

RWSP Cost Estimates

RWSP reporting policies call for including in the RWSP annual reports an update of the RWSP cost estimates through the year 2030.

The cost estimates presented in this report include estimates for projects in various stages of development including planning, predesign, final design, and construction. Costs of completed RWSP projects are also included. The accuracy of cost estimates increases as projects become more defined and are specified in greater detail. Often the scopes of work and estimated costs for projects in the planning phase will change as more detailed information becomes available over time.

Planning-level cost estimates are based on generic facility concepts. Specific details of a project such as location, technologies, and environmental impacts and potential mitigation of such impacts are determined later during project predesign. Planning-level cost estimates are expected to be within +/- 30–50 percent of the final cost, with the wider range assigned when there is greater uncertainty about the project or greater risk to construct. By the time a project enters the construction phase, estimates are typically within +/- 10 percent of the final cost. Other factors such as new regulations, changes in demand for construction materials, natural disasters, and international conflicts may cause unanticipated cost increases.

Traditionally, the Department of Natural Resources and Parks (DNRP) has assumed a standard increase of 3 percent per year in estimating costs for its wastewater projects to account for price increases in project components such as materials, labor, equipment, supplies, and contractor markups. However, in recent years, inflation costs have increased more than anticipated, which can cause a significant and unexpected impact on the cost of the construction projects. The recent increase in inflation is largely attributable to the extraordinary increase in the price of construction materials like concrete and steel. In 2005, inflation averaged about 4.1 percent per the Engineering News-Record's Construction Cost Index (CCI).¹ DNRP will continue to track inflation and take steps to mitigate possible impacts to RWSP construction projects as necessary, such as purchasing certain "high risk" materials and equipment before they are needed or using alternative materials that may be less expensive in the market place.

This chapter describes RWSP cost estimates done in 1998 and 2003. It then presents a summary table of the updated 2005 RWSP cost estimates, followed by an explanation of components in the table.

¹ The Engineering News-Record publishes both a Construction Cost Index (CCI) and Building Cost Index (BCI) that are widely used in the construction industry.

Details on RWSP capital projects in design and construction are provided as Appendix C. In accordance with RWSP reporting policies, the appendix presents a project schedule; an expenditures summary (including staff labor and miscellaneous services); a description of any adjustments to costs and schedules; and a status of the project contracts for each project.

10.1 1998 and 2003 RWSP Cost Estimates

The original RWSP cost estimates developed in 1998 reflected planning-level costs for capital projects adopted in Ordinance 13680 and outlined in the 1999 RWSP Operational Master Plan.^{2,3} An update to these original estimates, reflecting cost estimates as of December 31, 2003, was included in the *2004 RWSP Update*.⁴ In addition to updating the cost of projects included in the 1998 estimate, the 2003 cost estimates included anticipated costs for projects and programs that resulted from implementing RWSP policies but were not identified or included in the 1998 RWSP cost estimates. Such projects include the Carnation Treatment Plant, upgrades to the Vashon Treatment Plant, odor control improvements at the West Point and South plants, and acquisition of and improvements to Snohomish County interceptors.

The 2003 RWSP cost estimates also included costs for modifications made to the original RWSP conveyance improvements after 1998. These modifications resulted from information gathered through the basin planning process.⁵ More detail on the non-Brightwater conveyance cost increases from 1998 through 2003 is provided in the June 2004 technical memorandum: *Summary of Non-Brightwater Conveyance Cost Increases from the 1998 Regional Wastewater Services Plan to the 2004 Regional Wastewater Services Plan Update*. A revised 2003 RWSP cost estimates summary table was included in this memorandum. The revised table includes a project that was inadvertently omitted from the table provided in the *2004 RWSP Update*.

10.2 2005 RWSP Cost Estimates

Table 10-1 summarizes the 2005 RWSP cost estimates and compares them to the 2003 estimates. The 2005 cost estimate for implementing the projects and programs associated with the RWSP through 2030 is approximately \$2.97 billion, an increase of \$212 million from the 2003 RWSP cost estimate of approximately \$2.76 billion in 2005\$ dollars. The 2005 Brightwater cost trend estimates described in Chapter 2 of this report account for 89 percent (\$189 million) of this increase.

The 2005 estimates include adjustments for inflation, including cost increases that have occurred as the result of unforeseen circumstances such as the recent increases in global commodities. The 2005 estimates also reflect modifications to projects resulting from information gathered through flow monitoring, modeling, and cost analysis after 2003.

² Ordinance 13680 adopted the Regional Wastewater Services Plan and was approved by the Metropolitan King County Council in November 1999.

³ The Operational Master Plan explains how King County will implement the RWSP.

⁴ The *2004 RWSP Update* is available on the Web at: <http://dnr.metrokc.gov/wtd/rwsp/library.htm#3yrupdate>

⁵ See Chapter 3 of this report for more information on the basin planning process

Total project cost estimates reflect anticipated costs from the initial planning stage through construction and startup. The estimates also include the costs for RWSP projects that have been completed and projects that are in the planning, design or construction phase. Expenditures through 2004 are included at their original value (not adjusted for inflation) to provide as complete an estimate as possible of RWSP costs through 2030.

More details on the 2005 RWSP cost estimates and changes in costs by program are provided in the section following Table 10-1.

Table 10-1. Comparison of 2003 and Updated 2005 RWSP Cost Estimates (1999–2030)

RWSP Element	2003 RWSP Cost Estimates (2003\$ x 1M)	2003 RWSP Cost Estimates (2005\$ x 1M)	2005 RWSP Updated Cost Estimates (2005\$ x 1M)	Cost Change (2005\$ x 1M)
Total RWSP	\$2,599	\$2,756	\$2,968	\$212
Total Brightwater Treatment & Conveyance	\$1,350	\$1,432	\$1,621	\$189
Brightwater Treatment Plant	\$548	\$581	\$529	
Brightwater Conveyance	\$802	\$851	\$853	
Land and Right-of-Way ^a			\$98	
Mitigation ^a			\$141	
Total Treatment & Odor Control Improvements^b (Non-Brightwater)	\$133	\$141	\$147	\$6
Odor Control at South Plant	\$4	\$4	\$5	\$1
West Point Odor Control	---	---	\$1	\$1
West Point Digestion Improvements	\$4	\$4	\$4	--
King Street Regulator Odor Control Project	---	---	\$1	\$1
South Plant Expansion	\$97	\$103	\$103	---
Vashon Treatment Plant Upgrade	\$16	\$17	\$19	\$2
Carnation Treatment Plant	\$12	\$13	\$14	\$1
Total Conveyance (Non-Brightwater)^c	\$638	\$677	\$663	\$(14)
Projects included in the 2003 estimate	\$638	\$677	\$640	\$(37)
Projects identified after 2003 estimate	---	---	\$23	\$23
Total Infiltration/Inflow (I/I)	\$43	\$45	\$45	--
I/I Planning Study	\$43	\$45	\$45	--
Total Combined Sewer Overflow	\$392	\$417	\$428	\$11
CSO Control Program	\$355	\$377	\$377 ^h	--
CSO Planning & Updates	\$5	\$6	\$6	--
Sediment Management/Lower Duwamish Superfund	\$32	\$34	\$45	\$11
Total Reclaimed Water	\$18	\$19	\$36	\$17
Technology Demonstration ^d	\$1	\$1	\$1	--
Future Water Reuse	\$3	\$3	\$3	--
Demo Projects (Water Reuse Satellite Facility) ^e	\$14	\$15	\$5	\$(10)
Reclaimed Water Backbone	--	--	\$26	\$26
RWSP Water/Wastewater Conservation ^f	--	--	\$1	\$1
Water Quality Protection	\$15	\$15	\$15	--
Habitat Conservation Plan/Programmatic Biological Assessment^g	\$10	\$10	\$10	--
RWSP Planning and Reports	--	--	\$3	\$3

Notes: All costs in 2005 column are as of December 31, 2005; projects shown are not exhaustive, but are listed to illustrate changes. Totals may not add due to rounding.

^a In the 2003 RWSP cost estimates summary table, mitigation and land acquisition costs were included in the overall Brightwater Plant and Conveyance cost estimates.

^b The odor control improvement costs reflect specific odor control projects for existing facilities, resulting from implementing the policies adopted via Ordinance 14712.

^c Cost estimates for non-Brightwater conveyance will be updated and provided with the conveyance system improvement plan update, anticipated to be transmitted to the King County Council in early 2007.

^d The reclaimed water demonstration project was complete as of December 31, 2004.

^e The reuse satellite project was cancelled; the cost in the 2005 column represents the total expenditures through December 31, 2004.

^f The water/wastewater conservation program was inadvertently omitted from the 2003 RWSP cost estimates summary table; the program will be completed by end of 2006.

^g The Habitat Conservation Plan completed its first phase and will not continue. The majority of the HCP funds have been expended; remaining funds are being directed to pursuing a Programmatic Biological Assessment.

^h The 2005 cost estimates for the CSO control program are the 2003 estimates adjusted for inflation. CSO control program cost estimates will be updated after completion of the hydraulic model update and will be provided with the 2010 CSO Program Review.

10.3 Explanation of RWSP Cost Estimate Summary Table

Table 10-1 presents a summary of the 2003 and 2005 RWSP cost estimates. The table includes four columns:

- **2003 Cost Estimates (2003\$ x 1M) column.** This column shows the 2003 RWSP cost estimates in 2003\$ dollars. The costs and line items in this column are the same as the costs and line items shown for 2003 cost estimates in revised Table 14-1 in the June 2004 technical memorandum mentioned earlier in this chapter.
- **2003 Cost Estimates (2005\$ x 1M) column.** This column shows the 2003 RWSP cost estimates adjusted to 2005\$ dollars to show how the updated 2005 cost estimates compare to the 2003 cost estimates adjusted for inflation. Adjustments for inflation are based on the assumption of a standard increase of 3 percent per year.
- **2005 Updated Cost Estimates (2005\$ x 1M) column.** This column shows the updated 2005 cost estimates in 2005\$ dollars that were developed based on project details as of December 31, 2005.
- **Cost Change (2005\$ x 1M) column.** This column shows the changes in cost estimates for each line item and total category cost from the 2003 cost estimates to the 2005 cost estimates in 2005\$ dollars.

Table 10-1 presents the total cost estimates for each RWSP category first, followed by the cost estimates for specific projects or programs within the category. The RWSP categories are as follows:

- Brightwater Treatment and Conveyance
- Treatment and Odor Control Improvements (Non-Brightwater)
- Conveyance (Non-Brightwater)
- Infiltration/Inflow
- Combined Sewer Overflow
- Reclaimed Water
- Water Quality Protection
- Habitat Conservation Plan
- RWSP Planning and Reports

The following sections provide more detail on each category.

10.3.1 Brightwater Treatment and Conveyance

The 2005 cost estimates for the Brightwater System is \$1.6 billion, an increase of \$189 million from the 2003 cost estimates. Rising inflation, higher global commodities prices, and mitigation commitments have contributed to this cost increase. Chapter 2 of this report provides more detail on the Brightwater cost trend.

10.3.2 Treatment and Odor Control Improvements (Non-Brightwater)

Non-Brightwater treatment and odor control improvements costs cover treatment plant improvements and specific odor control improvements that result from implementing RWSP policies. The 2005 cost estimates for these projects is \$141 million, an increase of \$6 million from the 2003 cost estimates.

The cost estimate for odor control improvements at South plant increased by approximately \$1 million. Rising inflation and construction costs contribute to this increase. The odor control improvements at the West Point Plant and at the King Street Regulator Station were identified after publication of the 2003 RWSP cost estimates. Both of these projects meet the requirements of Ordinance 14712 to implement phased odor control improvements at the county's wastewater facilities. The cost estimates as of December 31, 2005, for these projects is \$2 million. More information on the odor control program is provided in Chapter 7 of this report.

The cost estimates for the Vashon Treatment Plant upgrades increased by \$2 million from the 2003 estimate. The costs of cleaning up the contaminated soils that were discovered on the site contributed to this increase. More information on the Vashon Treatment Plant project is provided in Chapter 6 of this report.

The cost estimates as of December 31, 2005, for the Carnation Treatment Plant increased by \$1 million. Rising inflation and construction costs contribute to this increase. More information on the Carnation Treatment Plant project is provided in Chapter 6 of this report.

10.3.3 Conveyance (Non-Brightwater)

The total non-Brightwater conveyance cost estimates include the cost estimates for projects included in the 2003 cost estimate and for projects that have been identified since the 2003 cost estimate was prepared.

The 2005 cost estimate for RWSP conveyance projects through 2030 is \$663 million, which is a decrease of \$14 million from the 2003 cost estimates. The cost change reflects cost increases to some projects, cost decreases because some projects are no longer needed prior to 2030 or the project need is being assumed through other projects, and costs of new projects since the 2003 cost estimate was prepared:

- **Cost increases of \$143 million in projects that were included in the 2003 RWSP cost**

estimates. Projected increases in land acquisition costs or modifications to the project contribute to these cost increases.

- **Cost decreases of \$180 million in projects that are no longer needed.** This decrease results from the removal of projects that were included in the 2003 RWSP cost estimate but are no longer needed by 2030 or their need is being assumed through other projects. This amount also includes cost decreases associated with some of the projects that have been completed. For example, the total project cost for the completed North Creek storage is approximately \$29 million. The 2003 estimate for this project was \$36 million in 2005\$ dollars.
- **Cost increases of \$23 million in new projects.** This increase results from the addition of the Black Diamond storage and Kenmore Lakeline projects and from staff and labor costs associated with the Conveyance System Improvement Program from 2005 through 2030.

As reported in Chapter 3 of this report, updated cost estimates for RWSP conveyance projects through 2030 will be presented in the conveyance system improvement (CSI) plan update, which will be transmitted to the King County Council in early 2007. The CSI plan update will identify needed improvements to address capacity and condition needs in the regional conveyance system.

10.3.4 Infiltration/Inflow (I/I)

There is no change in the 2005 RWSP I/I cost estimate from the 2003 estimate. The 2005 cost estimate for this program is \$45 million, which covers the costs for completing the six year comprehensive I/I study that led to the development of the Executive's Recommended I/I Control Program. The I/I Program Recommendation was subsequently adopted by the King County Council in May 2006. As reported in Chapter 4 of this report, components of the six year study included region-wide flow monitoring and implementation of ten pilot I/I reduction projects.

WTD and the local agencies will begin implementation of the Executive's Recommended I/I Control Program's in 2007. The first step will be development of two to three initial cost-effective I/I reduction projects. Funding of these initial projects will come from King County wastewater revenue that is dedicated to funding CSI projects in the regional conveyance system. The goal of the I/I control program is to cost-effectively remove enough I/I from the collection system to delay, reduce, or eliminate some otherwise needed CSI project. Based on this goal, the costs associated with implementation of the initial I/I reduction projects are already included in the CSI cost estimates, which are discussed earlier in this chapter.

More information on the RWSP I/I control program is provided in Chapter 4 of this report.

10.3.5 Combined Sewer Overflow

The total combined sewer overflow (CSO) cost estimate includes costs associated with the CSO control program, CSO planning and updates, Sediment Management Program, and the Lower Duwamish Waterway Superfund project. The 2005 total CSO cost estimate is \$428 million, an increase of \$11 million from the 2003 cost estimate.

The cost estimates for the Sediment Management Program have increased by around \$5.5 million, mainly because of delays in project start dates to accommodate partnership arrangements with other agencies. Another \$5.5 million has been added since the 2003 cost estimate for the county's participation in the Superfund remedial investigations and feasibility studies for sediment cleanup in the Duwamish River.

Cost estimates for the CSO Control Program have not been updated since the 2003 cost estimates. These estimates will be updated and presented in the *2010 CSO Control Program Review*. The cost estimates will be based on the results of updating and recalibrating the hydraulic model that is used to predict the design and effectiveness of CSO control projects.

More information on the CSO Control Program is provided in Chapter 3 of this report.

10.3.6 Reclaimed Water

The total 2005 cost estimates for the Reclaimed Water Program is \$36 million, an increase of \$17 million from the 2003 cost estimate. The projects and programs that make up the total reclaimed water cost estimate area as follows:

- **Technology Demonstration Project.** This project was complete as of December 31, 2004. The 2005 cost estimate represents the total expenditures for this project and is the same as the 2003 cost estimate.
- **Future Water Reuse.** This project includes activities to implement the RWSP water reuse plan that was submitted to the council in December 2000 and to support water conservation opportunities within WTD programs. There is no change in the 2005 cost estimate from the 2003 estimate.
- **RWSP Water/Wastewater Conservation Program.** This program was inadvertently omitted from the 2003 cost estimate summary table. The addition of the total cost for the program in the 2005 estimate increases the total estimated cost for the reclaimed water program by \$1 million. The program will be complete by the end of 2006.
- **Sammamish Valley Reclaimed Water Facility.** This project was cancelled in favor of the reclaimed water capabilities at the Brightwater Treatment Plant. As a result, the 2005 cost estimate for this project represents a \$10 million decrease from the 2003 cost estimate.
- **Reclaimed Water Backbone.** This is a new council-approved project since the 2003 cost estimate was prepared. The 2005 cost estimate for this project is \$26 million.

More information on the reclaimed water program is provided in Chapter 9 of this report.

10.3.7 Water Quality Protection

The Water Quality and Protection Program—a water resource modeling and monitoring program—provides scientific information on water quality and hydrologic conditions in both the Lake Washington and Green River watersheds.

There is no change in the 2005 cost estimate from the 2003 estimate. The 2005 cost estimate for this program is \$15 million. Approximately 75 percent of this cost estimate has been expended.

10.3.8 Habitat Conservation Plan

The cost estimates for the Habitat Conservation Plan (HCP) have not changed since the 2003 estimate. As reported in Chapter 11 of this report, the HCP completed its first phase and the program will not continue. The majority of the funds allocated to the HCP have been expended. The remaining funds are being directed to pursuing a Programmatic Biological Assessment with NOAA Fisheries and U.S. Fish and Wildlife Services.⁶

10.3.9 RWSP Planning and Reports

The RWSP reporting policies call for RWSP annual reports and comprehensive reviews. The costs associated with these reporting requirements were not included in the 2003 cost estimate. The 2005 cost estimates for these activities is \$3 million.

⁶ NOAA = National Oceanographic and Atmospheric Administration.