond those listed are underway at this time. The CSO plan update will consider accelerating the Ballard project at the request of the City of Seattle, parts of the King and Connecticut projects as needed to coordinate with the WSDOT Viaduct & Seawall replacement project, and other projects associated with Superfund sediment remediation projects.

Appendix B-5
Recycling Biosolids

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- During 1997 RWSP public involvement process, citizens ranked the recycling of biosolids as a high priority.
- The current biosolids program is effective and respected.
- Production of Class B biosolids is appropriate now, but change to Class A should be considered when more marketable cost-effectively.
- Biosolids shall be recycled outside the County through public-private partnerships.
- Further research and testing of Class A technologies needs to be done.
- Biosolids technology criteria include: product quality, marketability, odor, rate impacts, reliability of the treatment process, amount of land required for the treatment facility, and the number of truck trips needed to transport the biosolids.
- Additional digesters will be needed at the plants unless alternative technology is found.

  2003: West Point solids process is functioning at upper limits, with several near upsets. This results from efforts to minimize the number of digesters at the plant under the settlement agreement. Improvements are underway.

- The County will accept sewage, septage, sludge, and biosolids from outside the County service area where it provides a benefit to the region and as long as it is consistent with the King County Comprehensive Plan or the comprehensive plan of the source jurisdiction, capacity is available, and no operating difficulties are created.

Performance Measure Accomplishment

Biosolids Performance Measures	Scheduled Completion	Date Completed	Comments
Continue producing Class B biosolids at all treatment plants	Ongoing	Ongoing	The County will continue to explore technologies for cost-effective improvements to Class B production, and for Class A technologies that could be used in the future if determined needed.
Evaluate new technologies for biosolids processing	Ongoing	Ongoing	Have completed several pilot/demonstration-scale test programs on solids processing technologies. See discussion in Chapter 7.
Determine feasibility to replace or reduce digesters at the West Treatment Plant	2004	2003	King County satisfied the West Point Settlement Agreement requirement regarding digester removal feasibility in 2003. The Technology Assessment Program has worked closely with the West Point Citizen's Advisory Committee to identify, test, and evaluate technologies with the potential to reduce digesters and has concluded that there is no feasible alternative to the existing digesters at West Point. County staff are now working with a citizen's group and the City of Seattle to determine the appropriate uses of the funds.
Evaluate solids processing technology and design for the North Treatment plant and select technology	2004	2003	This was completed in 2003 for the Final EIS. Class B biosolids production will occur at Brightwater, but space will be reserved for Class A facilities should they be needed in the future.

Policy Implementation

Biosolids Policies	How is Policy Being Implemented?
BP-1: King County shall strive to achieve beneficial use of wastewater solids. A beneficial use can be any use that proves to be environmentally safe, economically sound and utilizes the advantageous qualities of the material.	One hundred percent of King County biosolids are recycled in land application projects: forestry and agriculture, and compost for landscaping. Digester gas is either used for energy generation in the plant or sold.
BP-2: Biosolids-derived products should be used as a soil amendment in landscaping projects funded by King County.	County DNRP and DOT project managers are contacted regarding availability and cost of compost; information published in Environmental Purchasing newsletter; GroCo compost listed in Roads Services Division "Bid Tabulation" documents.
BP-3: King County shall consider new and innovative technologies for wastewater solids processing, energy recovery, and beneficial uses brought forward by public or private interests. King County shall seek to advance the beneficial use of wastewater solids, effluent, and methane gas through research and demonstration projects.	Composting by contractor at Green Valley agricultural land application project; farms interested in recycling organic farm residuals and having Class A biosolids product to use on additional crops not currently included in Class B program. King County is continuing to evaluate and test new technologies with the capability to advance the beneficial use of biosolids and reclaimed water. Pilot/demonstration-scale tests on several biosolids technologies have been completed as described in Chapter 7. See Chapter 8, "Exploring and Increasing Water Reuse," of the report and Appendix B-6 for more information on the beneficial use of effluent. Digester gas (methane) is used for energy generation at the plants or is sold. A two-year fuel cell demonstration project using digester gas began in February 2004. If successful, the County will continue the fuel cell operation. A methane-fired boiler will soon begin operation at South Plant to provide heat for some plant facilities and operating processes
BP-4: King County shall seek to maximize program reliability and minimize risk by one or more of the following: 1. maintaining reserve capacity to manage approximately one hundred fifty percent of projected volume of biosolids; 2. considering diverse technologies, end products, and beneficial uses; or 3. pursuing contractual protections including interlocal agreements, where appropriate.	Agricultural , where demand for biosolids exceeds supply, provide reserve capacity. King County continues to investigate technologies that have the potential to cost-effectively produce Class A biosolids. Through research and demonstration, King County evaluates other uses such as mine reclamation, horticultural uses, hybrid poplars, canola biofuels, and other markets that would offer additional environmental benefits. Interlocal agreements with other biosolids generators have been signed. These provide

Biosolids Policies	How is Policy Being Implemented?
	assurance to regulators and the public that biosolids from those sources are being managed appropriately.
BP-5: King County shall produce and use biosolids in accordance with federal, state and local regulations.	All regulatory requirements are being met. An EMS program will go beyond minimum requirements. See Chapter 7 and BP-6.
BP-6: King County shall strive to produce the highest quality biosolids economically and practically achievable and shall continue efforts to reduce trace metals in biosolids consistent with 40 C.F.R. Part 503 pollutant concentration levels (exceptional quality) for individual metals. The county shall continue to provide class B biosolids and also to explore technologies that may enable the county to generate class A biosolids cost-effectively or because they have better marketability. Future decisions about technology, transportation and distribution shall be based on marketability of biosolids products.	Metals concentrations have been reduced. Consistent with regulatory requirements. Evaluating opportunities to reduce pollutants in wastewater system that are on Ecology's list of Persistent, Bioaccumulative, and Toxic (PBT) compounds (e.g., mercury, dioxins). King County continues to investigate technologies that have the potential to cost-effectively produce Class A biosolids. Technology Assessment and Biosolids Program staff evaluate characteristics of products from potential new processing technologies to ensure marketability. The County is participating in a EMS demonstration program conducted by the National Biosolids Partnership intended to formalize a system to promote continual improvement, assure compliance, and gain public input and support. The County may draw upon this experience to develop its system in the future. See Chapter 7.
BP-7: When biosolids derived products are distributed outside the wastewater service area, the county shall require that local sponsors using the products secure any permits required by the local government body.	Local sponsors are involved as partners in all projects.
BP-8: King County shall work cooperatively with statewide organizations on biosolids issues.	King County participates in local organizations such as Coalition for Clean Water, and is a member of Northwest Biosolids Management Association, working cooperatively with regulatory officials (Ecology), scientists, and other biosolids managers on regulatory issues, education and training, public information, research and demonstration, and pretreatment. The County is participating in an EMS demonstration program conducted by the National Biosolids Partnership. See Chapter 7 and BP-6.

Biosolids Policies	How is Policy Being Implemented?
BP-9: King County shall seek to minimize the noise and odor impact associated with processing, transporting and applying of biosolids, consistent with constraints of economic and environmental considerations and giving due regard to neighboring communities.	King County purchased new biosolids trucks and trailers in 1999 that were designed to minimize noise and number of truck trips from the treatment plant. In response to a proviso to the 2004 County budget, a study will be done looking at technologies to reducing any odors emanating from digestion processes.
BP-10: Where cost-effective, King County shall beneficially use methane produced at the treatment plants for energy and other purposes.	King County is beneficially using methane produced at both treatment plants. A new fuel cell demonstration project will complete construction at South Plant in 2004. This demonstration facility will convert a portion of the methane produced on-site into more than 1 MW of electricity.

Appendix B-6
Exploring and Increasing Water Reuse

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid except where noted.

- Purveyors in the County provide ~180 mgd of potable water on an average annual basis and up to 240 mgd during peak summer months. The City of Seattle estimates that 30 mgd more is needed to meet demands to 2026.

  2003: Discussions with regional purveyors indicate that there are differing opinions on when new potable supplies will be needed.

- Current projections assume that water conservation levels present in 1990 continue at the same level throughout the planning period. More aggressive water conservation measures, as described in the Seattle Water Department's Water Supply plan, could reduce base flows to the treatment plants by about 15 percent.

  2003: Recent information from purveyors indicates that water conservation has been more successful than assumed in the RWSP—water use decreased 5 percent by 2003, and another 5 percent reduction is considered likely by 2010.

- Future need for reclaimed water depends on many changeable factors, so King County needs a flexible alternative that leaves options open.
- King County shall hold and maintain the exclusive right to any reclaimed water generated by the County wastewater treatment plants.
- King County shall provide secondary treatment to all base sanitary flow delivered to its treatment plants, and may provide treatment beyond the secondary level to meet water quality standards and achieve other goals such as furthering the water reuse program or benefiting species listed under the ESA.
- King County's water reuse program shall be developed in coordination with regional water suppliers. All reclaimed water used in the community shall be distributed through a regional water supply agency consistent with a regional water supply plan.
- King County is evaluating the potential to use reclaimed water as an indirect source of potable (drinkable) water.

  2003: The December 2000 Water Reuse work plan delays any consideration of this use for at least 10 years.

- The cost of producing reclaimed water will likely exceed the market sale price.

- Reuse projects such as streamflow augmentation, especially where salmon are present, or groundwater replenishment will require more research, monitoring, and survey of public opinion before implementation.

Performance Measure Accomplishment

Reuse Performance Measures	Scheduled Completion	Date Completed	Comments
Continue producing reclaimed water at all treatment plants	Ongoing	Ongoing	Projects are underway to increase the use of reclaimed water from both plants. South plant will begin providing reclaimed water to new customers, including Foster Golf Course and Baker Commodities; West Point is working to increase its use of reclaimed water for irrigation.
Fund pilot-scale and demonstration projects including satellite treatment plants	Ongoing	Ongoing	A pilot of treatment technologies was completed in 2002. Sammamish Valley Reclaimed Water Production Facility is in predesign.
Coordinate with water suppliers to implement water reuse projects	Ongoing	Ongoing	Currently in the process of developing a memorandum of understanding with SPU. Coordination with regional water supply planning continues.
Develop a water reuse public education and involvement program	Ongoing	Ongoing	Extensive involvement efforts are underway and are focused on the siting and design of the Sammamish Reclaimed Water Production Facility. Community open houses and coordination with recreational users, neighbors, and other stakeholders are ongoing. Broad water reuse public education is taking advantage of existing communication vehicles and programs to get the word out, including the following examples: • Web site at http://dnr.metrokc.gov/WTD/reuse • Tours of the advanced treatment demonstration project • Interpretive signage at Fort Dent Park and along the Sammamish River Trail • Making reuse part of the Water Quality Education school lectures done by DNRP • Adding a Leader in Water Reuse award category to the Green Globe Award Ceremony • Building a demonstration garden irrigated with reclaimed water in 2001.

Reuse Performance Measures	Scheduled Completion	Date Completed	Comments
Submit a water reuse program work plan to council	2000	Dec 2000	Completed
Evaluate water reuse opportunities and markets during siting and design of the North Treatment Plant	2001–2004	Ongoing	Such evaluations were completed as part of siting for both The Unocal and Route 9 candidate sites. Reclaimed water production for in-plant uses is planned at Brightwater. Space is available on-site for any future water reuse facilities, should they be pursued. Reuse opportunities will continue to be evaluated during design.
Assess the economic and environmental feasibility of discharging reclaimed water to freshwater systems such as the Lake Washington and Lake Sammamish watersheds.	Phase 1, 2002	Ongoing	Initial phase is to use irrigation water source substitution to accomplish actual increase in water to the watershed. Investigations are underway to evaluate water quality impacts to streams and groundwater from irrigation with reclaimed water. A groundwater investigation is in process to determine if augmentation is feasible in the future if needed.

Policy Implementation

Water Reuse & Treatment Policies	How is Policy Being Implemented?
WRP-1: King County shall actively pursue the use of reclaimed water while protecting the public health and safety and the environment. The county shall accelerate the development of a water reuse program to help meet the goals of the county to preserve water supplies within the region and to ensure that any reclaimed water reintroduced into the environment will protect the water quality of the receiving water body and the aquatic environment.	Implementation is ongoing.
WRP-2: Within twelve months of the adoptions of this plan, the King County executive shall prepare for review by council a detailed work plan including tasks and schedule for the development of a water reuse program and a process to coordinate with affected tribal and local governments, the state and area citizens.	Work plan was submitted in December 2000 and is on track. Coordination with regional water supply planning is occurring.

Water Reuse & Treatment Policies	How is Policy Being Implemented?
Accompanying the work plan shall be a list of potential pilot projects and associated costs. Development of the water reuse program shall be coordinated with development of a regional water supply plan.	
WRP-3: Recycling and reusing reclaimed water shall be investigated as a possible significant new source of water to enhance or maintain fish runs, supply additional water for the region's nonpotable uses, preserve environmental and aesthetic values and defer the need to develop new potable water supply projects.	The Sammamish Valley Reclaimed Water Production facility will be a model project that will meet these criteria.
WRP-4: King County's water reuse program and projects shall be coordinated with the regional water supply plans and regional basin plans, in accordance with state and federal standards. Water reuse and water supply/resources must be developed in a manner complementary with each other to allow the most effective management of resources in the county.	This coordination with regional water supply planning is ongoing. A memorandum of understanding (MOU) is being developed with SPU to implement this policy
WRP-5: King County shall implement nonpotable projects on a case-by-case basis. To evaluate nonpotable projects, King County shall develop criteria which may include, but are not limited to: cost; environmental benefits; fisheries habitat maintenance and enhancement potential; community and social benefits and impacts; public education opportunities; risk and liability; demonstration of new technologies; and enhancing economic development.	Criteria were developed which resulted in nominations for projects around King County. The Sammamish Valley emerged as the top area for developing a reclaimed water production facility and predesign is underway.
WRP-6: King County shall work with local water purveyors, including when the local purveyors update their water comprehensive plans, to evaluate the opportunities for water reuse within their local service area.	Coordination in this area is ongoing. Discussions are underway to consider an amendment to the SPU water comprehensive plan to include a specific chapter on reuse opportunities. New requirements to include coordination of reuse in water and wastewater plans were passed by the legislature in 2003.
WRP-7: King County shall develop an active water reuse public education and involvement program to correspond with the development of the water reuse program and be coordinated with other water conservation education programs.	King County has developed an active water reuse public education and involvement program. Initial efforts are focused on siting and design of the first reclaimed water production facility. The effort is coordinated with the water conservation and other WTD educational programs.

Water Reuse & Treatment Policies	How is Policy Being Implemented?
WRP-8: King County shall utilize a forum or multiple forums to provide opportunities for coordination and communication with the Washington state Departments of Health and Ecology, which have the principal state regulatory roles in the planning, design and construction of reuse facilities. The county shall involve other parties on these forums, including but not limited to, the Corps of Engineers, Washington state Department of Fish and Wildlife, National Marine Fisheries Service, United States Fish and Wildlife Service, regional water suppliers, tribal governments, local water and wastewater districts, cities, local health departments, watershed forums and environmental and community groups.	Forums were held during development of the work plan. Coordination with appropriate agencies is ongoing.
WRP-9: King County shall work, on a case-by-case basis, with the Washington state Departments of Health and Ecology on water reuse projects including, but not limited to, those that are not specifically cited in the 1997 Department of Health and Ecology Water Reclamation and Reuse Standards.	King County is working closely with Washington State Departments of Health and Ecology on the County's water reuse projects.
WRP-10: King County shall hold and maintain the exclusive right to any reclaimed water generated by the wastewater treatment plants by the county.	Affirmed in MOUs and project designs.
WRP-11: King County's water reuse program projects shall not impair any existing water rights unless compensation or mitigation for such impairment is agreed to by the holder of the affected water rights.	This is implemented in projects.
WRP-12: King County shall retain the flexibility to produce and distribute reclaimed water at all treatment plants including retaining options to add additional levels of treatment.	Considered in design and operation of the plants. Space at the Route 9 site has been reserved for future reclaimed water production facilities.
WRP-13: King County shall continue to fund pilot-scale and water reuse demonstration projects, in whole or in part, from the wastewater utility rate base.	Ongoing.

Water Reuse & Treatment Policies	How is Policy Being Implemented?
WRP-14: King County shall complete an economic and financial feasibility assessment, including environmental benefits, of its water reuse program. The assessment shall include the analysis of marginal costs including stranded costs and benefits to estimate equitable cost splits between participating governmental agencies and utilities. The assessment shall also include a review of existing and planned water and wastewater facilities in an approved plan to ensure that water reuse facilities are justified when any resulting redundant capacity as well as other factors are taken into account.	Ongoing.
WRP-15: King County should pursue development of a water reuse program to discharge reclaimed water to reduce freshwater consumption used in the operation of the Ballard Locks as a priority water reuse project.	Initial studies were completed which indicated that this would not be cost effective at the current time, and that additional environmental studies will be needed. Further consideration was deferred at least 10 years by the work plan.
TPP-1: King County shall provide secondary treatment to all base sanitary flow delivered to its treatment plants. Treatment beyond the secondary level may be provided to meet water quality standards and achieve other goals such as furthering the water reuse program or benefiting species listed under the ESA	MBR treatment technology at Brightwater will provide high quality effluent that could be used in these ways. Sammamish Valley Reclaimed Water Production Facility is under development to evaluate uses, including streamflow augmentation.
TPP-5: King County shall undertake studies to determine whether it is economically and environmentally feasible to discharge reclaimed water to systems such as the Lake Washington and Lake Sammamish watersheds including the Ballard Locks.	Initial studies were completed which indicated that this would not be cost effective at the current time, and that additional environmental studies will be needed. Further consideration was deferred at least 10 years by the work plan.

Water Reuse & Treatment Policies	How is Policy Being Implemented?
TPP-7: King County may explore the possibility of constructing one or more satellite treatment plants in order to produce reclaimed water. The county may build these plants in cooperation with a local community and provide the community with reclaimed water through a regional water supply agency. In order to ensure integrated water resource planning, in the interim period prior to the development of a regional water supply plan, King County shall consult and coordinate with regional water suppliers to ensure that water reuse decisions are consistent with regional water supply plans. To ensure costs and benefits are shared equally throughout the region, all reclaimed water used in the community shall be distributed through a regional water supply agency consistent with a regional water supply plan.	Plans for a satellite demonstration plant are underway in the Sammamish Valley.
TPP-8: King County shall continue water reuse and explore opportunities for expanded use at existing plants, and shall explore water reuse opportunities at all new treatment facilities.	Implementation is ongoing. Reclaimed water production for in-plant uses is planned at Brightwater. Space is available on-site for any future water reuse facilities, should they be pursued.
CP-5: King County shall closely integrate water reuse planning and I/I study results with planning for wastewater conveyance and treatment facilities. Water conservation and demand management assumptions shall also be coordinated with wastewater facility planning.	See CP-5 in Appendix B-2. Water reuse, water conservation, and other demand management data are routinely considered in planning. I/I control alternatives will be considered after the results of the pilot projects are assessed. "Purple pipe" for reclaimed water will be laid to Brightwater Portal 41 during conveyance construction because future potential costs are significantly greater than the cost to install them now in coordination with Brightwater conveyance construction.

Appendix B-7
Wastewater Services

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid except for the changes noted.

- King County will provide wastewater management services to protect public health and the environment in a fiscally responsible manner.
- Wastewater treatment plants are considered "essential public facilities" under the state's Growth Management Act (GMA).
- King County provides conveyance, treatment, and disposal of sewage consistent with the terms of the agreements between Metro and local sewer utilities.
- King County will provide capacity or face moratoria, lawsuits, and contract abrogation.
- Population was expected to grow according to the following:

Decade	Sewered population (1998 King County projections)
1990	2,053,746
2000	2,385,578
2010	2,756,598
2020	3,129,189
2030	3,438,937
Percent change 1990–2030	67

- Population and employment growth are projected to require the wastewater system capacity to expand from 248 mgd to 304 mgd by 2030.

  2003: Updated population projections based upon the 2000 census indicate that 304 mgd may be needed by 2023, and that additional may be needed for buildout in 2050.

- The majority of the growth is forecast for the Renton system, east and south. For the West system, most growth is forecast for the Kenmore and Snohomish County basins.
- Demand management programs and conservation will have little impact on timing, sizing or type of facilities chosen.

  2003: Water conservation has been more successful within the City of Seattle than was expected in 1999. Should similar success be seen in other parts of the service area, the need for facilities could change.

- King County will consider development and operation of community treatment systems under the following circumstances:
    - The systems are necessary to alleviate existing documented public health hazards or water quality impairment;
    - Connections to public sewers tributary to conventional wastewater treatment facilities are not technically or economically feasible;
    - Installation of on-site septic systems is not technically feasible;
    - Properties to be served by said systems are within the jurisdiction and service area of a local government authority authorized to provide sewer service;
    - The local sewer service provider agrees to own and operate the collection system tributary to the community treatment system;
    - Development of the community systems and provision of sewer service are consistent with all applicable utility and land use plans; and
    - Public sewer extensions shall be in compliance with King County Comprehensive Plan Policy F-313 as in effect on March 11, 1999.
- In 1999 King County had contracts with 31 local agencies to provide wastewater services.

  2003: Vashon was added to the King County wastewater service area in 1999. Carnation was added to the service area in 2002.
- King County's wastewater service area consists of the service areas of the component agencies with which a sewage disposal agreement has been established in the agreement for sewage disposal, section 2, and the County's service area boundary is the perimeter of these areas.
- The service area boundary for sewer service provided to Snohomish and Pierce Counties shall not exceed each County's Urban Growth Boundary.
- The service area boundary within King County shall be consistent with countywide planning policy CO-14 and the King County Comprehensive Plan, which permit sewer expansion in rural areas and resource lands where needed to address specific health and safety problems.
- The County will accept sewage, septage, sludge, and biosolids from outside the County service area where it provides a benefit to the region and as long as it is consistent with the King County Comprehensive Plan or the comprehensive plan of the source jurisdiction, capacity is available, and no operating difficulties are created.
- All population within the Urban Growth Boundary will be sewered by 2020, and increase of 8 percent over 1990. Areas outside the Urban Growth Boundary will remain unsewered, except within King County as described above.

  2003: It is acknowledged that conversion of septic systems may occur more slowly, but current analysis indicates that this difference will cause little change in projected capacity needs.

- King County will build flexibility into its system to respond to uncertain future regulations and need for reclaimed water.
- King County shall design, construct, operate, and maintain its facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering, so as to meet or exceed regulatory requirements for air, water, and solids emissions, as well as ensure worker, public, and system safety.
- Existing component agency contractual agreements limit the expenditure of funds to wastewater system related projects.
- King County shall continue to foster tribal relations as appropriate to structure processes for joint water quality stewardship.

Performance Measure Accomplishment

Wastewater Services Performance Measures	Scheduled Completion	Date Completed	Comments
Develop facility plans/engineering specifications	By project	Ongoing	Implemented by projects.
Review all component agency comprehensive plans	Ongoing	Ongoing	The consultant planning area teams for the Conveyance System Improvements project review all sewer agency long-range plans and the utility components of city plans within their planning basins.
Update Facilities Asset Management Plan	Annually	January 15 every year	The complete plan is in development over 3 to 5 years. Existing plan components are updated on time.

Policy Implementation

Wastewater Service Policies	How is Policy Being Implemented?
WWSP-1: King County shall provide wastewater services to fulfill the contractual commitments to its component agency customers in a manner that promotes environmental stewardship, recognizes the value of wastewater in the regional water resource system and reflects a wise use of public funds.	The County coordinates with component agencies to identify and provide service to meet any developing capacity needs so as to avoid overflows in either the component agency's or the County's systems. County operations meet or exceed regulatory requirements and standards of practice. Opportunities to beneficially use the byproducts of wastewater treatment are pursued where cost-effective.
WWSP-2: King County shall continue to foster tribal relations as appropriate to structure processes for joint water quality stewardship.	Tribes are informed of projects and offered opportunity to review and comment on plans on a project-by-project basis. The County—as part of the Lower Duwamish Waterway group—is funding the Muckleshoot and Suquamish tribes

Wastewater Service Policies	How is Policy Being Implemented?
	to participate in the decision process for cleaning up the Duwamish River sediments.
WWSP-3: King County shall not accept additional wastewater directly from private facilities within the boundaries of a component agency without the prior written consent of such component agency.	No requests have been received during the time since RWSP adoption. Any requests will be reviewed by the local public agency group or the County's Local Agency Affairs Manager.
WWSP-4: King County's wastewater service area generally has been developed along those boundaries adopted in the original metropolitan Seattle sewerage and drainage survey, substantive portions of which were adopted as the county's comprehensive water pollution abatement plan and amended. King County's wastewater service area consists of the service areas of the component agencies with which a sewage disposal agreement has been established (agreement for sewage disposal, section 2) and the county's service area boundary is the perimeter of these areas. The service area boundary for sewer service provided to Snohomish county and Pierce county shall not exceed each county's urban growth boundary. The service area boundary within King County shall be consistent with countywide planning policy CO-14 and the King County Comprehensive Plan which permit sewer expansion in rural areas and resource lands where needed to address specific health and safety problems. To protect public health and safety, the county may assume in accordance with state procedures, the ownership of existing sewer treatment and conveyance facilities that have been constructed by a sewer district organized under state law.	The service area boundary remains consistent with this policy.
WWSP-5: Extensions of existing conveyance facilities or construction of new conveyance facilities must be consistent with King County's land use plans and policies, and certified by potentially affected land use jurisdictions as consistent with their adopted land use plans and policies.	Projects are reviewed for consistency with plans and policies.
WWSP-6: King County shall operate and maintain its facilities to protect public health and the environment, comply with regulations and improve services in a fiscally responsible manner.	King County has systems in place to monitor compliance with health, safety, and environmental regulations. Programs and projects are reviewed for their priority and costs at least annually in the rate development process and competing needs are balanced.

Wastewater Service Policies	How is Policy Being Implemented?
WWSP-7: King County shall plan, design and construct wastewater facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering.	King County applies good science and engineering to design and construction and will work with regulators for the most cost-effective approach to meeting the intent of regulations and professional practice.
WWSP-8: King County shall construct, operate and maintain facilities to prevent raw sewage overflows and to contain overflows in the combined collection system. In the event of a raw sewage overflow, the county shall initiate a rapid and coordinated response including notification of public health agencies, the media, the public and the affected jurisdiction. Preserving public health and water quality shall be the highest priority, to be implemented by immediately initiating repairs or constructing temporary diversion systems that return flow back to the wastewater system.	Coordination of Asset Management Planning and Major Capital Sections ensures that adequate system capacity is available when needed. Advance preparation for coming Capacity Management, Operations and Maintenance (CMOM) programs has been done. Emergency protocols have been established and are being used by Operations and Offsite staff. Public notification and media notification procedures have been formalized and included in a revised overflow response manual. Debriefings are conducted after each event to continually improve performance.
WWSP-9: To ensure the region's multibillion-dollar investment in wastewater facilities, ongoing maintenance and repair shall be a high priority of King County. The wastewater maintenance budget, staffing levels and priorities shall be developed to reflect the long-term useful life of wastewater facilities.	A formal and detailed asset management program is being developed to optimize the useful life of County wastewater facilities.
WWSP-10: King County shall establish a wastewater facilities assets management plan, updated annually, establishing replacement of worn, inefficient and/or depreciated capital assets to ensure continued reliability of the wastewater infrastructure.	Regularly scheduled condition assessments are performed and the results and recommendations are reported in a Facilities Inspection Annual Report addressing structures and the County's conveyance pipelines. A formal procedure to assess process equipment is being developed.
WWSP-11: King County shall design, construct, operate and maintain its facilities to meet or exceed regulatory requirements for air, water and solids emissions as well as to ensure worker, public and system safety.	Treatment plants continue to meet, and in most cases exceed permit requirements. King County is regularly recognized by Association of Metropolitan Sewerage Agencies (AMSA) as a "Gold" award winner, for excellent permit compliance. The Industrial Waste Program permits discharges into the sewer that are not hazardous to workers and cause no environmental harm. King County has systems in place to monitor compliance with health, safety, and environmental regulations.

Wastewater Service Policies	How is Policy Being Implemented?
WWSP-12: King County shall accept sewage, septage and biosolids from outside its service area provided that it is consistent with the King County Comprehensive Plan or the comprehensive plan of the source jurisdiction, capacity is available and no operating difficulties are created. The county shall establish a rate to recover costs from accepting sewage, septage and biosolids from outside its service area.	Services are monitored for consistency with applicable plans and to ensure they cause no adverse impact to the wastewater system. A rate sufficient to cover costs for services is adopted by Council each June.
WWSP-13: King County shall identify the potential for "liability protection" for component agencies for unexpected costs associated with water quality requirements.	King County monitors for the interests of the component agencies in all activities.
WWSP-14: King County shall continue its long-standing commitment to research and development funding relating to water quality and technologies for the wastewater system.	The Technology Assessment Program continues. The most significant recent example is the current demonstration of a fuel cell to generate energy from digester gas. King County contributes, along with other national agencies, to the Water Environment Research Foundation (WERF) for development and improvement of wastewater management practices and technologies.
WWSP-15: King County will consider development and operation of community treatment systems under the following circumstances: **1. The systems are necessary to alleviate existing documented public health hazards or water quality impairment;** **2. Connections to public sewers tributary to conventional wastewater treatment facilities are not technically or economically feasible;** **3. Installation of on-site septic systems is not technically feasible;** **4. Properties to be served by said systems are within the jurisdiction and service area of a local government authority authorized to provide sewer service;** **5. The local sewer service provider agrees to own and operate the collection system tributary to the community treatment system;** **6. Development of the community systems and provision of sewer service are consistent with all applicable utility and land use plans; and** **Public sewer extensions shall be in compliance with King County Comprehensive Plan Policy F-313 as in effect on March 11, 1999.**	Community treatment system service is provided in accordance with this policy.

Appendix B-8
Water Quality Protection

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- King County shall design, construct, operate, and maintain its facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering, so as to meet or exceed regulatory requirements for air, water, and solids emissions, as well as ensure worker, public, and system safety.
- King County shall assess the risk to human health and the environment from wastewater treatment and conveyance activities, and use this information in evaluating water pollution abatement control options.
- King County shall give the highest priority for control to CSO discharges that have the highest potential to impact human health, bathing beaches, and/or species listed under ESA.
- The County will develop CSO programs and projects based on assessments of water quality and contaminated sediments.
- The County will develop a contaminated sediment management plan.
- Existing component agency contractual agreements limit the expenditure of wastewater funds to wastewater-system-related projects.

Performance Measure Accomplishment

Water Quality Protection Performance Measures	Scheduled Completion	Date Completed	Comments
Annual water quality monitoring report	**Annually**	March 2001 March 2002 April 2003	Reports covering 2000, 2001, and 2002 were submitted. The report covering 2003 is submitted as Appendix D to this report.
Report on North Outfall Study	**2003**	2003	Became the Marine Outfall Siting Study (MOSS). The environmental process and siting were completed. The Point Wells outfall location was selected.
Report on Habitat Conservation Plan and fish studies	**2003**	Phase 1 expected in 2004 Phase 2 expected in 2006	Phase 1 in development at this time and is expected to be completed in 2004; Phase 2 will not start until the completion of draft Phase 1, and is expected to be completed in 2006. See Chapter 13 and Appendix B-13.

Water Quality Protection Performance Measures	Scheduled Completion	Date Completed	Comments
Report on Green/Duwamish Study	**2003**	Expected 2006	The project is expected to be complete in 2006. Ongoing work. Data collected since completion of the water quality section of the Habitat Limiting Factors and Reconnaissance Assessment Report were reported in 2003 and will continue to be reported annually.
Report on Sammamish/Lake Washington Area Management Plan (SWAMP)	**2004**	Expected 2005	Now named Sammamish-Washington Analysis and Modeling Program (SWAMP). Ongoing work. Annual progress reports submitted.
Monitor, evaluate, and report as required by local, state, and federal permits	**Ongoing**	Ongoing	Ongoing and on schedule.
Share water quality information from water resource sampling, monitoring, analysis, and research activities	**Ongoing**	Ongoing	New Web pages are under construction for the lake and stream monitoring, which will improve the turnaround time for information sharing.
Participate in developing water quality laws, standards, and programs to maintain and enhance environmental and public health	**Ongoing**	Ongoing	The County uses many opportunities to participate in the development of effective and reasonable regulations, both on its own and through professional organizations such as the Association of Metropolitan Sewerage Agencies (AMSA), Water Environment Federation (WEF), Pacific Northwest Pollution Control Association (PNPCA), and the Clean Water Coalition. The County participates in advisory groups, contributes technical information, and reviews and comments on proposals. King County has reviewed and commented on water quality standards and 303(d) listing changes proposed by regulatory agencies. Water Quality Effects thresholds for endangered species were developed with National Marine Fisheries Service and Washington Department of Fish and Wildlife for the HCP.

Water Quality Protection Performance Measures	Scheduled Completion	Date Completed	Comments
Assess human health and environmental risk from wastewater treatment and conveyance activities; use information to evaluate pollution abatement options	**By project**	Ongoing	Risk assessments are performed to assess the impact of wastewater facilities and activities on the environment. Wastewater facilities are included in the watershed models being developed under the SWAMP and Green-Duwamish Water Quality Assessment (G-DWQA) studies. Specific assessments are done on a project basis. Pollution control approaches are determined with consideration of this information.
Implement comprehensive water quality monitoring program of streams and water bodies that are or could be impacted by influent, effluent, sanitary system overflows, or CSOs.	**Ongoing**	Ongoing	King County has ongoing monitoring programs that assess discharge and sediment quality for permit compliance. Ambient water and sediment quality monitoring to provide background information for permit compliance, as well as to assist in identifying any adverse impacts from wastewater facilities. See the Water Quality Report in Appendix D of this report.

Policy Implementation

Water Quality Protection Policies	How is Policy Being Implemented?
WQPP-1: King County shall participate in identifying and resolving water quality issues pertaining to public health and ecosystem protection in the region to ensure that the public's investment in wastewater facilities and water resource management programs is protected.	By conducting ongoing ambient monitoring programs which give early alert to any developing water quality problems resulting from land use patterns or problems with the wastewater treatment plant or conveyance system and CSOs. In addition, numerous habitat surveys, fish surveys, and invertebrate surveys are, or have been, conducted. “Trouble Call” sampling program in response to treatment plant upsets.
WQPP-2: King County shall evaluate the impacts and benefits of actions that affect the quality of the region’s waters and identify measures to meet and maintain water quality standards.	Water and sediment quality is evaluated annually against state and federal criteria and standards. This information is reported in submittals to Ecology, in printed material, and via Web pages.

Water Quality Protection Policies	How is Policy Being Implemented?
WQPP-3: King County shall forecast future aquatic resource conditions that may affect wastewater treatment decisions and work cooperatively to identify cost-effective alternatives to mitigate water quality problems and enhance regional water quality.	Ongoing ambient monitoring programs and the development of the SWAMP and G-DWQA models serve as forecasting tools.
WQPP-4: King County shall participate with its regional partners to identify methods, plans and programs to enhance water quality and water resources in the region.	See Appendix D, 2004 Water Quality Report.
WQPP-5: King County executive shall implement a comprehensive water quality monitoring program of streams and water bodies that are or could be impacted by influent, effluent, sanitary system overflows or CSOs. The executive shall submit annually to council for review a written report shall include: **1. Analysis and presentation of water resource sampling, environmental monitoring, economic and other improvement data. The range of data to be gathered should be based on water pollutants and elements that scientific literature identifies as variables of concern in addition to data required by state and federal agencies.** **2. Analysis regarding the impacts of CSOs and the benefits of abating CSOs. The range of data to be gathered should be based on what is needed to substantiate the benefits of abating overflows in addition to data required by state and federal agencies.** **3. Other wastewater research activities undertaken by the executive.** **4. The quality variability of biosolids over time.**	By implementation of the marine, freshwater, and sediment monitoring programs—with sampling sites near key wastewater facilities—and evaluation of data. Through annual reporting of data collected by King County and outside agencies/interested parties. Reports were submitted in 2001 (for 2000) and 2002 (for 2001), and the 2003 report is included in this report as Appendix D. Monitoring data are made available on King County Web sites.
WQPP-6: King County shall implement and maintain water quality, monitoring, evaluating and reporting programs to support the national pollutant discharge elimination system for wastewater and other permit applications, and ensure permit compliance.	King County has ongoing monitoring programs that assess discharge and sediment quality for permit compliance. Ambient water and sediment quality monitoring to provide background information for permit compliance, as well as to assist in identifying any adverse impacts from wastewater facilities.

Water Quality Protection Policies	How is Policy Being Implemented?
WQPP-7: King County shall actively participate in the development of water quality laws, standards and program development to ensure cost-effective maintenance or enhancement of environmental and public health.	The County uses many opportunities to participate in the development of effective and reasonable regulations, both on its own and through professional organizations such as the Association of Metropolitan Sewerage Agencies (AMSA), Water Environment Federation (WEF), Pacific Northwest Pollution Control Association (PNPCA), and the Clean Water Coalition. The County participates in advisory groups, contributes technical information, and reviews and comments on proposals. King County has reviewed and commented on water quality standards and 303(d) listing changes proposed by regulatory agencies. Water Quality Effects thresholds for endangered species were developed with National Marine Fisheries Service and Washington Department of Fish and Wildlife for the HCP.
WQPP-8: King County shall assess the risk to human health and the environment from wastewater treatment and conveyance activities, and use this information in evaluating water pollution abatement control options.	Risk assessments are done assessing impact of wastewater facilities and activities on the environment. Wastewater facilities are included in the watershed models being developed under the SWAMP and G-DWQA studies. Pollution control approaches are determined with consideration of this information.

Appendix B-9
Wastewater Planning

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- The objectives of the RWSP, developed based on guidance from citizens, stakeholders, and the Regional Water Quality Committee, include:
    - Remain consistent with the King County Comprehensive Plan and state Growth Management Act
    - Maximize the public's existing investment in the wastewater system
    - Reduce wastewater flow and solids through demand management programs, conservation, and coordination of services with other regional utilities
    - Locate wastewater facilities designed to serve new growth where growth is occurring
    - Design and construct the wastewater system to meet regulatory requirements
    - Preserve and enhance water quality and protect public health
    - Provide maximum flexibility to respond to population growth and regulations
    - Provide opportunities to recycle treated wastewater and help meet water supply needs for people and for fish
    - Minimize impacts on rate payers and provide reasonable equity.
- King County planning will be based on a long-term assessment of wastewater system needs, collaboration with other jurisdictions, looking for opportunities to achieve cost savings, and accommodation of buildout population in facility sizing.
- Recognizing that the RWSP is a complex and dynamic plan, King County will conduct periodic reviews to ensure that the RWSP is consistent with other County-adopted policy, with planning assumptions, and with scientific, economic, and technical information.

Performance Measure Accomplishment

Wastewater Planning Performance Measures	Scheduled Completion	Date Completed	Comments
Report on implementation to the RWQC/Council	Semi-annually; written report due by Dec. 1	Ongoing and on schedule	These reports have been submitted every June and December.
Plan review report to the RWQC/council	Annually by March 1	Ongoing and on schedule	The annual Water Quality Report has been submitted in March 2001, March 2002, and April 2003. The 2004 report is attached as Appendix D of this report.
Comprehensive plan and program report to the RWQC/council	By March 1 every 3 years beginning in 2003	2004 ongoing	This 2004 RWSP update report was delayed by one year to align with the issuance of the Brightwater Final EIS and siting decision in order to provide an update on the facilities that differ depending on the chosen site.

Policy Implementation

Wastewater Planning Policies	How is Policy Being Implemented?
WWPP-1: King County shall plan comprehensively to provide for the design and construction of facilities that meet the wastewater system needs of the service area and shall coordinate with other local jurisdictions to ensure that construction-related disruption to neighborhoods is minimized.	This policy is implemented through the RWSP update reports and through the individual projects. The project management consultant tracks the overall schedule for overlaps.
WWPP-2: In planning future wastewater systems, King County shall make a long-term assessment of wastewater system needs.	Current planning is through saturation in 2050.
WWPP-3: In planning for facilities, King County shall work collaboratively with other jurisdictions and look for opportunities to achieve cost-savings.	Opportunities for joint projects are monitored through the RWSP update reports and by the individual projects.
WWPP-4: Facility sizing shall take into account the need to accommodate build-out population.	Implemented through the projects.

Wastewater Planning Policies	How is Policy Being Implemented?
WWPP-5: RWSP review processes. King County shall monitor the implementation of and conduct the following reviews of the RWSP: **1. Implementation. The King County executive shall submit an annual written report and shall report semiannually to the RWQC and the council on siting, permitting, design and construction of any new treatment facilities and associated conveyances, project cost estimates, schedules and issues of concern. The written report shall be submitted no later than December 1 of each year until the facilities to implement the RWSP are operational. The initial report shall identify key decision points during implementation. The executive shall provide timely reports on these key decisions to allow for evaluation for consistency with the adopted policies;** **2. Annual plan review. The county should ensure that the RWSP reflects current conditions. An annual review of the plan should address water pollution abatement, water quality monitoring results, water conservation and water reclamation, ESA compliance, septic system conversions to the regional sewer system, biosolids management, wastewater public health problems, compliance with other agency regulations and agreements; and** **3. Comprehensive three-year plan review. A comprehensive review of RWSP shall be conducted every three years beginning in 2003. The purpose of the review is to evaluate plan components, including but not limited to: the planning assumptions on the rate and location of growth, phasing and size of facilities, and the effectiveness of policy implementation for I/I reduction, water reuse, biosolids, CSO abatement, water quality protection, environmental mitigation and public involvement. The executive shall transmit a report to the RWQC and the council on the results of the review and may recommend policy changes based on this report, changing regulations, technologies or other emergent or relevant factors. The council should convene an engineering and science panel to independently evaluate the report and recommendations and prepare findings.**	The required reviews are occurring on schedule. The exception is that this 2004 RWSP update report was delayed by one year to align with the issuance of the Brightwater Final EIS and siting decision in order to provide update on the facilities that differ depending on the chosen site.

Appendix B-10
Environmental Mitigation

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- Citizens are willing to pay more to prevent water quality problems as long as costs and other impacts are distributed equally.
- To insure that incentives are directed toward authorized water pollution abatement activities the following factors guide the process:
    - There should be a causal relationship between the impact being addressed and the water pollution abatement activities
    - There should be a relationship between the incentive measures and the impact of the water pollution abatement activities
    - The incentive measures should have reasonable costs.
- King County shall enter into a negotiated mitigation agreement with any community that is adversely impacted by the expansion or addition of major regional wastewater conveyance and treatment facilities.
- Mitigation agreements shall be executed in conjunction with the project permit review.
- Mitigation shall be designed and implemented in coordination with the local community, and shall be at least 10 percent of the costs associated with the new facilities.
- For the South Treatment Plant and for the new North Treatment Plant, a target for mitigation shall be at least ten percent of individual project costs, or a cumulative total of $10 million for each plant, whichever is greater
- Mitigation funded through wastewater revenues shall be consistent with:
    - Chapter 35.58 RCW; Section 230.10.10 of the King County Charter
    - Agreements for sewage disposal entered into between King County and component agencies
    - Other applicable County ordinance and state law restrictions.

Performance Measure Accomplishment

Environmental Mitigation Performance Measures	Scheduled Completion	Date Completed	Comments
Treatment Improvements Performance Measure: Complete project level EIS for North Treatment Plant and outfall	**June 2003**	Nov. 2003	The Draft EIS was completed November 2002. The Final EIS was issued November 2003 in order to adequately respond to the more than 5,000 comments received.
Treatment Improvements Performance Measure: SEPA process and predesign for the North Treatment Plant and outfall	**2004**	On Schedule	SEPA was completed November 2003. Predesign will complete March 2004. Memoranda of understanding with the local jurisdictions are being developed. These memoranda set out the processes under which specific mitigation measures will be developed.
Treatment Improvements Performance Measure: SEPA process and predesign for South Treatment Plant expansion	**2023**	As Scheduled	No activity at this time. SEPA review will be conducted at the appropriate time.
Complete SEPA process and develop mitigation measures	**Ongoing by project**	Ongoing	SEPA process and mitigation measure development are carried out for every project that is subject to SEPA review.

Policy Implementation

Environmental Mitigation Policies	How is Policy Being Implemented?
EMP-1: King County shall work with affected communities to develop mitigation measures for environmental impacts created by the construction, operation, maintenance, expansion or replacement of regional wastewater facilities. These mitigation measures shall: **1. Address the adverse environmental impacts caused by the project;** **2. Address the adverse environmental impacts identified in the county's environmental documents; and** **3. Be reasonable in terms of cost and magnitude as measured against severity and duration of impact.**	This policy was used to guide the Brightwater project and development of its Final EIS. The Final EIS was issued November 2003. Negotiated mitigation agreements are being developed for certain projects according EMP-5.
EMP-2: Mitigation measures identified through the state Environmental Policy Act process shall be incorporated into design plans and construction contracts to ensure full compliance.	Policy is implemented for every project that undergoes the SEPA review process. Environmental planners who prepare checklists review construction plans and specifications to make sure mitigation measures are included in these documents.
EMP-3: The siting process and mitigation for new facilities shall be consistent with the Growth Management Act and the state Environmental Policy Act, as well as the lawful requirements and conditions established by the jurisdictions governing the permitting process.	The proposed Brightwater Treatment Plant and associated facilities are essential public facilities under the Growth Management Act. The requirements of this law have been and will be complied with in the siting and development of these and all other WTD facilities. WTD environmental staff carry out this process for each project in compliance with SEPA. WTD environmental planning staff work with the permitting agencies to ensure that WTD projects and facilities are in compliance with applicable requirements and conditions.
EMP-4: King County shall mitigate the long-term and short-term impacts for wastewater facilities in the communities in which they are located. The county's goal will be to construct regional wastewater facilities that enhance the quality of life in the region and in the local community, and are not detrimental to the quality of life in their vicinity.	Negotiated mitigation agreements are being developed for certain projects according EMP-5.

Environmental Mitigation Policies	How is Policy Being Implemented?
EMP-5: King County shall enter into a negotiated mitigation agreement with any community that is adversely impacted by the expansion or addition of major regional wastewater conveyance and treatment facilities. Such agreements shall be executed in conjunction with the project permit review. Mitigation shall be designed and implemented in coordination with the local community, and shall be at least ten percent of the costs associated with the new facilities. For the south treatment plant and for the new north treatment plant, a target for mitigation shall be at least ten percent of individual project costs, or a cumulative total of ten million dollars for each plant, whichever is greater, provided that mitigation funded through wastewater revenues is consistent with: chapter 35.58 RCW; Section 230.10.10 of the King County Charter; agreements for sewage disposal entered into between King County and component agencies; and other applicable county ordinance and state law restrictions.	Negotiated mitigation agreements are being developed for certain projects according to this policy.

Appendix B-11
Public Involvement

Assumptions

The following list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- King County citizens and their leaders:
    - Value clean water, public health, and safety balanced with concerns about costs and sewer rates
    - Recognize cost—and equitable distribution of costs—as important considerations
- They want wastewater services that will:
    - Be maintained at the current level
    - Help manage and accommodate growth
    - Be consistent with the King County Comprehensive Plan, and encourage partnerships with cities and sewer districts
    - Meet all applicable regulations
    - Site and construct new facilities with sensitivity to the environment
    - Equitably distribute the impacts of facilities by
        - providing capacity where it is needed
        - avoiding sending wastewater over long distances
        - minimizing the need to parallel existing pipelines.
    - Be forward thinking
    - Consider decentralized conveyance and treatment facilities as part of long-range planning
    - Explore nontraditional wastewater treatment methods
    - Address inflow and infiltration, and consider water conservation, recycling of biosolids, and reuse of wastewater in planning
    - Provide continued opportunities for public involvement
    - Be flexible so as to accommodate changes in population, regulations, technology, and public opinion.

Performance Measure Accomplishment

Public Involvement Performance Measures	Scheduled Completion	Date Completed	Comments
Create specific task forces/workgroups for programs, e.g., I/I, water reuse, and CSOs	Ongoing as needed	Completed	This measure has been met. Activities will be carried forward under the ongoing Wastewater Treatment Division Public Involvement and Education Program described in PIP-1 below.
Develop community relations plan for construction projects	Ongoing by project	Ongoing	See PIP-3 below.
Create siting advisory committee(s) for North Treatment Plant	June 2000	June 2000 and complete	See TPP-9 in Appendix B-1. This process is completed.
Develop and implement wastewater/water conservation education program	2001–2006	2001 and ongoing	See PIP-8 below.
Develop and implement I/I public awareness program	Jan. 2001	2001 and complete	See PIP-7 below. This program will continue under the larger WTD public information and education program.
North Treatment Plant Siting Measure: Develop a comprehensive public involvement program	2000	2000 and complete	See TPP-9 in Appendix B-1.

Policy Implementation

Public Involvement & Related Policies	How is Policy Being Implemented?
PIP-1: King County shall maintain public information/education programs and engage the public and component agencies of local sewer service in the planning, designing and operating decisions affecting them.	WTD public involvement guidelines have been developed for use by community relations staff and consultants. The guidelines facilitate planning and implementation of public involvement for projects and programs throughout WTD. King County routinely uses task forces and work groups. The County works closely with the MWPAAC and Council's Regional Water Quality Committee.
PIP-2: King County shall develop public information and education programs to support county wastewater programs and shall lay the groundwork for public understanding of and involvement in specific programs.	WTD conducts a variety of public information and outreach activities including: • Speaker's bureau • Community open houses • Wastewater treatment plant tours • Wastewater treatment facilities tours (e.g., CSO facilities, pump stations) • Internship programs for tours, Brightwater, and lake studies • Community fairs and festivals • Booths at King County-sponsored events • Partnerships with other DNRP outreach activities (WLRD, SWD, etc.) • Coordination with WRIA activities • Advertising campaign • Consideration of opportunities to sponsor water-quality-related media programming.
PIP-3: King County shall involve public officials and citizens of affected jurisdictions early and actively in the planning and decision-making process for capital projects.	For capital projects, the County routinely interacts with local jurisdictions and residents to: • Provide information to assist the public in understanding the need for the project, alternatives, and solutions • Discuss potential impacts and ways to minimize them • Coordinate public outreach with public notification requirements of SEPA review and permitting • Provide opportunities for public feedback on facility design elements such as aesthetics, architecture, and landscape design • Provide opportunities for public feedback on route alternatives for conveyance lines. WTD project teams routinely include design features that will minimize long-term impacts on facility neighbors (e.g., noise mitigation, odor control).

Public Involvement & Related Policies	How is Policy Being Implemented?
PIP-4: King County shall inform affected residents and businesses in advance of capital construction projects.	Public involvement staff are part of construction project team. Public notification includes fliers, signs, direct on-the-ground contact, and 24-hour project hotlines. Staff are available to immediately respond to questions and concerns. Procedures are also in place to document and track complaints and claims and ensure prompt response. Lessons learned evaluations are conducted to identify what has worked and apply it to other projects.
PIP-5: King County shall disseminate information and provide education to the general public, private sector and governmental agencies regarding the status, needs and potential future of the region's water resources.	Annual water quality reports. Integrated outreach strategies with WLRD. Participation in Water Conservation Coalition.
PIP-6: King County shall actively solicit and incorporate public opinions throughout the implementation of its comprehensive plan.	See PIP-1 through -5. Annual neighborhood surveys of treatment plants. Annual water quality survey.
PIP-7: Beginning January 1, 2001, King County shall implement a public awareness and education program regarding the environmental impacts and costs to wastewater rate payers of I/I in the local and regional conveyance systems.	Efforts to educate and involve local agency staff and elected officials about I/I began in 2000 and continue today. Efforts have included: • Eight successful workshops for local agency representatives to select criteria for pilot projects to test different rehabilitation approaches and 10 pilot basins/projects to be implemented in various parts of the King County service area • Meetings with Regional Water Quality Committee, Utilities Committee, other policy makers, and some Local Agency heads • Work with MWPAAC's Engineering & Planning committee in developing I/I Control Program standards, procedures, and policies. An assessment of the level of public awareness about I/I was conducted in 2001. Building public awareness about I/I to date has taken advantage of existing communication vehicles to get the word out: • A Web site has been established at http://dnr.metrokc.gov/WTD/i-i • Articles have appeared in WTD's Watermark and "Trenchless Technology," an industry publication

Public Involvement & Related Policies	How is Policy Being Implemented?
	• Articles about use of rain barrels, (unhooking downspouts from sewer pipes to help keep clean water out of the sewage system) have been included in WLRD's Web site and DNRP's natural lawn care program, which in turn have been quoted in the national media (*Parade* magazine). During construction of I/I pilot projects, outreach activities included signs, fliers, and 24-hour construction hotlines (see PIP-4).
PIP-8: King County shall support regional water supply agencies and water purveyors in their public education campaign on the need and ways to conserve water. King County should promote pilot projects that support homeowner water conservation in coordination with water suppliers and purveyors, emphasizing strategies and technologies that reduce wastewater.	Conservation education efforts are underway on multiple fronts: • Networking and partnering with local water purveyors on water conservation education is accomplished via participation in the Water Conservation Coalition of Puget Sound. • A television spot highlighting one water/wastewater conservation message, "Don't use your toilet as a trashcan," aired on KCPQ and KTWB television stations and is available to all government cable stations. • 10,000 Bert the Salmon baseball cards featuring water conservation messages have been distributed at Mariners games and various community fairs since summer 2001. • Articles on water conservation in King County are included in publications and on the Web. The majority of resources are being invested in two retrofit projects: • A partnership with King County Housing Authority to retrofit over 80 percent of its washing machines with water-conserving models to save 30,000 gallons of water per day. Retrofitting in several major renovations with low-flow toilets was done by 2002. • Water audits of King County's own downtown facilities have been completed. Retrofits are underway. The fixes range from fixing valves to installing low-flow toilets and waterless urinals. Payback for these retrofits range from two days to two years. Educational signage was included.

Public Involvement & Related Policies	How is Policy Being Implemented?
WRP-7: King County shall develop an active water reuse public education and involvement program to correspond with the development of the water reuse program and be coordinated with other water conservation education programs.	Policy met. See WRP-7 in Appendix B-6.
TPP-9: A comprehensive public involvement program shall be developed and implemented to provide the public, at a minimum, the opportunity to give input on the criteria and the screening process used for selecting the list of possible sites for the new north treatment plant, its conveyance system and outfall and to comment on the final selection of a site. The King County executive shall establish one or more committees to aid in the siting of a north treatment plant. The committees shall, at a minimum, evaluate siting criteria to be used and propose a narrowed list of sites for consideration by the executive after consulting with the council as follows: **1. The King County executive shall transmit a motion to the council that establishes the criteria by which sites will be selected; and** **2. The executive shall provide the council with timely reports that detail the sites that meet the criteria and are under consideration and, at a later date, those sites that are final candidates for the siting of the north treatment plant.**	Policy met. See TPP-9 in Appendix B-1.

Appendix B-12
Siting New Facilities

Assumptions

This list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- Factors to be considered in siting facilities per the King County Comprehensive Plan (F-217 to -222) are:
    - Efficiency of operation
    - Equitable distribution of facilities among communities
    - No racial, cultural or class group is unduly impacted
- Facility siting will be consistent with the King County Comprehensive Plan and State Growth Management Act.
- King County will locate wastewater facilities designed to serve new growth where growth is occurring.
- Siting decisions will provide maximum flexibility to respond to population growth and regulations.
- Citizens are willing to pay more to prevent water quality problems as long as costs and other impacts are distributed equally.

Performance Measure Accomplishment

Siting New Facilities Performance Measures	Scheduled Completion	Date Completed	Comments
Develop a comprehensive public involvement program (for siting)	2000	2000	See TPP-9 in Appendix B-1.
Select and set-up Siting Advisory Committee	June 2000	June 2000	Executive Advisory Committee was created with Snohomish County Executive Bob Drewel.
Executive to transmit a motion to council that establishes the criteria for selecting sites and outfalls	2000	Sept. 2000	King County Executive Ron Sims forwarded the criteria to Council for review. Council adopted the criteria in February 2001.

Siting New Facilities Performance Measures	Scheduled Completion	Date Completed	Comments
Executive to report to council about sites and outfalls being considered and final candidate sites	Ongoing	Completed 2003	The Council has been regularly informed of siting progress through briefings and bi-annual written reports.
Narrow site selection for North Treatment Plant and outfalls to 3–5 sites, possibly acquire multiple sites	Dec. 2001	Dec. 2001	On December 10, 2001, the Council approved the Unocal system in Edmonds and the Route 9 system north of Woodinville for advancement to Phase 3.
Complete project level EIS for North Treatment Plant and outfall	June 2003	Nov. 2003	The Draft EIS was completed November 2002. The Final EIS was issued November 2003 in order to adequately respond to the more than 5,000 comments received.
Recommend preferred package (site, conveyance and outfall) for North Treatment Plant to county Executive	June 2003	Aug. 2002	King County Executive Sims announced the Route 9 site as the preferred alternative with 3 conveyance routes and 3 outfall zones.
Executive makes final decision on site and outfall	2003	Dec. 2003	King County Executive Sims selected the Route 9 site for the plant, the 195th conveyance alignment, and the Point Wells outfall zone.
Site the North Treatment Plant and outfall and acquire property for the sites	2003	Dec. 2003	Property acquisition underway into 2004.

Policy Implementation

Facility Siting Policies	How is Policy Being Implemented?
No policies were defined.	

Appendix B-13
Habitat Conservation Plan

Assumptions

This list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid.

- The HCP must maximize its flexibility to benefit threatened and endangered species.
- The initial HCP will be developed through negotiations with NOAA Fisheries and U.S. Fish and Wildlife (the Services).
- The HCP will include provisions for adaptive management of WTD activities as they impact threatened and endangered species.
- The HCP will be implemented in phases.
- King County shall design, construct, operate, and maintain its facilities in accordance with standards established by regulatory agencies and manuals of practice for engineering, so as to meet or exceed regulatory requirements for air, water, and solids emissions, as well as ensure worker, public, and system safety.
- King County will build flexibility into its system to respond to uncertain future regulations and need for reclaimed water.
- King County shall provide secondary treatment to all base sanitary flow delivered to its treatment plants, and may provide treatment beyond the secondary level to meet water quality standards and achieve other goals such as furthering the water reuse program or benefiting species listed under the ESA.
- King County will meet the State CSO control standard of one untreated overflow per year on average, recognizing that this may become more stringent in the future due to ESA.

Performance Measure Accomplishment

HCP Performance Measures	Scheduled Completion	Date Completed	Comments
Prepare phase I of the Habitat Conservation Plan	**2001**	2004	Delayed due to complexity of negotiations with the Services.
Prepare phase II of the Habitat Conservation Plan	**2003**	2006	Phase 2 will not start until the completion of draft Phase 1.

Policy Implementation

Habitat Conservation Plan Policies	How is Policy Being Implemented?
No policies were defined.	

Appendix B-14
Finance

Assumptions

This list describes the Regional Wastewater Services Plan assumptions used in 1999. These assumptions are still valid except where noted.

- A discount rate of 3 percent above the rate of inflation has been assumed for cost projections.
- The County will sell revenue bonds each year to obtain the capital to pay "up front" and then will spread the repayment of the bonds over a 35-year period. Constant annual payments are assumed.
- King County wastewater bonds are rated AA/Aa.
- The planned capitalization mix is approximately 80 percent from bond sales and 20 percent from internally generated funds.
- The County's current capacity charge is at the maximum allowed by state law, $10.50 per month per household for 15 years, and may drop to as low as $7 if changes to the law are not made.

  2003: The capacity charge legislation was changed in June 2000.

- Capacity charge will not change for several years.

  2003: The capacity charge legislation was changed in June 2000.

- Rates for residential customers are based on number of households (RCEs), and rates for commercial are based on actual winter water use translated as 750 cubic feet per RCE.
- The average monthly rate necessary to support the plan over the period 1999–2015 is $19.92 in today's dollars. Because of the debt retirement and growth of customers … the average monthly rate needed for the period 1999–2030 would be $18.97 in today's dollars, although actual rates will be higher due to inflation. This assumes no change in the capacity charge.

  2003: The rate is recalculated to account for population changes, project changes, and capacity charge changes. The capacity charge legislation was successfully changed in June 2000.

- King County is undertaking a number of benchmarking studies with similar utilities along the West Coast to identify ways to become more efficient while still delivering high quality services.

  2003: The WTD Productivity Initiative, and under it the reorganization, was begun in 1999 to increase efficiency and control costs. A pilot program was approved by Motion 11156 on April 9, 2001. See Chapter 16 on "Managing Resources" for more information.

Performance Measure Accomplishment

Finance Performance Measures	Scheduled Completion	Date Completed	Comments
No performance measures were defined.			

Policy Implementation

Financial Policies	How is Policy Being Implemented?
FP-1: The county shall maintain for the wastewater system a multiyear financial forecast and cash-flow projection of six years or more, estimating service growth, operating expenses, capital needs, reserves and debt service. The financial forecast shall be submitted by the executive with the annual sewer rate ordinance.	Six-year financial plan is submitted each year with the WTD sewer rate proposal and, again, with the annual budget proposal.
FP-2: If the operations component of the proposed annual wastewater system budget increases by more than the reasonable cost of the addition of new facilities, increased flows, new programs authorized by the council, and inflation, or if revenues decline below the financial forecast estimate, a feasible alternative spending plan shall be presented, at the next quarterly budget report, to the council by the executive identifying steps to reduce cost increases. The executive shall maintain an ongoing program of reviewing business practices and potential cost-effective technologies and strategies for savings and efficiencies; the results shall be reported in the annual budget submittal and in an annual report to the RWQC.	The program receives an ongoing review of financial performance by internal and external agencies and organizations. The WTD Productivity Initiative is an ongoing systematic and comprehensive program for identifying ways to increase efficiency.
FP-3: The county shall maintain for the wastewater system a prudent minimum cash balance for reserves, including but not limited to, cash flow and potential future liabilities. The cash balance shall be approved by the council in the annual sewer rate ordinance.	Cash balance in the form of an operating reserve was increased from $5 million to 10 percent of the operating expense.
FP-4: Unless otherwise directed by the council by motion, the King County department of natural resources and parks or its successor agency shall charge a fee that recovers all direct and indirect costs for any services related to the wastewater system provided to other public or private organizations	The sewer rate is set on an annual basis such that, given projections of other revenues and costs, the revenue requirements for providing wastewater services are met.

Financial Policies	How is Policy Being Implemented?
FP-5: Water quality improvement activities, programs and projects, in addition to those that are functions of sewage treatment, may be eligible for funding assistance from sewer rate revenues after consideration of criteria and limitations suggested by the metropolitan water pollution abatement advisory committee, and, if deemed eligible, shall be limited to one and one half percent of the annual wastewater system operating budget. An annual report on activities, programs and projects funded will be made to the RWQC. This policy shall remain in effect until such time as a financial plan for the surface water regional needs assessment is adopted and implemented.	One and one-half percent of annual operating budget limit on "Culver" funds is strictly adhered to.
FP-6: The calculation of general government overhead to be charged to the wastewater system shall be based on a methodology that provides for the equitable distribution of overhead costs throughout county government. Estimated overhead charges shall be calculated in a fair and consistent manner, utilizing a methodology that best matches the estimated cost of the services provided to the actual overhead charge. The overall allocation formula and any subsequent modifications will be reported to the RWQC.	General government overhead is calculated by the Budget Office and while WTD staff closely monitored and analyzed this, it is not under the control of WTD or DNRP.
FP-7: The assets of the wastewater system are pledged to be used for the exclusive benefit of the wastewater system including operating expenses, debt service payments, asset assignment and the capital program associated therewith. The system shall be fully reimbursed for the value associated with any use or transfer of such assets for other county government purposes. The executive shall provide reports to the RWQC pertaining to any significant transfers of assets for other county government purposes in advance of and subsequent to any such transfers.	Current policy. In the rare occurrence of asset transfer, FP-7 is the current policy.
2. Debt financing and borrowing.	
FP-8: The county shall structure bond covenants to ensure a prudent budget standard.	Bond covenants are strictly followed and monitored and revised to maintain prudent and conservative standards.
FP-9: King County should structure the term of its borrowings to match the expected useful life of the assets to be funded.	King County bond issues are comprised of a range of maturity dates that correspond with different asset life cycles.

Financial Policies	How is Policy Being Implemented?
FP-10: The wastewater system's capital program shall be financed predominantly by annual staged issues of long-term general obligation or sewer revenue bonds, provided that: **All available sources of grants are utilized to offset targeted program costs;** **Funds available after operations and reserves are provided for shall be used for the capital program; excess funds accumulated in reserves may also be used for capital;** **Consideration is given to competing demands for use of the county's overall general obligation debt capacity; and** **Consideration is given to the overall level of debt financing that can be sustained over the long term given the size of the future capital programs, potential impacts on credit ratings, and other relevant factors such as intergenerational rate equity and the types of projects appropriately financed with long-term debt.**	WTD capital expenditures are predominantly funded by the issuance of Sewer Revenue Bonds. County General Obligation Bonds are not expected to be a significant portion of new debt issuance. Through 2004, funds from meeting debt service coverage requirements are transferred to the capital program. Beginning January 2005, with the end of relevant bond covenants, WTD will be able to establish a true rate stabilization reserve that allows deferral of some operating revenues into subsequent years. See FP-12.2 (b) for further discussion
FP-11: To achieve a better maturity matching of assets and liabilities, thereby reducing interest rate risk, short-term borrowing shall be used to fund a portion of the capital program, provided that: **Outstanding short-term debt comprises no more than fifteen percent of total outstanding revenue bonds and general obligation bonds; and** **Appropriate liquidity is available to protect the day-to-day operations of the system.**	Short-term (junior lien) debt is targeted for approximately 13 percent of the total debt issued. Liquidity reserves were increased to 10 percent of operating expenses during the 2002 rate process.
3. Rates - sewer rates and capacity charge.	
FP-12: King County shall charge its customers sewer rates and capacity charges sufficient to cover the costs of constructing and operating its wastewater system. Revenues shall be sufficient to maintain capital assets in sound working condition, providing for maintenance and rehabilitation of facilities so that total system costs are minimized while continuing to provide reliable, high quality service and maintaining high water quality standards.	Beginning in 2002, WTD was reorganized to include an asset management section to reinforce the emphasis and visibility on maintaining the current assets of the utility.

Financial Policies	How is Policy Being Implemented?
FP-12.1. Existing and new sewer customers shall each contribute to the cost of the wastewater system. To implement this policy, rate and capacity charge methodology will be adopted by the council, after consultation with the RWQC, consistent with state law as follows: **a. Existing customers shall pay through the monthly sewer rate for the portion of the existing and expanded conveyance and treatment system that serves existing customers.** **b. New customers shall pay costs associated with the portion of the existing wastewater conveyance and treatment system that serves new customers and costs associated with expanding the system to serve new customers. New customers shall pay these costs through a combination of the monthly sewer rate and the capacity charge. Such rates and charges shall be designed to have growth pay for growth.**	Ordinance 14219, adopted October 2001, specifies the methodology by which the contributions of customer groups are defined. See FP-12.3 below.
FP 12.2. Sewer rate. King County shall maintain a uniform monthly sewer rate expressed as charges per residential customer or equivalent for all customers. Costs of infrastructure improvements for new customers shall be recovered by a capacity charge. **a. Sewer rates shall be designed to generate revenue sufficient to cover, at a minimum, all costs of system operation and maintenance and all capital costs incurred to serve existing customers.** **b. King County should attempt to adopt a multiyear sewer rate to provide stable costs to sewer customers. If a multiyear rate is established and when permitted upon the retirement by the county of certain outstanding sewer revenue bonds, a rate stabilization reserve account shall be created to ensure that adequate funds are available to sustain the rate through completion of the rate cycle. An annual report on the use of funds from this rate stabilization account shall be provided annually to the RWQC.**	Current policy. The sewer rate is set on an annual basis such that, given projections of other revenues and costs, the revenue requirements for providing wastewater services are met. The recent refinancing of certain bond series has lifted bond convenants that constrained the creation of a true rate stabilization reserve. Under the old parity bond covenants, revenues earned in one year could be recognized only in that year, forcing all excess operating revenues to be used to fund capital projects. This reduced the utility's borrowing needs; however, the resulting reduction in debt service had only a modest impact on the subsequent year's rate. With a true rate stabilization reserve, excess revenues generated in the first year of a multi-year rate can be treated as operating revenues for the subsequent year. These revenues therefore can be applied directly to debt coverage requirements in the subsequent year, allowing for a substantial reduction of the multi-year rate. The Executive's 2005 rate transmittal proposes the use of such a reserve.

Financial Policies	How is Policy Being Implemented?
c. The executive, in consultation with the RWQC, shall propose for council adoption policies to ensure that adequate debt service coverage and emergency reserves are established and periodically reviewed.	The debt service coverage minimum was changed from 1.25 on parity debt to include the added coverage of 1.15 on all debt in 2001. This policy was adopted through the adoption of the 2002 sewer rate.
FP 12.3. Capacity charge. The amount of the capacity charge shall be a uniform charge, shall be approved annually and shall not exceed the cost of capital facilities necessary to serve new customers. The methodology that shall be applied to set the capacity charge is set forth in FP-12.3.a.	King County successfully achieved changes to the state code allowing the capacity charge level and methodology to be set by the County. The legislation was signed by the governor in June 2000.
a. The capacity charge shall be based on allocating the total cost of the wastewater system (net of grants and other non-rate revenues) to existing and new customers as prescribed in this subsection. The total system cost includes the costs to operate, maintain, and expand the wastewater system over the life of the RWSP. Total estimated revenues from the uniform monthly rate from all customers and capacity charge payments from new customers, together with estimated non-rate revenues, shall equal the estimated total system costs. **The capacity charge calculation is represented as follows:** **Capacity Charge =** **((Total system costs – Rate revenues from existing customers)** **– Rate revenues from new customers)** **/ Number of new customers** **where:** **(1) total system costs (net of grants and other non-rate revenues) minus rate revenue from existing customers equals costs allocated to new customers.** **(2) costs allocated to new customers minus rate revenue from new customers equals the total revenue to be recovered through the capacity charge.** **(3) total capacity charge revenue requirements divided by the total number of new customers equals the amount of the capacity charge to be paid by each new customer.**	Detailed methodology was transmitted by the County Executive to the Council in December 2000. Council adopted the capacity charge methodology through Ordinance 14219 in October 2001. The first year of implementation was 2003, with a capacity charge level of $17.60 per month. This level was based on the original RWSP cost estimates for the Brightwater treatment plant and conveyance. The charge increased by rate of inflation to $18.00 for 2004. This increase did not reflect an update of the underlying costs because the RWSP update was deferred for a year. The 2005 capacity charge proposal of $28.50 is an intermediate step, pending the completion of value engineering of the Brightwater facilities..

Financial Policies	How is Policy Being Implemented?
b. The capacity charge may be paid by new customers in a single payment or as a monthly charge at the rate established by the council. The county shall establish a monthly capacity charge by dividing that amount by one hundred eighty (twelve monthly payments per year for fifteen years). The executive shall transmit for council adoption an ordinance to adjust the discount rate for lump sum payment. The executive shall also transmit for council adoption an ordinance to adjust the monthly capacity charge to reflect the county's average cost of money if the capacity charge is paid over time.	To more accurately reflect the County's cost of money, the 2005 rate transmittal proposes a change in the discount offered for lump sum payment from the current 8 percent to 5.5 percent.
c. King County shall pursue changes in state law to enable the county to require payment of the capacity charge in a single payment.	
d. The capacity charge shall be set such that each new customer shall pay an equal share of the costs of facilities allocated to new customers, regardless of what year the customer connects to the system. The capacity charge shall be based upon the costs, customer growth and related financial assumptions used for the Regional Wastewater Services Plan adopted by Ordinance 13680 as such assumptions may be updated. Customer growth and projected costs, including inflation, shall be updated every three years beginning in 2003.	The updating of costs and other information was postponed by one year, pending the final Brightwater siting decision.
e. The county should periodically review the capacity charge to ensure that the actual costs of system expansion to serve new customers are reflected in the charge. All reasonable steps should be taken to coordinate the imposition, collection of and accounting for rates and charges with component agencies to reduce redundant program overhead costs.	
f. Existing customers shall pay the monthly capacity charge established at the time they connected to the system as currently enacted by K.C.C. 28.84.055. New customers shall pay the capacity charge established at the time they connect to the system.	
g. To ensure that the capacity charge will not exceed the costs of facilities needed to serve new customers, costs assigned and allocated to new customers shall be at a minimum ninety five percent of the	

Financial Policies	How is Policy Being Implemented?
projected capital costs of new and existing treatment, conveyance and biosolids capacity needed to serve new customers.	
h. Costs assigned and allocated to existing customers shall include the capital cost of existing and future treatment, conveyance and biosolids capacity used by existing customers, and the capital costs of assessing and reducing infiltration and inflow related to the use of the existing conveyance and treatment capacity.	
i. Capital costs of combined sewer overflow control shall be paid by existing and new customers based on their average proportionate share of total customers over the life of the RWSP.	
j. Operations and maintenance costs shall be paid by existing and new customers in the uniform monthly rate based on their annual proportionate share of total customers.	
k. Any costs not allocated in FP-12.3 f, g, h, i and j shall be paid by existing and new customers in the sewer rate.	
l. Upon implementation of these explicit policies, the Seattle combined sewer overflow benefit charge shall be discontinued.	As agreed to at Robinswood, the Seattle CSO benefit charge was terminated as of January 1, 2002.

Appendix C
Web Sites

Appendix C—Web Sites

Appendix C
Web Sites

King County Government
http://www.metrokc.gov/

King County Executive
http://www.metrokc.gov/exec/

Council
http://www.metrokc.gov/mkcc/index.htm

Regional Water Quality Committee
http://www.metrokc.gov/mkcc/Committees/rwq.htm

Department of Natural Resources
http://dnr.metrokc.gov/

Wastewater Treatment Division
http://dnr.metrokc.gov/wtd/

Wastewater Services and Planning

The Business We Do – 24/7
http://dnr.metrokc.gov/wtd/community/performance.htm

Facts at a Glance
http://dnr.metrokc.gov/wtd/wtdfacts.htm

Graphical Information System (GIS)
http://www.metrokc.gov/gis/

Regional Wastewater Services Plan
http://dnr.metrokc.gov/wtd/rwsp/rwsp.htm

Sustainable Building Program
http://dnr.metrokc.gov/topics/sustainable-building/index.htm

Source Control

Industrial Waste Program
http://dnr.metrokc.gov/wlr/indwaste/index.htm
http://dnr.metrokc.gov/wlr/indwaste/metals.htm
http://dnr.metrokc.gov/wlr/indwaste/duwamish.htm

Hazardous Waste Program
http://www.metrokc.gov/hazwaste/house/

Pacific Northwest Pollution Prevention Resource Center
http://www.pprc.org/

Treatment Improvements

West Point Treatment Plant
http://dnr.metrokc.gov/wtd/westpoint/

South Treatment Plant
http://dnr.metrokc.gov/wtd/southplant/index.htm

Brightwater Treatment System
http://dnr.metrokc.gov/wtd/brightwater/index.htm

Brightwater Siting Environmental Review and EIS
http://dnr.metrokc.gov/wtd/brightwater/env/index.htm

Carnation Treatment Plant Facilities
http://dnr.metrokc.gov/WTD/carnation/

Vashon Treatment Plant
http://dnr.metrokc.gov/WTD/vashon/

Conveyance System Improvements

http://dnr.metrokc.gov/wtd/csi/

Hidden Lake Pump Station and Conveyance Improvements
http://dnr.metrokc.gov/wtd/projects/hiddenlake.htm

Juanita Bay Pump Station Replacement Project
http://dnr.metrokc.gov/wtd/projects/juanita/

Matthews Park Pump Station
http://dnr.metrokc.gov/WTD/projects/matthews/index.htm

North Creek Storage Facility
http://dnr.metrokc.gov/wtd/ncstorage/

Sweyolocken Pump Station
http://dnr.metrokc.gov/wtd/projects/sweyolocken.htm

Inflow and Infiltration Control
http://dnr.metrokc.gov/WTD/i-i/

CSO Control Program
http://dnr.metrokc.gov/wtd/cso/index.htm
http://dnr.metrokc.gov/wlr/waterres/wqa/wqpage.htm
http://dnr.metrokc.gov/wtd/dennyway/
http://dnr.metrokc.gov/wtd/henderson-cso/
http://dnr.metrokc.gov/wtd/projects/ravenna.htm
http://www.metrokc.gov/HEALTH/hazard/cso.htm

Sediment Management Program

Elliott Bay/Duwamish Restoration Program
http://www.darcnw.noaa.gov/eb-rest.htm
http://dnr.metrokc.gov/wlr/waterres/norfolk/norfolk.htm
http://dnr.metrokc.gov/wtd/duwamish/
http://dnr.metrokc.gov/wlr/indwaste/duwamish.htm

City of Seattle's CSO Control Program
http://www.ci.seattle.wa.us/util/CSOPlan/default.htm

Biosolids Program
http://dnr.metrokc.gov/WTD/biosolids/index.htm

Fuel Cell Demonstration Project
http://dnr.metrokc.gov/wtd/fuelcell/

Water Reuse Program
http://dnr.metrokc.gov/wtd/reuse/index.htm

Advanced Wastewater Treatment Demonstration Project
http://dnr.metrokc.gov/wtd/reuse/alternatives.htm

Water Conservation
http://dnr.metrokc.gov/wtd/waterconservation/index.htm

Water Quality Protection

Environmental Laboratory
http://dnr.metrokc.gov/wlr/envlab/index.htm

Monitoring Programs

Lakes
http://dnr.metrokc.gov/wlr/waterres/lakes/

Beach
http://dnr.metrokc.gov/wlr/waterres/lakes/bacteria.htm

Streams
http://dnr.metrokc.gov/wlr/waterres/streams/creekindex.htm

http://dnr.metrokc.gov/wlr/waterres/Bugs/index.htm

Marine
http://dnr.metrokc.gov/wlr/waterres/marine/marine.htm

Watersheds

Cedar River
http://dnr.metrokc.gov/wlr/watersheds/cedar-lkwa.htm

Lake Washington
http://dnr.metrokc.gov/wlr/waterres/lakes/biolake.htm
http://dnr.metrokc.gov/wlr/waterres/lakes/Wash.HTM

Sammamish River
http://dnr.metrokc.gov/wlr/watersheds/samm.htm
http://dnr.metrokc.gov/wlr/waterres/lakes/SAMM.htm

Lake Union
http://dnr.metrokc.gov/wlr/waterres/lakes/UNION.HTM

Green River
http://dnr.metrokc.gov/wlr/watersheds/green.htm

Puget Sound
http://dnr.metrokc.gov/wlr/watersheds/puget.htm

Salmon Recovery Activities

http://dnr.metrokc.gov/topics/salmon/SALtopic.htm
http://dnr.metrokc.gov/Wrias/9/index.htm

Environmental Mitigation

Property Relocation and Acquisition
http://dnr.metrokc.gov/WTD/row/acquisition.htm

SEPA Appeal Process
http://dnr.metrokc.gov/WTD/brightwater/env/SEPAappl.htm

Public Involvement Program
http://dnr.metrokc.gov/wtd/community/involved.htm

Habitat Conservation Plan
http://dnr.metrokc.gov/wtd/hcp/index.htm

Finance

Capacity Charge
http://dnr.metrokc.gov/wtd/capchrg/

Appendix D
2004 RWSP Water Quality Report

Appendix D—2004 RWSP Water Quality Report

This appendix is bound separately.