Regional Wastewater Services Plan

2009 Annual Report

September 2010

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Regional Wastewater Services Plan (RWSP)

RWSP 2009 Annual Report

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Acronyms and Abbreviations

AWWD	Alderwood Water and Wastewater District
BIT	Bellevue Influent Trunk
BT	Brightwater Tunnel
CBD	Central Business District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	capital improvement plan
CSI	conveyance system improvement
CSO	combined sewer overflow
EBI	Elliott Bay Interceptor
Ecology	Washington State Department of Ecology
EECBG	Energy Efficiency and Conservation Block Grant
EECC	Environmental Education/Community Center
EPA	U.S. Environmental Protection Agency
ETDF	Energy Technology Demonstration Facility
H_2S	hydrogen sulfide
HCP	Habitat Conservation Plan
I/I	infiltration and inflow
KCIW	King County Industrial Waste Program
LHWMP	Local Hazardous Waste Management Program
MBR	membrane bioreactor
MG	million gallons
mgd	million gallons per day
MOA	memorandum of agreement
MTCA	Model Toxics Control Act
NBMA	Northwest Biosolids Management Association
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PCBs	polychlorinated biphenyls
RI/FS	remedial investigation/feasibility study
RWSP	Regional Wastewater Services Plan
SMP	Sediment Management Plan
SPU	Seattle Public Utilities
SSO	sanitary sewer overflow
WAC	Washington Administrative Code
WSU	Washington State University
WTD	Wastewater Treatment Division

Executive Summary

King County Ordinance 15384 and King County Code 28.86.165 require that the King County Executive submit a yearly report to the King County Council on implementation of the Regional Wastewater Services Plan (RWSP).

Providing Needed Capacity in the Regional Wastewater System

Brightwater Treatment System

Progress made in 2009 on the Brightwater Treatment Plant includes (1) completion of concrete work on the digester complex, solids and energy buildings, and the three odor control structures, (2) completion of construction of the electrical substation, and (3) startup of finished grading, installation of irrigation systems, and planting of the buffer landscape that will surround the plant's facilities.

Progress made in 2009 on the Brightwater Conveyance System includes (1) completion of pipe installation and partial concrete backfill on the East Tunnel, and (2) 92 percent completion of the West Tunnel. Tunneling progress was made on the Central Tunnels until May when significant rim bar wear was discovered on both tunnel boring machines.

Conveyance System Improvements

In 2009, as part of the RWSP Conveyance System Improvement (CSI) Program, four projects were in design and two projects were in construction. In addition, the Decennial Flow Monitoring project was initiated to collect accurate flow data from meters installed throughout the separated wastewater service area.

WTD completed 30 percent design on the initial infiltration and inflow (I/I) reduction projects. A primary goal of the initial projects is to determine whether and under what conditions it is possible to cost-effectively remove enough I/I from the collection systems to delay, reduce, or eliminate a planned regional CSI project.

Protecting Water Quality and Complying with Regulations

The RWSP offers guidance on providing treatment at the County's existing treatment facilities, controlling combined sewer overflows (CSOs), and complying with permits and regulations. Implementation of these efforts helps to protect our region's water quality.

Treatment Plants

Effluent from King County's treatment plants must meet National Pollutant Discharge Elimination System (NPDES) permit requirements and Washington State Water Quality Standards. NPDES permit limitations were met for all four of King County's secondary treatment plants. Both the South and West Point Treatment Plants earned the National Association of Clean Water Agencies Gold Peak Performance Award for achieving 100 percent compliance with their NPDES permits for an entire calendar year. These two plants also received the Platinum Peak Performance Award for multiple years of consecutive gold performance.

Combined Sewer Overflow Control and Sediment Management

The RWSP identifies 21 capital projects to control King County's remaining uncontrolled CSOs by 2030. Predesign was under way in 2009 for four of these projects, collectively called the Puget Sound Beach projects. By the end of 2009, alternatives for each project were identified for further refinement and evaluation in 2010.

The County continued to partner with other agencies on sediment management in the Duwamish Waterway under two federal Superfund projects: the Harbor Island and the Lower Duwamish Waterway projects.[1]

Pollution Source Control

King County operates two source control programs: the King County Industrial Waste Program (KCIW) and the Local Hazardous Waste Management Program (LHWMP). Both programs work to control pollutants at their source, thereby keeping them out of the wastewater system and, in turn, out of surface waters and the environment. During 2009, the LHWMP collected 1,348 tons of household hazardous waste from more than 44,883 customers.

KCIW regulates industrial wastewater discharged into the County's wastewater system. In 2009, 130 permits and 304 industrial waste discharge approvals were in effect and 438 inspections were conducted.

[1] Superfund is the common name for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Creating Resources from Wastewater

The RWSP encourages the County to beneficially use the byproducts from wastewater treatment—biosolids and digester gas from the solids treatment process and reclaimed water from the liquids process.

Biosolids Recycling

Approximately 116,000 wet tons of biosolids were produced in 2009, all of which was beneficially recycled and used as a fertilizer and soil amendment for forestry and agricultural applications and to make compost.

Energy Recovery

Energy recovery and efficiency efforts at the South and West Point plants continued in 2009. Digester gas is used at the West Point and South plants to produce power and heat for plant processes and buildings. In addition, South plant sold 1.93 million therms of natural gas to Puget Sound Energy, which is enough to serve more than 2,300 typical Seattle homes. South plant also produced 0.387 million kilowatt hours of electricity, which is enough to power 42 homes.

Final design of an Energy Technology Demonstration Facility (ETDF) at the Brightwater plant was completed in 2009.

Reclaimed Water

West Point and South Treatment Plants produced approximately 300 million gallons of reclaimed water for use at the plants for process water and irrigations. Approximately three million gallons of the reclaimed water produced at South plant was sold to the City of Tukwila for irrigation and public works uses. In March, the Carnation plant started discharging its Class A reclaimed water to enhance a wetland in the Chinook Bend Natural Area.

Odor Control and Prevention Program

At the West Point plant, efforts continued in 2009 to adjust operations and maintenance (O&M) activities and to monitor the efficacy of these adjustments and of plant improvements made in 2007 (covering the division channel and modifying the odor scrubber system). At South plant, new odor scrubbers to control emissions from the aeration basins (first pass of each) were in operation for all of 2009. Efforts during the year focused on O&M activities to help improve odor control at the plant.

Tracking RWSP Costs and Reporting on Productivity Initiative

Tracking RWSP Costs

The 2009 estimate for implementing the projects and programs associated with the RWSP through 2030 is approximately $3.44 billion in 2009 dollars, an increase of about $35 million, or 1.06 percent, from the 2008 RWSP cost estimate of $3.41 billion in 2009 dollars. The difference is attributed to (1) startup of the Decennial Flow Monitoring project, which is a new project resulting from King County Council approval of Ordinance 16033 in March 2008, (2) inflation associated with delaying construction of some projects, (3) adjustments to some projects' contingency costs, and (4) an increase in Brightwater costs, which are largely attributed to delays in conveyance system construction.

Nearly one-fourth of the 2009 RWSP cost estimate represents planning-level costs,which are based on generic facility concepts.

Productivity Initiative

The Productivity Initiative Pilot Program identifies specific levels of service, cost reductions, and efficiencies over the period 2001–2010 that are anticipated to result in an estimated $75.9 million savings for ratepayers, while increasing levels of service to these same customers. Positive productivity results were generated in 2009, the ninth year of the pilot program. Since 2001, a savings of $72.6 million for ratepayers has been achieved.

Chapter 1

Introduction

The 2009 Annual Report for the Regional Wastewater Services Plan (RWSP) describes the progress made during 2009 in implementing the major programs and projects in the RWSP. The report is presented in response to the RWSP reporting policies outlined in Ordinance 15384 and King County Code 28.86.165.[1]

The subject of each chapter is as follows:

- Chapter 2 highlights activities associated with RWSP programs and plan elements.
- Chapter 3 reports on the progress made on the 19 RWSP capital projects that were in design or construction during 2009.
- Chapter 4 presents an update of the RWSP cost estimates through 2030 and provides information on the Productivity Initiative Pilot Program.

RWSP Annual Reporting Policies

The policies below were established through adoption of Ordinance 15384. They guide the preparation of the RWSP annual reports.

"A. Regional wastewater services plan annual report. The executive shall submit a written report to the council and RWQC in September each year until the facilities in the RWSP are operational. This report, covering the previous year's implementation, will provide the following:

1. *A summary of activities for each major component of the RWSP, including treatment, conveyance, infiltration and inflow, combined sewer overflows, water reuse, biosolids and highlights of research and development projects underway and proposed for the coming year;*
2. *Details on each active RWSP project in the capital budget, including a project summary, project highlights, project issues, upcoming activities, schedules, and expenditures summary including labor staff and miscellaneous services, a description of adjustments to costs and schedule and a status of the projects contract;*
3. *A status of the odor prevention program, including a listing and summary of odor complaints received and progress on implementing odor prevention policies and projects;*
4. *A summary of the previous year's results for the comprehensive water quality monitoring program;*
5. *A review of the plan elements, including water pollution abatement, water quality, water reclamation, Endangered Species Act compliance, biosolids management and variability of quality over time, wastewater public health problems, compliance with other agency regulations and agreements, to ensure it reflects current conditions; and*
6. *An update of anticipated RWSP costs through the year 2030."*

1.1 Regional Wastewater Services Plan

In the 1990s, in response to projected population growth and future wastewater service needs, King County carried out an intensive regional planning effort to ensure the continuation of high-quality and effective wastewater treatment services. The RWSP resulted from this effort and

[1] Previous RWSP annual reports are available at http://www.kingcounty.gov/environment/wtd/Construction/planning/rwsp/Library.aspx.

was adopted by the King County Council in November 1999, through Ordinance 13680.

The RWSP outlines a number of important projects, programs, and policies for King County to implement through 2030. It calls for building the Brightwater Treatment System to accommodate growth in the northern portion of the wastewater service area. The plan also calls for improvements to the regional conveyance system to meet the 20-year peak flow storm design standard and accommodate increased flows; improvements to reduce existing and future levels of infiltration and inflow (clean groundwater and stormwater) into local collection systems; and improvements to control CSOs so that an average of no more than one untreated discharge occurs per year at each CSO site by 2030.[2]

In addition, the RWSP identifies the need to expand the South Treatment Plant by 2029 to handle projected increased wastewater flows in the southern and eastern portions of the County's wastewater service area.

More information on the RWSP is available at http://www.kingcounty.gov/environment/wtd/Construction/planning/rwsp.aspx.

1.2 King County's Wastewater Treatment System

King County protects water quality and public health in the central Puget Sound region by collecting and treating wastewater from 17 cities, 16 local sewer utilities, and 1 Indian tribe. WTD serves about 1.5 million people within a 420-square-mile service area, which includes most urban areas of King County and parts of south Snohomish County and northeast Pierce County. King County's wastewater system (Figure 1-1) includes two large regional treatment plants, the West Point Treatment Plant in the City of Seattle and the South Treatment Plant in the City of Renton, two small treatment plants (one on Vashon Island and one in the City of Carnation), one community septic system (Beulah Park Cove on Vashon Island), four combined sewer overflow (CSO) treatment facilities (Alki, Carkeek, Mercer/Elliott West, and Henderson/Norfolk—all in the City of Seattle), over 350 miles of pipes, 19 regulator stations, 42 pump stations, and 38 CSO outfalls. Construction is under way on the Brightwater Treatment System, which includes a new regional treatment plant, associated conveyance facilities, and a marine outfall.

More information on the County's regional wastewater system is available at http://www.kingcounty.gov/environment/wtd/About/System.aspx.

[2] The Washington State Department of Ecology (Ecology) regulates the level of CSO control based on the number of untreated CSO events that occur in a year. Ecology defines "the greatest reasonable reduction" in CSOs (Chapter 90.48 RCW) as being "control of each CSO in such a way that an average of one untreated discharge may occur per year" (WAC 173-245-020).

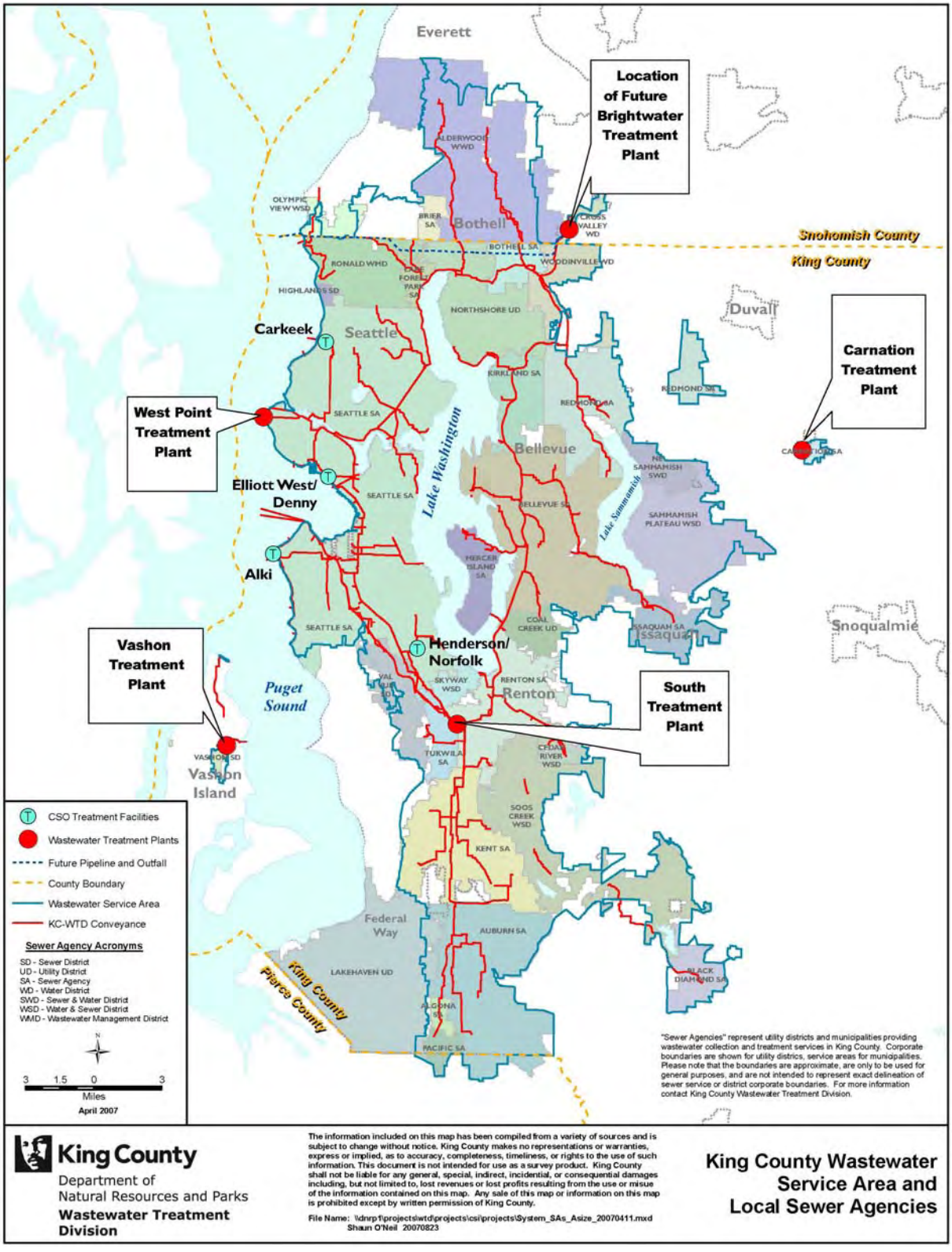


Figure 1-1. King County Wastewater Service Area

Chapter 2

RWSP Program Elements

This chapter provides highlights of activities in 2009 associated with the following RWSP program elements:

- Providing Needed Capacity in the Regional Wastewater System: Treatment and Conveyance System Improvements
- Protecting Water Quality and Complying with Regulations: Combined Sewer Overflow Control Program; NPDES Permit Compliance; Pollution Source Control Programs
- Resource Recovery Programs: Biosolids Recycling, Energy Recovery, and Reclaimed Water Programs
- Odor Prevention and Control Program

2.1 Providing Needed Capacity

2.1.1 Expanding Treatment Capacity

The RWSP calls for construction of the Brightwater Treatment System to provide additional capacity for projected population growth in the northern portion of King County's wastewater service area. Construction on the Brightwater facilities continued in 2009. Chapter 3 provides details on construction progress made in 2009.

2.1.2 Implementing Conveyance System Improvements and Infiltration/Inflow Reduction Programs

The RWSP calls for improvements to King County's wastewater conveyance system. RWSP conveyance policies direct WTD to use the 20-year peak flow storm as the design standard for the separated portion of the County's wastewater system to avoid sanitary sewer overflows and ensure there is sufficient capacity in the regional conveyance system to accommodate projected population growth.[1] Because no uniform capacity standard was in place before adoption of the RWSP, portions of the regional conveyance system do not currently meet the design standard. In setting this standard, the King County Executive and King County Council recognized that it is one of the most stringent standards in the nation and that it would take some time for the conveyance system to be upgraded to meet this standard.

[1] The separated system is the part of the King County regional system where stormwater and wastewater are collected in separate pipes.

In 2009, as part of the RWSP Conveyance System Improvement (CSI) Program, four projects were in design and two projects were in construction. In addition, consistent with RWSP conveyance policies, the Decennial Flow Monitoring project was initiated to collect accurate flow data from meters installed throughout the separated wastewater service area. Information on these projects is provided in Chapter 3. The next CSI Program update is due in 2013.

RWSP conveyance policies provide guidance on acquisition of an interceptor or trunk sewer constructed by a local agency. In October 2009, the City of Renton requested that King County consider assuming ownership of a portion of the City's Central Plateau Interceptor. WTD's review of this request is under way.

The RWSP also calls for improvements to reduce existing and future levels of infiltration and inflow (I/I) into local collection systems. I/I is clean stormwater and groundwater that enter the sewer system through cracked pipes, leaky manholes, or improperly connected storm drains, down spouts, and sump pumps. Most inflow comes from stormwater and most infiltration comes from groundwater. I/I affects the size of King County conveyance and treatment systems and, ultimately, the rates that businesses and residents pay to operate and maintain them.

WTD continues to implement initial I/I reduction projects to test the effectiveness of I/I reduction on a larger scale than the pilot projects that were completed in 2004.[2,3] A primary goal of the initial projects is to determine whether and under what conditions it is possible to cost-effectively remove enough I/I from the collection system to delay, reduce, or eliminate a planned regional conveyance system improvement project. Information on the initial I/I reduction projects is provided in Chapter 3.

More information on the CSI program can be found at http://www.kingcounty.gov/environment/wastewater/CSI.aspx.

More information on the I/I reduction program can be found at http://www.kingcounty.gov/environment/wastewater/II.aspx.

2.2 Protecting Water Quality and Complying with Regulations

The RWSP offers guidance on providing treatment at the County's existing treatment facilities, controlling combined sewer overflows (CSOs), and complying with permits and regulations. Implementation of these efforts helps to protect our region's water quality. This section provides summaries of activities in 2009 associated with these efforts. A summary of the 2009 results of the County's water quality monitoring program is included as Appendix A.

[2] The purpose of the pilot projects was to evaluate the effectiveness of various rehabilitation techniques. Details on the pilot projects are available at http://www.kingcounty.gov/environment/wastewater/II/Resources/Reports/PilotProject.aspx.

[3] The initial I/I reduction projects are being implemented as part of the Executive's Recommended Regional Infiltration and Inflow Control Program, which is available at http://www.kingcounty.gov/environment/wastewater/II/Resources/Reports/ExecutiveRecommendation.aspx.

2.2.1 Implementing the Combined Sewer Overflow Control Program

During heavy rainstorms when combined sewers in Seattle are full, untreated wastewater and stormwater may discharge into Puget Sound, the Duwamish Waterway, Elliott Bay, Lake Union, the Lake Washington Ship Canal, or Lake Washington.[4] These CSOs help protect treatment plants and prevent sewer backups into buildings and onto streets. Although the wastewater in CSOs is greatly diluted, CSOs can carry chemicals and disease-causing pathogens that may be harmful to public health and aquatic life.

The RWSP calls for continued improvements to CSO control. CSO control policies stipulate that highest priority be given to controlling CSOs that have the greatest potential to impact human health, bathing beaches, and/or species listed under the federal Endangered Species Act. Approximately half of the County's 38 CSO locations are controlled to meet the state standard of no more than an average of one untreated discharge per year at each CSO location.

The RWSP identifies 21 capital projects to control King County's remaining uncontrolled CSOs by 2030. Predesign was under way in 2009 for four of these projects, collectively called the Puget Sound Beach projects. Progress reports on these projects are provided in Chapter 3.

RWSP CSO control policies also direct the County to implement its long-range sediment management strategy and, where applicable, to participate with partners in sharing responsibilities and costs of cleaning up sites such as the Superfund sites in the Duwamish Waterway.

CSO Control Program Review

The RWSP calls for conducting a CSO control program review prior to submitting a CSO control plan update to the Washington State Department of Ecology (Ecology); the update is required with each National Pollutant Discharge Elimination System (NPDES) permit renewal application (about every five years) for the West Point plant. In 2009, WTD continued to plan for the next program review, scheduled for transmission to the King County Council in 2012.

The CSO control program review will evaluate the prioritization of RWSP CSO control projects, develop project alternatives, and consider adjustments to the schedule for completing the projects.

More information on King County's CSO Control Program can be found at http://www.kingcounty.gov/environment/wastewater/CSO.aspx.

[4] Combined sewers exist in older cities across the nation, including Seattle.

Sediment Management

To meet RWSP policies, WTD is carrying out a sediment management plan to remediate contaminated sediment near CSO outfalls.[5] Most of the contamination dates from the first half of the twentieth century. The plan calls for cleanup of the Denny Way, Hanford, Lander, and Chelan CSOs.[6] After dredging and capping the area near the old Denny Way CSO off of Myrtle Edwards Park, the County began a 10-year program in 2008 to monitor sediment quality at the site. After five years of monitoring, the County will evaluate alternatives for cleaning up nearby areas. A model to better predict deposition of contaminants around CSO outfalls, also part of the sediment management plan, was completed in 2009 and is being reviewed by Ecology. The model will help identify which CSOs are likely to have contaminated sediments and will inform cleanup decisions.

Since completion of the plan, King County has been coordinating its sediment management efforts in the Duwamish Waterway with two federal Superfund projects—the Harbor Island and the Lower Duwamish Waterway projects. The County is responsible for remediating CSO-related sediment contamination under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the state Model Toxics Control Act (MTCA).[7] Information on sediment management program activities in 2009 is provided in the Sediment Management Plan and Lower Duwamish Waterway Superfund project reports in Chapter 3.

In 2009, WTD submitted a comprehensive sediment quality summary report to Ecology to fulfill a requirement of the NPDES permit renewal for the West Point plant.[8] The report presented a history of the County's CSO locations and available sediment monitoring data for the locations.

2.2.2 NPDES Compliance and Permit Renewals

Wastewater Flows and NPDES Permit Compliance

On average, the County's four secondary treatment plants processed more than 168 million gallons of wastewater each day in 2009. All four plants operated without a single violation of their NPDES permit limits, although there were some violations of the CSO treatment plant limits in the West Point permit. Both the South plant and West Point plant earned the National Association of Clean Water Agencies Gold Peak Performance Award for achieving 100 percent compliance with their NPDES permits for an entire calendar year and the Platinum Peak Performance Award for multiple years of consecutive gold performance.

[5] The sediment management plan is available at http://www.kingcounty.gov/environment/wastewater/SedimentManagement/ManagementPlan.aspx.
[6] The Hanford, Lander ,and Chelan CSOs are discussed under "Harbor Island Superfund Site."
[7] CERCLA is commonly known as Superfund.
[8] The Comprehensive Sediment Quality Summary Report for CSO Discharge Locations is available at http://www.kingcounty.gov/environment/wastewater/CSO/Library/SedQualSum.aspx.

Sanitary Sewer Overflows and Permit Deviations

Sanitary sewer overflows (SSOs) are discharges of wastewater from separated sewer systems and from combined systems when no rain is occurring. They can flow to city streets, water bodies, and basements. Permit deviations are occurrences that are not allowed by the NPDES permit but that do not result in a violation of permit limits or overflows of untreated wastewater.

Twelve SSOs and seven permit deviations occurred in 2009. Nine of the SSOs occurred in the conveyance system at pipes and pump stations, and three occurred at treatment plants. Most were caused by equipment failure; operator error contributed to one of the SSOs. Five of the seven permit deviations occurred at West Point and resulted in blending of primary and secondary treated effluent. The other two, at Beulah Park Cove on Vashon Island, were releases of treated wastewater without disinfection. Appendix B provides details on the SSOs and permit deviations in 2009.

While there may be some short-term risk to public health and the environment from SSOs and permit deviations, the volumes of releases do not produce long-term effects. For all SSOs, WTD implements overflow response procedures, including posting the area, cleaning up the area as appropriate, and monitoring water quality in the vicinity of the overflow to determine when pollutant concentrations have returned to levels consistent with state Water Quality Standards.

CSO Events

King County's CSOs are regulated through West Point's NPDES permit. WTD submits a report to Ecology each year on annual CSO volumes and frequencies and on progress made to control its CSOs. Before 2009, volumes and frequencies were reported for the period of June 1 of one year through May 31 of the next year in order to capture data for an entire wet season. The most recent renewal of the West Point NPDES permit on July 1, 2009, requires reporting on duration and rainfall for each CSO event that occurred in the calendar year.

In 2009, there were 236 untreated CSO events with a total discharge volume of 690 million gallons (MG), representing a 70 percent reduction from the 1981–1983 baseline of 2,339 MG. Treated CSO flows were discharged a total of 51 times from King County's five CSO treatment facilities; total discharge volume was 500 MG.

More information on CSO events in 2009 is provided in the CSO Control Program 2009 Annual Report, which is available at http://www.kingcounty.gov/environment/wastewater/CSO/Library/AnnualReports.aspx.

NPDES Permit Renewals

NPDES permits outline the conditions under which a municipality can discharge treated wastewater. King County has four NPDES permits for discharging treated wastewater from its regional wastewater system. NPDES permits are renewed about every five years, and in 2009, these permits were renewed for both the South and West Point Treatment Plants.

New provisions in the permits for both South and West Point plants include the following:

- Additional study of pollutants from selected industrial areas
- Increased receiving water monitoring

Other new provisions for the West Point Treatment Plant are as follows:

- Disinfection system improvements at the plant
- Sediment monitoring at the plant outfall and potential toxicity identification
- Increased scrutiny of CSOs, including more stringent fecal coliform limitations for CSO treatment plants, increased monitoring at the plants and CSO facilities, more frequent CSO data reporting, and gathering and synthesis of sediment data at CSO sites

Details on King County's wastewater discharge permits are available at http://www.kingcounty.gov/environment/wtd/About/System/NPDES.aspx.

2.2.3 Pollution Source Control Programs

Two source control programs in King County—the King County Industrial Waste Program (KCIW) and the Local Hazardous Waste Management Program (LHWMP)—work to control pollutants at their source, thereby keeping them out of the wastewater system and, in turn, out of surface waters and the environment. KCIW is operated by WTD. LHWMP is a regional partnership under a state-mandated program that complements WTD's efforts to protect water quality.

King County Industrial Waste Program

KCIW regulates industrial wastewater discharged into the King County wastewater system. The program serves to protect surface water and biosolids quality, the environment, public health, and the wastewater system and its workers. It ensures that industries treat wastewater for harmful substances before discharging the wastewater to sewers. To do this, the program issues three main kinds of discharge approvals: letters of authorization, discharge authorizations, and permits.

During 2009, 130 permits and 304 industrial waste discharge approvals were in effect and 438 inspections were conducted. Notices of Violation were issued to 33 companies for 94 violations (with several companies having multiple violations in more than one category). None of the violations in 2009 caused NPDES permit exceptions at King County treatment plants.

Other KCIW activities in 2009 include the following:

- Continued to work on revising the King County Code and Public Rules following EPA's amendment to its Pretreatment Streamlining Rule
- Participated in preparations for responding to potential flooding from flows released from the Howard Hanson Reservoir because of compromised integrity of the dam

- Continued source control efforts, including business inspections and sampling, to supplement available chemistry data on the Hanford and Lander CSOs in support of the Lower Duwamish Waterway sediment remediation project

More information on KCIW can be found at http://www.kingcounty.gov/environment/wastewater/IndustrialWaste.aspx.

Local Hazardous Waste Management Program

LHWMP brings together resources from four local government agencies and 37 suburban cities to protect and enhance public health and environmental quality by helping citizens, businesses, and governments reduce the threat posed by the production, use, storage, and disposal of hazardous materials. The program is a regional partnership comprising King County Water and Land Resources and Solid Waste Divisions, Seattle Public Utilities, Public Health–Seattle & King County, and the Suburban Cities Association. Controlling pollutants and wastes at their source helps keep them out of the wastewater system, and in turn, out of surface waters and the environment. In 2009, WTD paid about $2.4 million into the Local Hazardous Waste Fund to support LHWMP. The fees are based on the volume of wastewater treated at King County's treatment plants.

LHWMP achievements in 2009 include the following:

- The program collected 1,348 tons of household hazardous waste from more than 44,883 customers.
- A pilot program targeted at businesses resulted in the collection of over 25 tons of waste from 560 businesses.
- By the end of 2009, the pharmaceutical take-back demonstration project had collected more than 27,000 pounds of unused medicines.

More information on LHWMP can be found at http://www.lhwmp.org/home/.

2.3 Resource Recovery Programs

The RWSP encourages the County to beneficially use the byproducts from wastewater treatment—biosolids and digester gas from the solids treatment process and reclaimed water from the liquids process.

2.3.1 Biosolids Recycling Program

Biosolids are the nutrient-rich organic material produced by treating wastewater solids. After being processed and treated, biosolids can be beneficially reused as a fertilizer and soil amendment. RWSP biosolids policies encourage King County to continue to produce and market Class B biosolids and to evaluate alternative technologies to produce the highest quality

marketable biosolids, including Class A biosolids.[9,10] Information on WTD's biosolids program is available at http://www.kingcounty.gov/environment/wastewater/Biosolids.

Production and Use of Biosolids in 2009

In 2009, WTD continued to produce high-quality Class B biosolids at the South and West Point plants. Approximately 116,000 wet tons of biosolids were produced during the year, all of which was beneficially recycled and used as a fertilizer and soil amendment for forestry and agricultural applications and to make compost. The sale of biosolids generated more than $160,000 in fertilizer revenue from customers.

The biosolids were used for a variety of applications:

- 5,275 acres of dryland wheat in Douglas County as part of the Boulder Park Soil Improvement Project
- 1,300 acres of hops, orchards, and wheat at Natural Selection Farms located in the Yakima Valley
- 331 acres of state forestlands and 949 acres of Douglas-fir plantations in Hancock's Snoqualmie Forest as part of the Mountains to Sound Greenway Biosolids Forestry Program

In addition, about 1 percent of King County's biosolids was used to produce GroCo compost, a mixture of biosolids and sawdust. For more than 35 years, GroCo, Inc. has been producing and marketing this compost for use in residential and commercial landscaping, home gardens, and soil restoration.

Other Accomplishments in 2009

WTD continues to work with its major agricultural and forestry customers and to participate in biosolids research studies through its membership in the Northwest Biosolids Management Association (NBMA). Accomplishments in 2009 include the following:

- A research study funded by NBMA and Ecology was completed by the University of Washington (UW) and Washington State University (WSU). The scientists quantified the carbon sequestration benefits of using biosolids and other composts in soil. The results show a significant increase in carbon stored in agricultural soils, indicating that biosolids as a soil amendment have the potential to reduce the carbon footprint while helping secure the sustainability of agriculture in the state.

[9] Class B biosolids refer to biosolids that have been treated to significantly reduce pathogens to levels that are safe for beneficial use in land application.

[10] Class A biosolids refer to biosolids that have been treated to reduce pathogens to below detectable levels. Biosolids that meet this designation can be used without site access or crop harvest restrictions and are exempt from site-specific permits. Federal regulations require Class A level of quality for biosolids that are sold or given away in a bag or other container or that are applied to lawns or home gardens.

- WTD is carrying out a project to design and construct the necessary modifications to the West Point plant's influent screening facilities to meet an amendment to the state's biosolids management rule (WAC 173-308-205), which requires "significant removal" of manufactured inerts from biosolids.[11] WTD issued a notice to proceed for alternatives analysis in July 2009. Construction is expected to occur in 2013 and 2014.
- A report was completed to fulfill a proviso in the 2009 King County budget requiring analysis of the status of the work program for the Biosolids Recycling Program and of alternative uses of biosolids. The analysis found that (1) a diverse land application program in this state costs less than a biosolids-to-fuel program, (2) greenhouse gas emissions from trucking to Eastern Washington are very small and the carbon storage benefits in agricultural soils are large, and (3) WTD is currently capturing a range of benefits from biosolids: energy from digesters, improved soils and crops, and significant carbon storage.
- A team of UW researchers, stakeholders, and various King County divisions are collaborating on a four-year carbon sequestration demonstration project in a borrow pit at Island Center Forest on Vashon Island. Researchers will evaluate the ability of composted organic residuals (biosolids, food waste, and woody debris) to recover soil quality by capturing and storing carbon, improving soil health, and enhancing vegetation growth on this degraded site.
- A biosolids research and demonstration garden was installed at South plant. UW scientists studied the safety of vegetables grown in a sandy loam soil mix and a biosolids compost soil mix. The vegetables grown in the biosolids compost mix were deemed safe and the growth was considered lush.

2.3.2 Energy Recovery and Efficiency Program

RWSP policies call for the County to use digester gas, an energy-rich methane gas naturally produced as a byproduct of solids treatment, for energy and other purposes where cost-effective. The South and West Point plants continue to use digester gas to generate heat, electricity, and natural gas. In addition, energy teams at these plants meet regularly to discuss ways to reduce energy usage. Energy audits are in progress or planned for WTD facilities that are high energy users (South and West Point plants and various pump stations). The goal of the audits is to identify opportunities to increase energy efficiencies at these facilities. The division is seeking funding to conduct the audits and complete projects focused on energy efficiency and energy recovery.

The following sections discuss energy recovery and efficiency efforts at the South and West Point plants in 2009 and plans for energy recovery and a research facility at the Brightwater plant. More information on WTD's energy recovery efforts is available at http://www.kingcounty.gov/environment/wastewater/EnergyRecovery.aspx.

[11] Manufactured inerts are wastes such as plastic, metals, ceramics, and other manufactured items that remain relatively unchanged during wastewater or solids treatment processes.

South Treatment Plant

At South plant, digester gas is used to fuel a boiler that provides heat for plant processes and buildings. The remainder of the gas is "scrubbed" to produce natural gas. During periods of high energy use, a cogeneration system consisting of two gas turbines and one steam turbine may be used to generate supplemental heat and electricity and reduce peak load utility charges for the plant. The gas turbines run on scrubbed digester gas; the steam turbine runs on heat recovered from the gas turbines. When the cogeneration system is not running, the scrubbed gas is sold to the local natural gas utility.

Energy recovery and efficiency efforts at the plant, either completed or under way in 2009, were as follows:

- Sold 1.93 million therms of natural gas to Puget Sound Energy, which is enough to serve more than 2,300 typical Seattle homes, and produced 0.387 million kilowatt hours of electricity, which is enough to power 42 homes.
- Evaluating the best use of digester gas at the plant, including whether to run the gas turbines more frequently.
- Reviewing the findings of a consultant's energy audit of the plant and evaluating opportunities for energy efficiency for equipment added since the audit.
- With the help of incentive funding from Puget Sound Energy, replaced two preaeration blowers with more efficient models.

West Point Treatment Plant

At the West Point plant, digester gas is used to fuel (1) internal combustion engines that provide power to run the raw sewage pumps and (2) boilers that provide heat for plant processes and buildings. About 28 percent of the digester gas produced at West Point is used for these purposes.

Work continued on the Waste-to-Energy project, which will install a new cogeneration facility that uses digester gas to generate electricity. The project's two internal combustion engines have the ability to produce up to 4.6 megawatts of electricity. The amount of digester gas used at the plant will increase significantly once the engines start producing power in 2012. Project accomplishments in 2009 include the following:

- Completed final design, issued a request for proposals, and received EPA grant funding to help cover a portion of construction costs.
- Executed a memorandum of agreement (MOA) to comply with the National Historic Preservation Act. The MOA describes how impacts to archaeological resources will be avoided and how any archaeological resources disturbed by the project will be handled. Signatories include King County, three Indian tribes, EPA, and the Washington State Department of Archaeology and Historic Preservation.

- Signed a renewable power purchase agreement with Seattle City Light that includes the amount of electricity that WTD will have available for sale to City Light, rate structure, and applicable renewable energy credits associated with project implementation.

Also in 2009, WTD accomplished the following at West Point:

- Obtained incentive funding from Seattle City Light and from an Energy Efficiency and Conservation Block Grant (EECBG) to defer part of the capital investment costs for replacing preaeration blowers with more efficient blowers. The block grant was awarded to all of King County, and WTD applied to the County for use of a portion of the funds.
- Obtained funding from the same EECBG to conduct an energy audit and evaluate an energy performance contract at the plant. A request for supplemental information will be issued, a contractor will be secured, and the audit will be conducted in 2010.

Brightwater Treatment Plant

Some of the digester gas produced at the Brightwater plant will be used to fuel a boiler that generates heat for the digestion process and buildings. In addition, final design of an Energy Technology Demonstration Facility (ETDF) was completed in 2009. The goal of the ETDF is to provide a versatile platform for researchers and manufacturers in the Pacific Northwest to beta test a wide variety of nearly or commercially ready equipment for producing alternative forms of energy from digester gas produced at Brightwater. Friends of the Hidden River, a community group of local teachers, continues to work with King County to develop broad support and secure funding for the ETDF.

2.3.3 Reclaimed Water Program

The RWSP encourages the County to explore ways to increase the use of reclaimed water at the County's existing and future wastewater treatment facilities.

Reclaimed Water from Existing and Future Treatment Plants

South Treatment Plant

South plant produced approximately 111 million gallons of Class A reclaimed water in 2009.[12] The majority of the water was used at the plant for process water and irrigation, typically saving an estimated $80,000–$110,000 per year in potable water costs.[13] Approximately 3 million gallons was sold to the City of Tukwila for irrigation of the Starfire Sports Complex (formerly Fort Dent Park) and for city public works uses such as street sweeping and sewer flushing.

[12] Class A reclaimed water is the highest quality water and is allowed for all permitted uses of reclaimed water, which include nonpotable uses such as irrigation, groundwater recharge, wetland enhancement, streamflow augmentation, and street cleaning.
[13] Net cost savings are avoided costs less reclaimed water system operating costs.

West Point Treatment Plant

In 2009, the West Point plant produced approximately 201 million gallons of Class A quality reclaimed water. All of the reclaimed water produced at West Point is used at the plant site for process water and irrigation in place of potable water, typically saving an estimated $440,000–$575,000 in potable water costs per year.[14]

Carnation Treatment Plant

In March 2009, the Carnation plant started discharging its Class A reclaimed water to enhance a wetland in the Chinook Bend Natural Area.

Brightwater Treatment Plant

The South Segment of the Brightwater reclaimed water system will be capable of transporting up to 7 million gallons per day of reclaimed water to the Sammamish Valley after the Brightwater plant and outfall tunnel are complete (Chapter 3).

Reclaimed Water Comprehensive Plan

Efforts continued in 2009 to determine if, how, when, where, and by what funding mechanisms over the next 30 years the County's existing reclaimed water system should expand. As part of this process more than 800 potential locations for nonpotable consumptive use of reclaimed water were identified. In addition, 15 watershed basins in the planning area were identified to have streams that could likely benefit from additional water inputs. Environmental flow restoration targets were estimated for 12 of these basins. The potential for using reclaimed water to aid in the management of Lake Washington water levels and to support groundwater recharge in the City of Auburn was also identified.

On December 14, 2009, the King County Council approved the reclaimed water comprehensive planning process through Motion 13108. The planning process is designed to be an open, transparent, and dynamic process that involves check-in and approval points to assess next steps based on results of previous steps.

More information on the Reclaimed Water Comprehensive Plan can be found at http://www.kingcounty.gov/environment/wastewater/ReclaimedWater/CompPlan.aspx.

Information on WTD's Reclaimed Water Program is available at http://www.kingcounty.gov/environment/wastewater/ReclaimedWater.aspx.

2.4 Odor Prevention and Control Program

RWSP policies guide King County in achieving its goal of preventing and controlling nuisance odor occurrences at all wastewater treatment plants and associated conveyance facilities. To

[14] The West Point plant has a larger cost saving in potable water costs than South plant because West Point uses more than twice the water and pays a higher rate for the potable water.

achieve this goal, the policies provide direction on implementing an odor prevention program that goes beyond traditional odor control. RWSP reporting policies call for including in the annual reports a status of the odor prevention program and a summary of odor complaints. The program status is discussed below; the summary of odor complaints received in 2009 is in Appendix C.

More information on WTD's odor control program is available at http://www.kingcounty.gov/environment/wtd/Response/OdorControl/GoodNeighbor.aspx.

Phased Retrofit of West Point and South Treatment Plants

At the West Point plant, efforts continued in 2009 to adjust operation and maintenance (O&M) activities and to monitor the efficacy of these adjustments and of plant improvements made in 2007 (covering the division channel and modifying the odor scrubber system). Activities in 2009 include the following:

- Placed hydrogen sulfide monitors around the perimeter of the plant. A few random spikes were recorded but could not be associated with the plant by wind direction or plant activity. Except for the spikes, no hydrogen sulfide was recorded.
- Cleaned process tanks more quickly as they were taken out of service.
- Took influent hydrogen sulfide readings to monitor the effectiveness of prechlorination and to make adjustments as needed.
- Modified the secondary sedimentation tank filling schedule to minimize odor impacts.

At South plant, new odor scrubbers to control emissions from the aeration basins (first pass of each) were in operation for all of 2009. Efforts during the year focused on O&M activities to help improve odor control at the plant:

- Doubled the amount of sodium hypochlorite used for prechlorinating the influent to improve control of hydrogen sulfide emissions.
- Implemented an air pollution environmental management system, which includes increased monitoring and maintenance of odor control systems.
- Scheduled tank cleaning tasks so that enough personnel are available to perform the cleaning quickly and thus reduce odor emissions.

Future improvements are planned for South plant to help meet the odor reduction targets. These improvements include covering and treating foul air from the mixed liquor channel, the remaining three passes of each aeration basin, and the primary sedimentation tanks. The project to implement these improvements is anticipated to begin in 2012. WTD continues to work closely with the City of Renton on operational methods to reduce odor emissions.

Conveyance System Upgrades

RWSP policy calls for retrofitting conveyance facilities that pose nuisance odor problems with odor prevention systems as soon as such odors occur, subject to technical and financial feasibility.

Three odor control projects were completed in 2009: (1) installation of a replacement odor scrubber at the Lake City Regulator Station, (2) installation of a carbon bed odor scrubber at the King Street Regulator Station, and (3) installation of a chemical injection system in the Eastside Interceptor. A fourth project, installation of a replacement scrubber at the Sweyolocken Force Main Discharge Structure, was under way in 2009 and will be completed early in 2010.

Chapter 3

RWSP Capital Projects Reports

RWSP reporting policies call for annual reports to provide details on RWSP capital projects, including a project schedule, an expenditures summary (including staff labor and miscellaneous services), a description of adjustments to costs and schedules, and a status of the project contracts. This chapter provides a project report with this information for the following RWSP capital projects that were in design or construction during 2009:

- Brightwater Treatment Plant, project 423484[1]
- Brightwater Conveyance, project 423575
- Brightwater Reclaimed Water Pipeline, project 423600
- King Street Regulator Odor Control, project 423580
- Bellevue Pump Station, project 423521
- Black Diamond Storage Facility, project 423615
- SW Interceptor (Kent/Auburn Conveyance System Improvements), project 423582
- North Creek Pipeline, project 423596
- Bellevue Influent Trunk Improvements, project 423626
- Sunset/Heathfield Pump Station Replacement and Force Main Upgrade, project 423627
- Decennial Flow Monitoring, project 423373, subproject 368
- RWSP Local Systems I/I Implementation (I/I Initial Projects), project 423618
- West Point Digestion Improvements, project 423593
- Magnolia Combined Sewer Overflow (CSO) Control and Improvements, project 423607
- Murray CSO Control and Improvements, project 423608
- North Beach CSO Control and Improvements, project 423609
- Barton CSO Control and Improvements, project 423610
- Sediment Management Program, project 423368
- Lower Duwamish Waterway Superfund, project 423589

[1]Each wastewater capital project is assigned a six-digit number. The first two numbers (42) identify the project as a wastewater project (as opposed to a transit or roads project), the third number (3) identifies the project as a capital project (as opposed to operating), and the last three numbers are sequential numbers reflecting the order the projects were assigned.

Each report is generated from the Wastewater Treatment Division (WTD) Project Management and Financial Forecast Database and includes the project milestone schedule, cost summary, contract status, annual cash flow, and lifetime cash flow. The project description appears on the first page of each report. The sections below provide an explanation and example of the other elements.

3.1 Milestone Schedule

The project's milestone schedule (Figure 3-1) is on the second page of the project report. It is presented in a bar graph format and includes timelines for the various phases of a project: development, predesign, final design, implementation, closeout, and land acquisition.

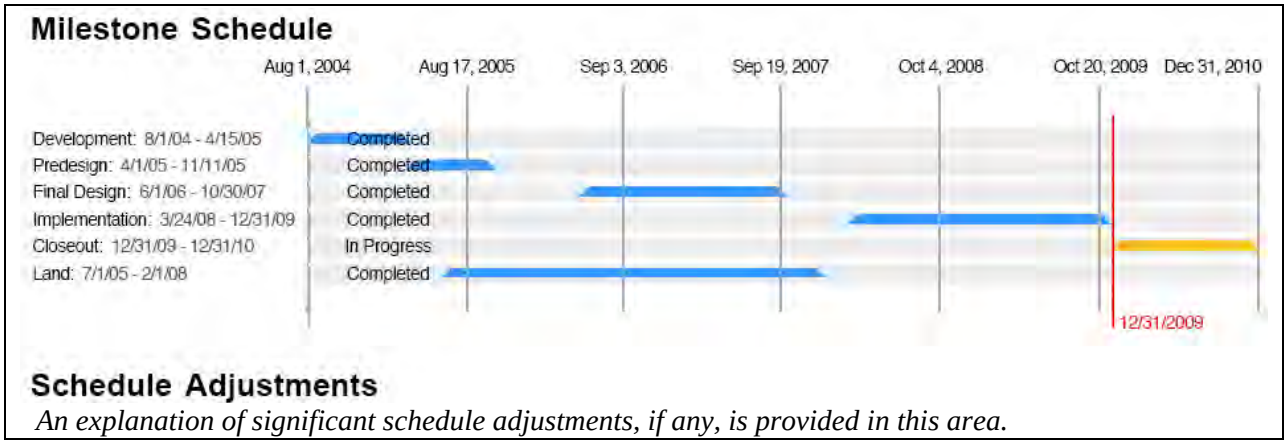


Figure 3-1. Example Milestone Schedule

3.2 Cost Summary

The cost summary table (Figure 3-2) is on the second page of the project report. It shows expenditure information for 2009 and lifetime budget information based on the King County 2009 adopted budget.

The following sections explain the categories shown on the cost summary table.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	3,596,758	3,059,464	6,257,980	19,451,084	25,336,667	24,897,012
Construction Contracts	3,593,560	3,022,899	6,257,980	19,447,886	25,264,602	24,897,012
Outside Agency Construction		36,565	0	0	72,065	0
Other Capital Charges	3,198	0	0	3,198	0	0
NON-CONSTRUCTION	1,393,945	743,897	742,020	8,735,162	8,374,739	8,797,232
Engineering	577,543	197,586	250,000	5,101,751	5,223,810	5,084,208
Planning & Management Svcs.	130,697	175,000	110,000	482,262	385,964	511,566
Permitting & Other Agency Support	22,364	31,999	33,333	166,065	196,838	194,201
Right-of-Way	0	0	0	58,281	58,281	58,281
Misc. Services & Materials	16,826	20,600	15,632	260,760	171,262	259,945
Staff Labor	646,515	318,712	333,055	2,666,043	2,336,583	2,689,032
PROJECT RESERVE		0	0	0	752,889	677,915
Project Reserve		0	0	0	752,889	677,915
Total (incl Credits & Revenues)	4,990,704	3,803,361	7,000,000	28,186,247	34,464,295	34,372,160
Total Credits & Revenues						
Total (w/out Credits & Revenues)	4,990,704	3,803,361	7,000,000	28,186,247	34,464,295	34,372,158

Cost/Budget Adjustments

An explanation of significant cost/budget adjustments, if any, is provided in this area.

Figure 3-2. Example Cost Summary Table

3.2.1 Expenses

The "Expenses" portion of the cost summary table includes four main categories:

- **Construction.** These are costs associated with construction.
- **Non-Construction.** These are costs associated with outside engineering services, permitting and other agency support (costs for permits), planning and management services, right-of-way (costs associated with acquisition and easements), and WTD and other county labor costs.
- **Project Reserve.** These are costs associated with project contingency.

- **Credits and Revenues.** Credits and revenues reflect any grants received, rents received, or salvage/surplus revenues.

3.2.2 2009 Actual Expenditure and Plan

The "2009 Actual Expenditure and Plan" portion of the cost summary table (Figure 3-2) includes three categories:

- **IBIS YTD (Year-to-Date) Dec-09.** This column reflects the actual expenditures from January through December 2009.[2]
- **Adopted Plan.** The costs in this column reflect the approved appropriation and breakdown by expense category for 2009.
- **Updated Plan.** The costs in this column reflect what was anticipated to be expended of the 2009 King County Council–approved project budget in preparation for WTD's 2010–2015 capital improvement plan (CIP) budget submittal. Capital project managers begin developing their project budget submittals nine months before a budget is adopted and appropriated. Changes may occur from the time a budget is developed as compared to the current budget year. Such changes may result from new information that could affect the project's scope or schedule, construction delays, or permitting and environmental review complexities.

3.2.3 Lifetime Actual Expenditure and Budget

The "Lifetime Actual Expenditure and Budget" portion of the cost summary table (Figure 3-2) includes three categories:

- **IBIS LTD (Life-to-Date) Dec-09**. The costs in this column refer to total project expenditures through December 2009.
- **Lifetime Budget**. The costs in this column refer to projected total inflated project costs in WTD's 2009–2014 CIP budget, which was approved by the King County Council in November 2008 as part of the 2009 King County budget.
- **Updated Budget**. The costs in this column reflect the projected total inflated project costs in WTD's 2010–2015 CIP budget, which was approved by the King County Council in November 2009 as part of the 2010 King County budget. As noted earlier in the chapter, project managers begin developing their project budget submittals around nine months before a budget is adopted and appropriated. The updated budget takes into account changes to the project scope or schedule and any new information identified since the current year's budget was adopted.

[2] IBIS refers to King County's financial reporting system.

3.3 Contract Status

Information on the project's contract status, if there are contracts associated with the project, is shown on the contract status table (Figure 3-3) on the third page of the project report.

Contract Status

Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Bellevue Pump Station Upgrade- Pump Station C00334C08	$8,605,000	$0	$8,605,000	$428,671	5%	6	$9,033,671	$3,780,953	13	42%
Engineering Services for the Bellevue Pump Station E23015E	$775,015	$5,066,666	$5,841,681	$0	0%	8	$5,841,681	$4,722,637	80	81%
Construction management service for Bellevue Pump P00016P06	$298,445	$218,736	$517,182	$0	0%	2	$517,182	$293,323	14	57%

Figure 3-3. Example Contract Status Table

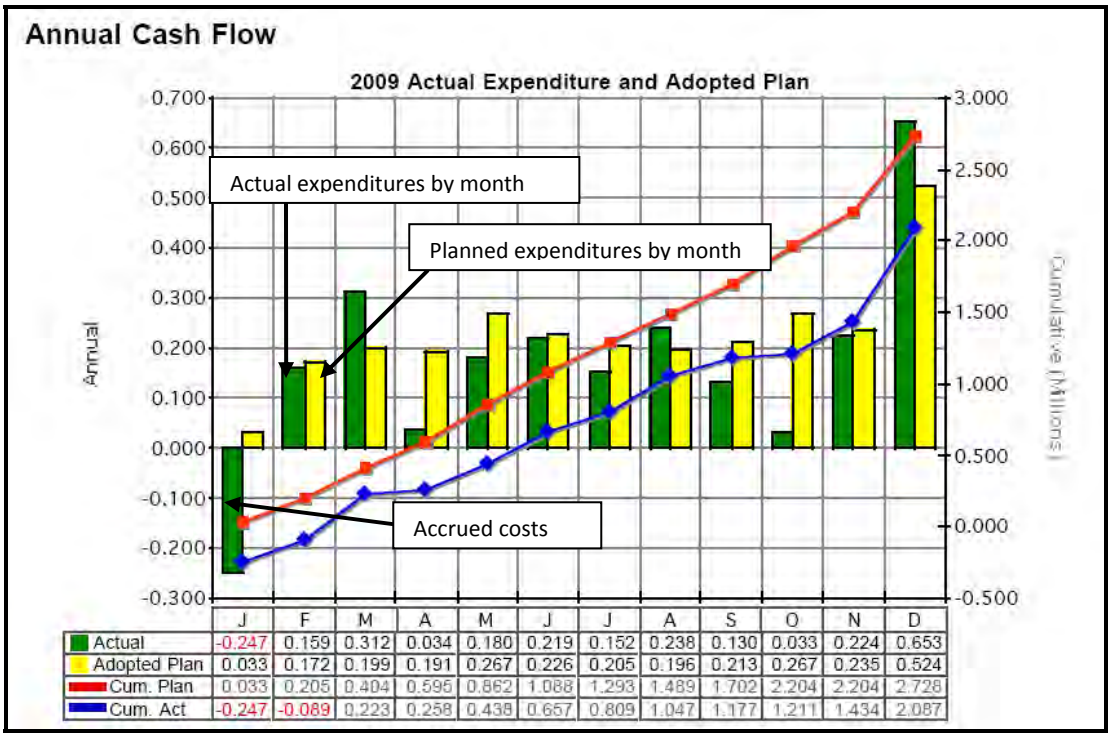
The contract status table includes the name of the contract, the original contract amount, amounts associated with amendments or change orders, and percentage paid of contract.

The "Phased Amends" column refers to additional planned phases of the contract; the value of those planned phase amendments are included in the "Base Contract Amount" column. If work associated with the contract was not planned when the original contract was signed, the costs associated with that work are shown in the "Change Amends or COs" column.[3]

3.4 Annual Cash Flow

A chart depicting annual cash flow (Figure 3-4) for each project is shown on the third page of the project report. The chart provides information on monthly and cumulative expenses in 2009 as compared to planned expenditures.

[3] "COs" refers to change orders.



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.247	0.159	0.312	0.034	0.180	0.219	0.152	0.238	0.130	0.033	0.224	0.653
Adopted Plan	0.033	0.172	0.199	0.191	0.267	0.226	0.205	0.196	0.213	0.267	0.235	0.524
Cum. Plan	0.033	0.205	0.404	0.595	0.862	1.088	1.293	1.489	1.702	2.204	2.204	2.728
Cum. Act	-0.247	-0.089	0.223	0.258	0.438	0.657	0.809	1.047	1.177	1.211	1.434	2.087

Figure 3-4. Example Annual Cash Flow Chart

The two bars shown for every month in Figure 3-4 compare actual and planned expenditures. The only exception is for accrued costs. To comply with Generally Accepted Accounting Principles, King County requires that goods and services received at the end of the calendar year (usually in December) that have been fully completed and for which payment obligation has been incurred be accrued to the year those cost obligations were incurred. This practice results in a charge of the estimated accruals to the closing year and a corresponding negative offsetting charge in the January expenditures of the next year when payment is actually made. Unlike all other months where expenditures shown are based on actual payments made, the December/January transition shows expenses on an accrual basis. Because accrued costs are shown as expenses in the closed year and not shown as expenses in the new year, the reporting result for project cost-tracking is (1) relatively higher than planned expenditures shown in December and (2) relatively lower than planned expenditures shown in January.

3.5 Lifetime Cash Flow

A chart depicting the lifetime cash flow (Figure 3-5) for each project is shown on the fourth page of the project report. The chart provides information on annual and cumulative expenditures through 2009 and the expenditures forecast in the six-year (2009–2014) CIP budget. This information is generated from the King County 2009 adopted budget.

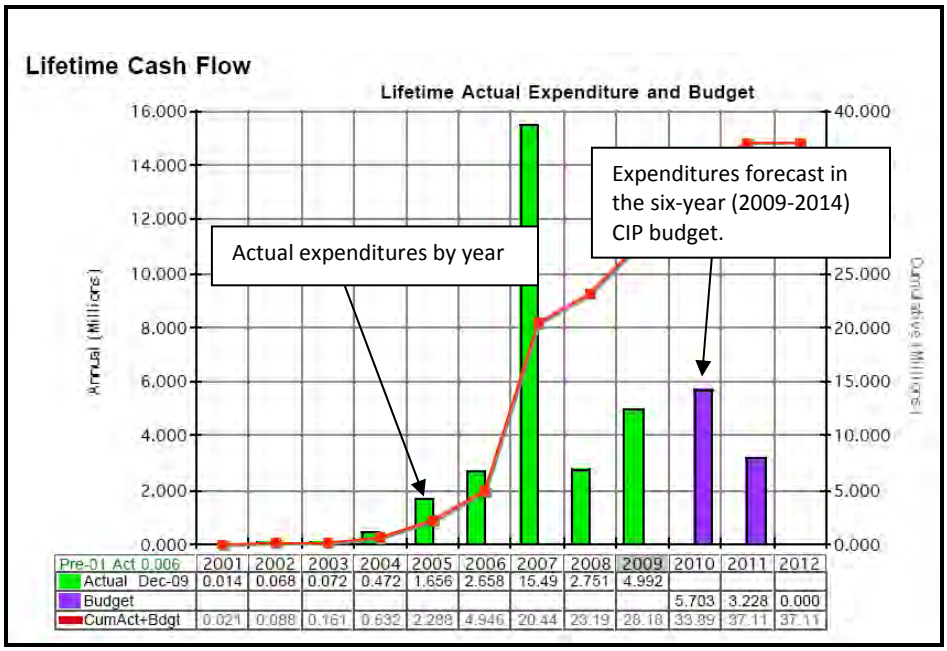


Figure 3-5. Example Lifetime Cash Flow Chart

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423484 Brightwater Treatment Plant

Project Phase: 4 Implementation

Project Description

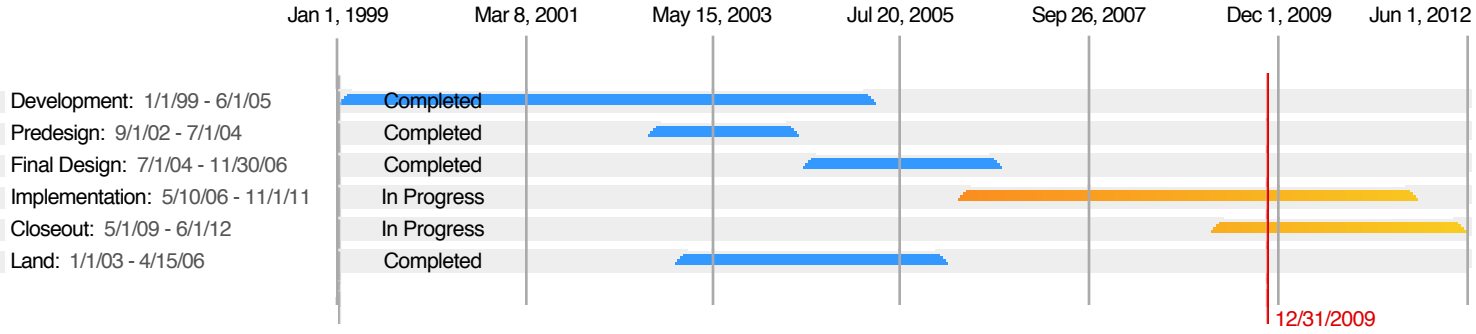
This project will design and construct a treatment plant to provide 36 million gallons per day (mgd) of treatment capacity by 2011. The Brightwater Treatment Plant will be located just east of State Route 9 and north of State Route 522 and Woodinville. Treatment and support facilities will cover approximately 43 acres (with additional area for stormwater treatment, open space, wildlife habitat and wetlands). The Brightwater plant will include a membrane bioreactor (MBR) secondary treatment system, Class B biosolids processing, Class A reclaimed water production, odor control systems, and disinfection. Wastewater treatment commissioning is anticipated to occur in August 2011.

Major accomplishments in 2009 include the following:

- Completed concrete work on the digester complex, solids and energy buildings, as well as the three odor control structures. A substantial portion of the piping and electrical lines were installed.
- Installed piping and electrical lines in the liquids facilities as well as connections between buildings. Water tested all primary tanks. Approximately half of the piping and electrical lines for the liquids facilities were installed.
- Completed construction of the electrical substation providing two independent power supplies to the plant.
- Received a majority of the membrane equipment including permeate pumps, blowers, piping, valves, and other associated equipment.
- Completed all concrete work for the grit, headworks, primary clarifiers, aeration basins, galleries, and MBR tanks, and backfilled all tanks.
- Refined startup plan and began operations/maintenance staff transfer and training.
- Began finished grading, installation of irrigation systems, and planting of the buffer landscape that will surround the treatment facilities.
- Broke ground for the Environmental Education Community Center (EECC). The American Institute of Architects awarded the EECC a Regional Green Building Design Award.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/North/Brightwater.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes in the schedule.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	187,453,979	156,235,405	226,844,409	378,729,276	550,931,422	549,963,441
Construction Contracts	174,553,155	139,650,997	209,555,356	351,097,250	503,688,902	501,230,452
Owner Furnished Equipment	9,824,802	10,393,819	11,775,251	11,696,984	28,545,396	28,894,064
Outside Agency Construction	1,196,700	4,036,200	3,359,414	5,876,119	6,794,734	8,038,833
Other Capital Charges	1,879,322	2,154,389	2,154,389	10,058,923	11,902,390	11,800,092
NON-CONSTRUCTION	14,243,735	14,333,658	16,654,030	309,551,735	325,617,693	329,870,838
Engineering	3,633,713	4,677,864	5,194,646	69,464,454	76,494,769	76,433,688
Planning & Management Svcs.	5,973,797	4,163,370	5,111,873	24,717,183	27,734,228	30,270,064
Permitting & Other Agency Support	1,054,199	1,707,000	2,373,056	5,491,948	9,932,120	7,467,321
Right-of-Way	120,449	836,084	596,744	180,928,405	179,662,490	181,859,718
Misc. Services & Materials	474,874	283,074	238,074	4,645,138	4,747,171	4,766,096
Staff Labor	2,986,704	2,666,267	3,139,637	24,304,607	27,046,915	29,073,950
PROJECT RESERVE		0	0	0	2,000,000	1,999,999
Project Reserve		0	0	0	2,000,000	1,999,999
CREDITS AND REVENUES	-7,050	0	-121,100	-3,108,187	-3,235,415	-3,222,237
Credits and Revenues	-7,050	0	-121,100	-3,108,187	-3,235,415	-3,222,237
Total (incl Credits & Revenues)	201,690,664	170,569,063	243,377,339	685,172,823	875,313,701	878,612,040
Total Credits & Revenues	-7,050	0	-121,100	-3,108,187	-3,235,415	-3,222,237
Total (w/out Credits & Revenues)	201,697,714	170,569,063	243,498,439	688,281,010	878,549,116	881,834,278

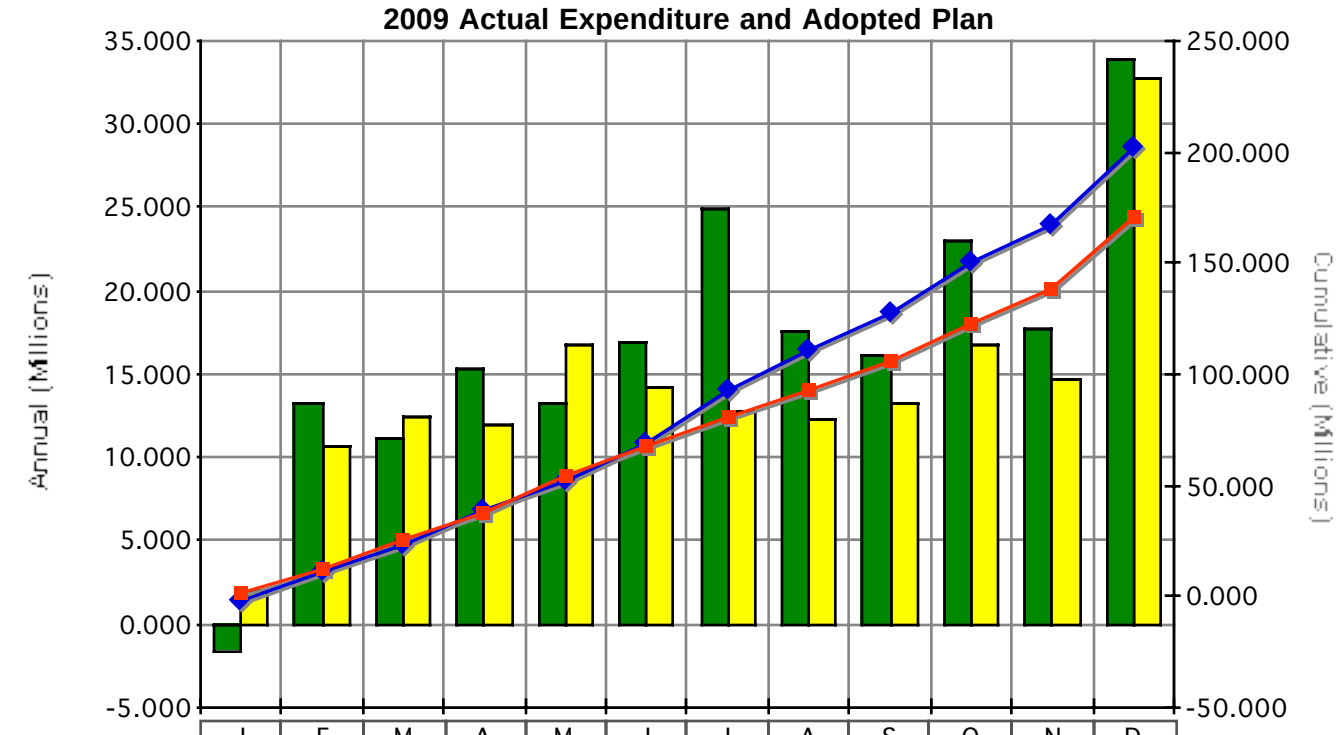
Cost/Budget Adjustments

A detailed explanation of Brightwater cost changes is contained in the annual Brightwater Cost Update Current Conditions and Trends, January 2010.

Contract Status

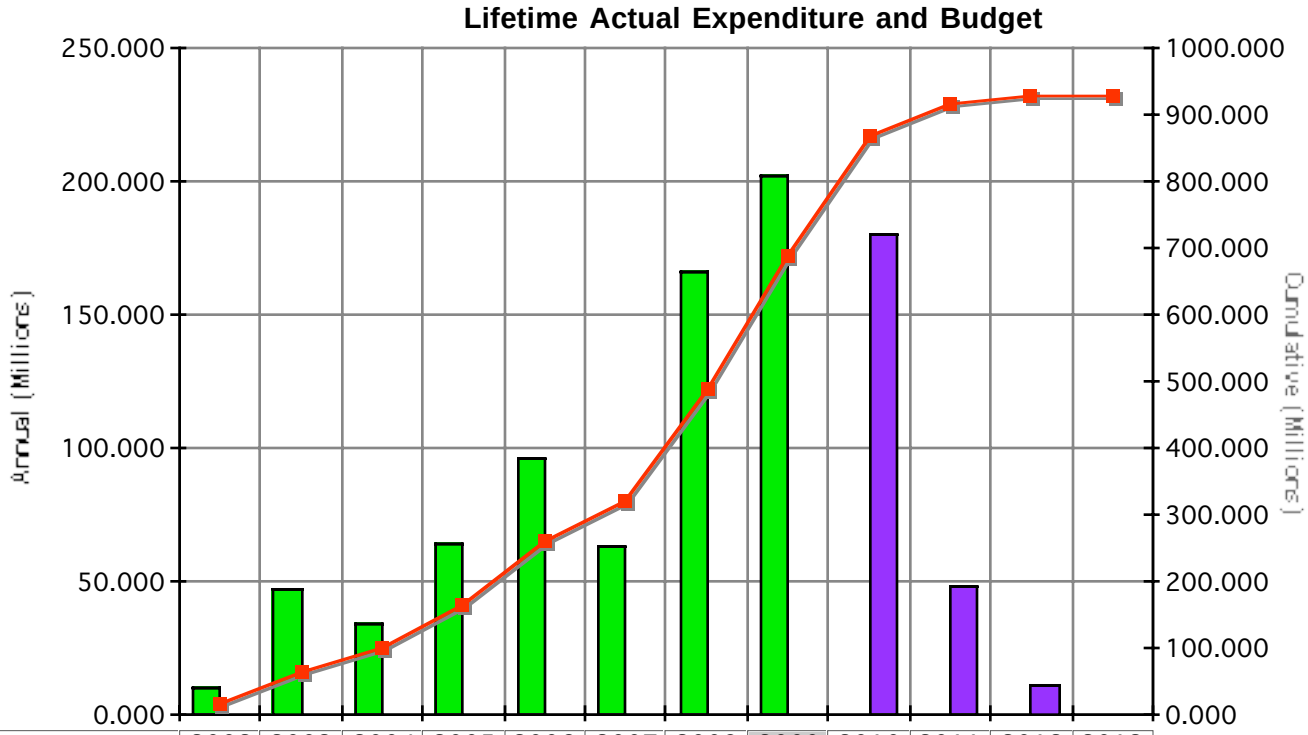
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Brightwater Treatment Plant Solids / Odor Control Facilities	$166,459,000 C00168C07	$0	$166,459,000	$2,327,375	1%	16	$168,786,375	$103,399,408	24	61%
Engineering Services for Brightwater Treatment Plant	$9,719,364 E13035E	$51,086,355	$60,805,719	$17,396,652	29%	41	$78,202,371	$69,788,877	435	89%
North Treatment Facilities Site Selection	$4,617,000 P93012P	$0	$4,617,000	$7,629,920	165%	12	$12,246,920	$12,001,214	71	98%
Architectural, Landscape Arch & Interior Design Svcs/Brightwater	$4,401,280 E23002E	$0	$4,401,280	$39,338	1%	2	$4,440,618	$4,363,046	21	98%
Brightwater Legal Services	$3,500,000 Agreement/Brightwater legal Svcs	$0	$3,500,000	$0	0%		$3,500,000	$479,929	30	14%
GCCM Contract for Brightwater	$1,424,428 C38138C	$344,968,751	$346,393,179	-$16,239,929	-5%	53	$330,153,250	$221,516,079	144	67%
NTF Legal Services	$1,150,000 T01129T	$2,150,000	$3,300,000	$0	0%	7	$3,300,000	$2,930,867	63	89%
NTF Legal Services	$1,150,000 T01130T	$3,364,700	$4,514,700	$0	0%	8	$4,514,700	$4,387,056	85	97%
Engrg & Design Svcs to Construct Electrical Infrastructure	$157,500 Agreement 299593	$0	$157,500	$388,700	247%		$546,200	$530,204	21	97%
Brightwater Treatment Plant Testing and Inspection	$100,000 P00001P06	$900,000	$1,000,000	$0	0%	6	$1,000,000	$995,663	34	100%
Brightwater Team Facilitation	$69,932 P56016P	$0	$69,932	$24,374	35%	2	$94,306	$68,744	7	73%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-1.597	13.24	11.23	15.39	13.18	16.96	24.93	17.52	16.17	23.03	17.66	33.95
Adopted Plan	2.047	10.74	12.45	11.94	16.71	14.15	12.79	12.28	13.30	16.71	14.66	32.74
Cum. Plan	2.047	12.79	25.24	37.18	53.90	68.05	80.85	93.13	106.4	137.8	137.8	170.5
Cum. Act	-1.597	11.65	22.88	38.28	51.46	68.42	93.35	110.8	127.0	150.0	167.7	201.6

Lifetime Cash Flow

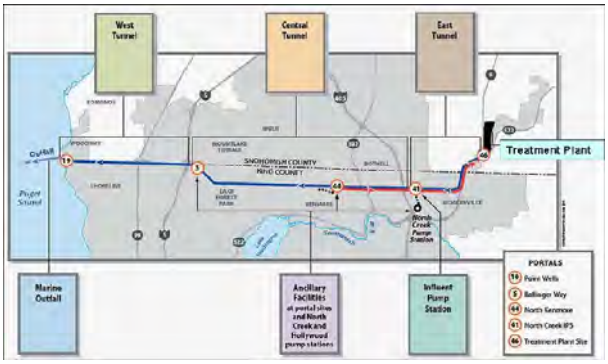


Pre-02 Act 8.055	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09	9.675	46.92	33.54	64.34	95.68	62.75	165.6	201.7				
Budget									179.5	47.62	10.72	0.000
CumAct+Bdgt	17.73	64.65	98.19	162.5	258.2	320.9	486.5	688.3	867.9	915.5	926.2	926.2

RWSP Project Report
DECEMBER 2009

423575 Brightwater Conveyance

Project Phase: 4 Implementation



Project Description

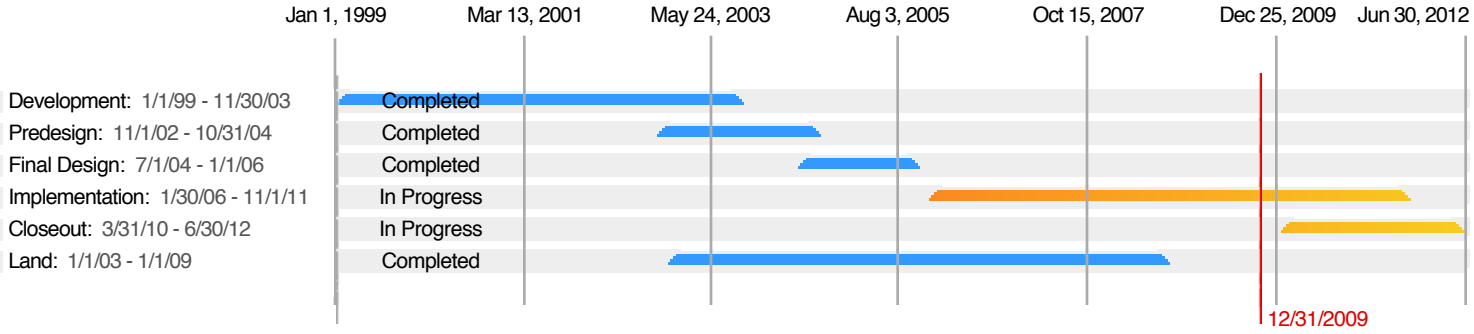
The Brightwater conveyance system consists of 13.9 miles of pipeline to be constructed in underground tunnels. The pipelines will convey untreated wastewater (influent) to the Brightwater Treatment Plant, treated wastewater (effluent) from the Brightwater plant to an outfall in Puget Sound, and reclaimed water for distribution to customers located along the effluent pipeline and down the Sammamish Valley.

Highlights of project-related activities in 2009 include the following:

- Completed pipe installation and partial concrete backfill on the East Tunnel or Brightwater Tunnel (BT)-1.
- Made tunneling progress on Central Tunnels BT-2 and BT-3 until May when significant rim bar wear was discovered on both tunnel boring machines and work was suspended until repairs could be completed.
- Mining of the West Tunnel (BT-4) was 92 percent complete as of December 2009.
- Continued closeout activities on the construction contract for the marine outfall.
- Closed out the Hollywood Facilities Improvements contract.
- McGraw-Hill Construction and Engineering News-Record magazine awarded King County and its contractors the “Best of the Best” award for the successful completion of the marine outfall project.
- The state chapter of the American Public Works Association awarded King County a “Project of the Year” award for its commitment to the environment during design and construction of Brightwater’s marine outfall.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/North/Brightwater.aspx

Milestone Schedule



Schedule Adjustments

The delay in completion of the Central Tunnel has delayed conveyance system completion. The timing for completing the Brightwater conveyance system has not been determined.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	133,939,541	219,434,290	179,757,914	498,832,366	723,478,824	698,161,490
Construction Contracts	130,466,030	215,290,553	176,461,766	477,730,604	699,506,001	674,642,388
Owner Furnished Equipment	510,698	164,072	499,962	900,028	695,672	1,059,492
Outside Agency Construction	140,234	1,183,479	0	3,004,440	5,999,885	5,172,706
Other Capital Charges	2,822,579	2,796,186	2,796,186	17,197,294	17,277,266	17,286,904
NON-CONSTRUCTION	21,458,044	13,644,546	23,963,857	189,876,516	197,243,280	220,998,183
Engineering	3,588,595	2,080,146	3,108,266	76,381,087	76,834,883	78,405,000
Planning & Management Svcs.	12,973,828	5,810,720	13,988,384	53,299,186	53,820,097	73,632,790
Permitting & Other Agency Support	84,830	2,150,643	140,376	1,105,525	6,071,042	1,221,446
Right-of-Way	1,861,272	0	3,159,897	27,801,188	23,817,422	30,797,761
Misc. Services & Materials	230,216	540,095	390,095	4,227,704	5,467,728	4,947,724
Staff Labor	2,719,303	3,062,943	3,176,839	27,061,826	31,232,108	31,993,461
PROJECT RESERVE		0	0	0	6,200,829	2,000,002
Project Reserve		0	0	0	6,200,829	2,000,002
CREDITS AND REVENUES	801	0	0	-3,865	-6,415	-4,666
Credits and Revenues	801	0	0	-3,865	-6,415	-4,666
Total (incl Credits & Revenues)	155,398,386	233,078,836	203,721,772	688,705,017	926,916,518	921,155,00
Total Credits & Revenues	801	0	0	-3,865	-6,415	-4,666
Total (w/out Credits & Revenues)	155,397,585	233,078,836	203,721,772	688,708,882	926,922,933	921,159,675

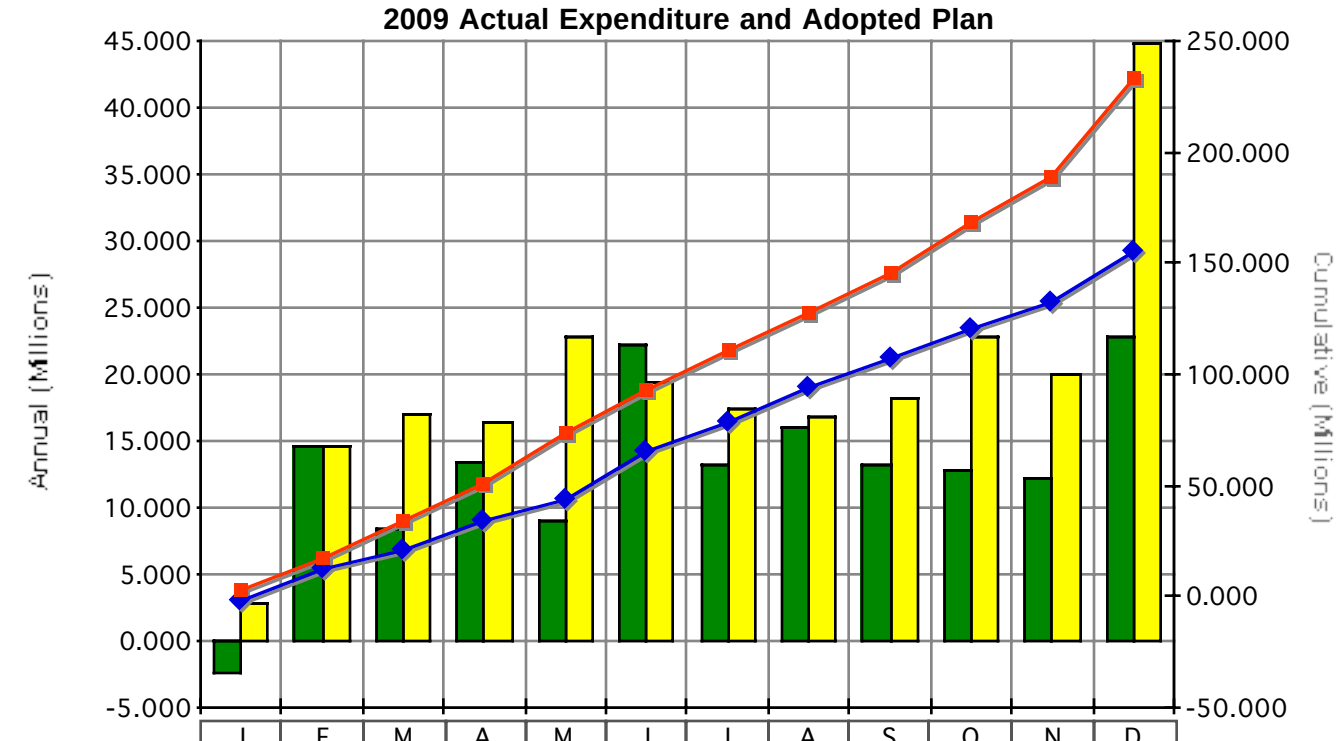
Cost/Budget Adjustments

A detailed explanation of Brightwater cost changes is contained in the annual Brightwater Cost Update: Current Conditions and Trends, January 2010.

Contract Status

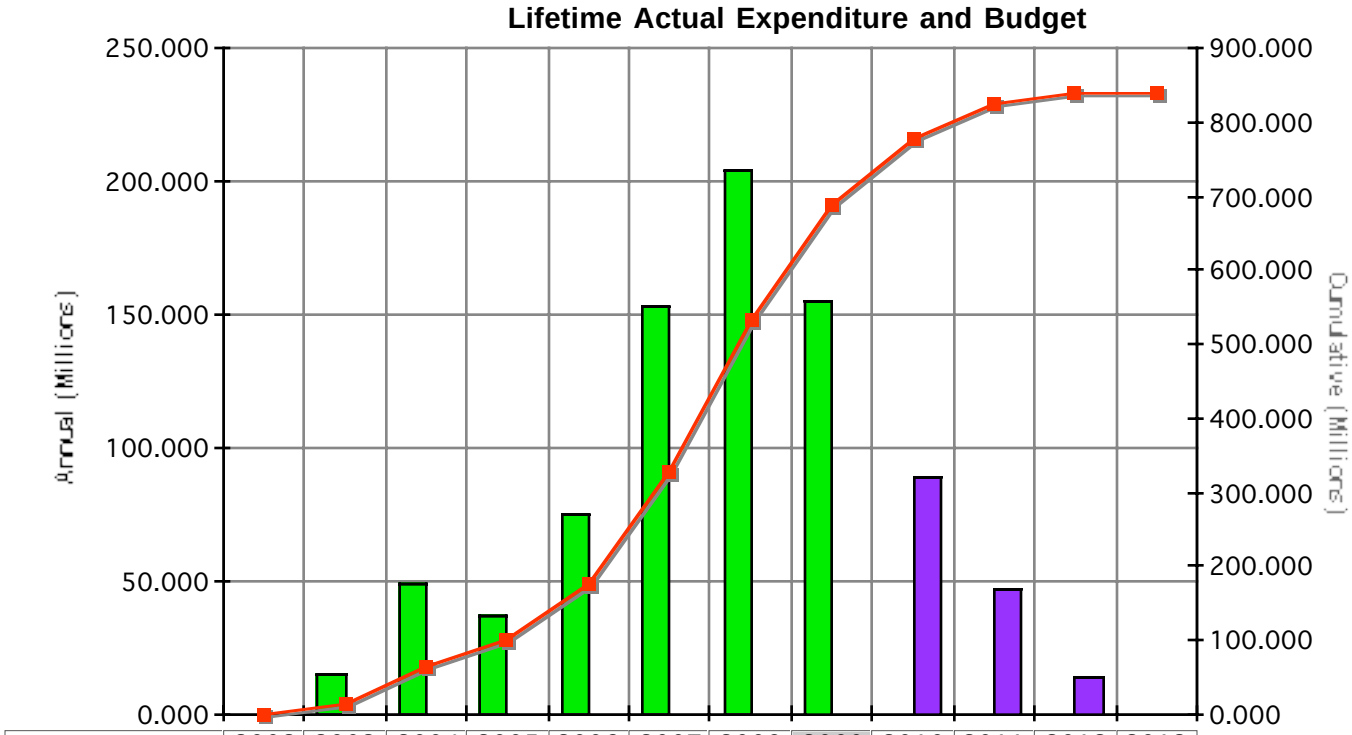
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Brightwater Conveyance Sys, Central Contract, BW Tunnel,	$211,076,058 C00005C06	$0	$211,076,058	$21,197,118	10%	15	$232,273,176	$162,464,776	57	70%
East Combined Tunnel	$130,848,750 C53060C	$1,000,000	$131,848,750	$4,180,461	3%	21	$136,029,211	$126,936,592	59	93%
Brightwater Conveyance System - West Contract	$102,453,000 C00007C06	$0	$102,453,000	$6,282,029	6%	10	$108,735,029	$90,406,734	32	83%
Brightwater Influent Pump Station	$91,860,000 C00002C06	$0	$91,860,000	$5,154,854	6%	18	$97,014,854	$24,919,832	31	26%
Brightwater Conveyance Marine Outfall	$27,599,800 E58016E	$792,230	$28,392,030	$1,401,663	5%	12	$29,793,693	$29,618,959	17	99%
CM Services for BW Conveyance	$13,327,255 P43020P	$32,789,992	$46,117,247	$2,295,318	5%	5	$48,412,565	$33,158,359	57	68%
Geotechnical Services for the Brightwater Conveyance	$11,474,386 E23007E	$10,386,010	$21,860,396	$368,876	2%	5	$22,229,272	$17,747,050	813	80%
Engineering Svcs for the Brightwater Conveyance Sys	$11,217,376 E23006E	$0	$11,217,376	$0	0%	5	$11,217,376	$10,921,533	36	97%
Brightwater Conveyance	$11,173,313 E33015E/A	$2,291,578	$13,464,890	$0	0%	1	$13,464,890	$13,226,636	65	98%
Brightwater Conveyance System North Creek Facilities	$10,180,000 C00063C06	$0	$10,180,000	$315,381	3%	5	$10,495,381	$10,495,381	17	100%
Prof Svcs for Brightwater Conveyance Final Design	$7,167,571 E33015E/C	$1,581,546	$8,749,117	$0	0%	1	$8,749,117	$7,948,706	65	91%
Prof Svcs for Brightwater Conveyance Final Design	$5,672,837 E33015E/B	$1,234,040	$6,906,877	$0	0%	1	$6,906,877	$5,489,466	65	79%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-2.469	14.67	8.458	13.49	8.955	22.15	13.16	16.00	13.26	12.72	12.20	22.75
Adopted Plan	2.797	14.68	17.01	16.31	22.84	19.34	17.48	16.78	18.18	22.84	20.04	44.75
Cum. Plan	2.797	17.48	34.49	50.81	73.65	92.99	110.4	127.2	145.4	188.3	188.3	233.0
Cum. Act	-2.469	12.20	20.66	34.16	43.12	65.27	78.44	94.45	107.7	120.4	132.6	155.3

Lifetime Cash Flow



Pre-02 Act 0.000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09		14.90	49.22	36.97	74.65	153.3	204.2	155.3				
Budget									89.07	47.39	13.91	0.000
CumAct+Bdgt	0.000	14.90	64.13	101.1	175.7	329.0	533.3	688.6	777.7	825.1	839.0	839.0

RWSP Project Report
DECEMBER 2009

423600 Brightwater Reclaimed Water Pipeline

Project Phase: 4 Implementation

Project Description

This project will convey Class A reclaimed water produced at the Brightwater Treatment Plant to the Sammamish Valley and to potential customers along the effluent pipeline system. The project includes construction of two pipelines--the West Segment and the South Segment. The South Segment runs from the Brightwater Treatment Plant through the Sammamish Valley and consists of two portions of new pipe and a portion of converted existing force main. The West Segment is a dedicated reclaimed water pipeline that is being installed inside the Brightwater effluent tunnels that go from the Brightwater plant to the Ballinger Way Portal in the City of Shoreline. The West Segment is designed to allow distribution from the access portals along the effluent tunnel route.

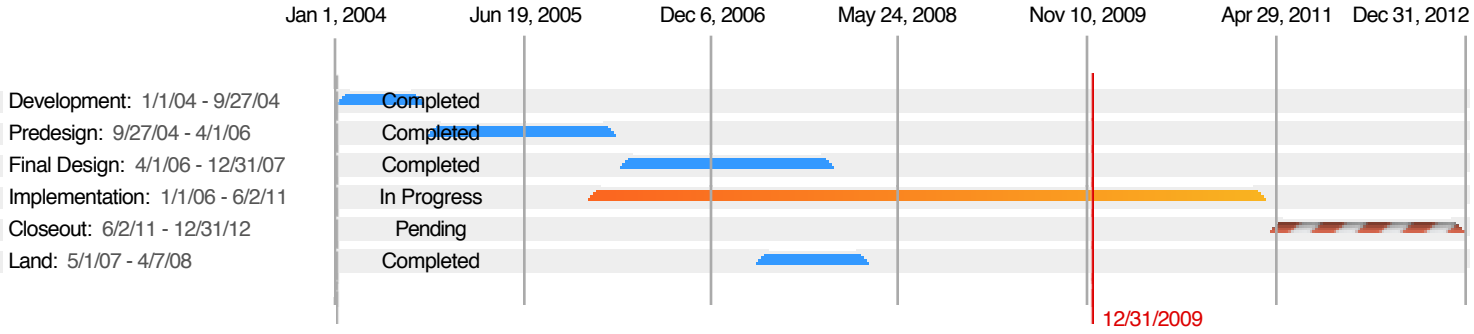
Initially, only the South Segment will be operational. It will be able to transport up to 7 mgd of reclaimed water to the Sammamish Valley by gravity flow.

Highlights of activities in 2009 include the following:
- Substantial completion of the second section of the reclaimed water pipe from the existing North Creek Pump Station to the existing York Pump Station was achieved in October.
- Conversion of additional 4.5 miles of existing force main was completed in the fall.
- Commissioning of the reclaimed water facilities at the York Pump Station was completed during the fourth quarter.
- Efforts began to clean the North Creek Force Main. To determine the scope of pigging* and cleaning required, closed circuit television of the force main was completed in December. No significant debris was observed.
- Construction was under way on the West Segment pipeline.
- Work continued to develop the Operations and Maintenance manual for the reclaimed water facilities at the York and North Creek Pump Stations.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wastewater/ReclaimedWater/ExistingSystem/Brightwater.aspx

*Pigging refers to the practice of using an independent, self-contained device, tool, or vehicle, that moves through the interior of the pipeline for purposes of inspecting, dimensioning, or cleaning.

Milestone Schedule



Schedule Adjustments

There were no major changes to the schedule.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	5,204,953	5,955,624	6,582,638	10,608,514	14,174,586	14,932,936
Construction Contracts	5,204,953	5,914,424	6,541,438	10,597,843	13,921,143	14,614,191
Owner Furnished Equipment	0	0	0	10,413	10,413	10,413
Other Capital Charges	0	41,200	41,200	259	243,030	308,333
NON-CONSTRUCTION	1,493,491	1,723,871	1,947,212	5,976,025	8,145,718	8,742,598
Engineering	608,432	593,574	891,243	3,188,424	3,705,389	4,195,864
Planning & Management Svcs.	-25,741	341,460	360,140	32,436	918,902	839,069
Permitting & Other Agency Support	55,635	10,300	10,300	114,198	97,200	79,473
Right-of-Way	657	139,624	3	24,292	318,797	23,638
Misc. Services & Materials	132,488	35,665	35,665	264,385	177,293	217,374
Staff Labor	722,021	603,247	649,860	2,352,289	2,928,137	3,387,180
PROJECT RESERVE		0	0	0	4,593,499	3,182,702
Project Reserve		0	0	0	4,593,499	3,182,702
Total (incl Credits & Revenues)	6,698,445	7,679,495	8,529,849	16,584,539	26,913,803	26,858,237
Total Credits & Revenues						
Total (w/out Credits & Revenues)	6,698,445	7,679,495	8,529,849	16,584,539	26,913,803	26,858,236

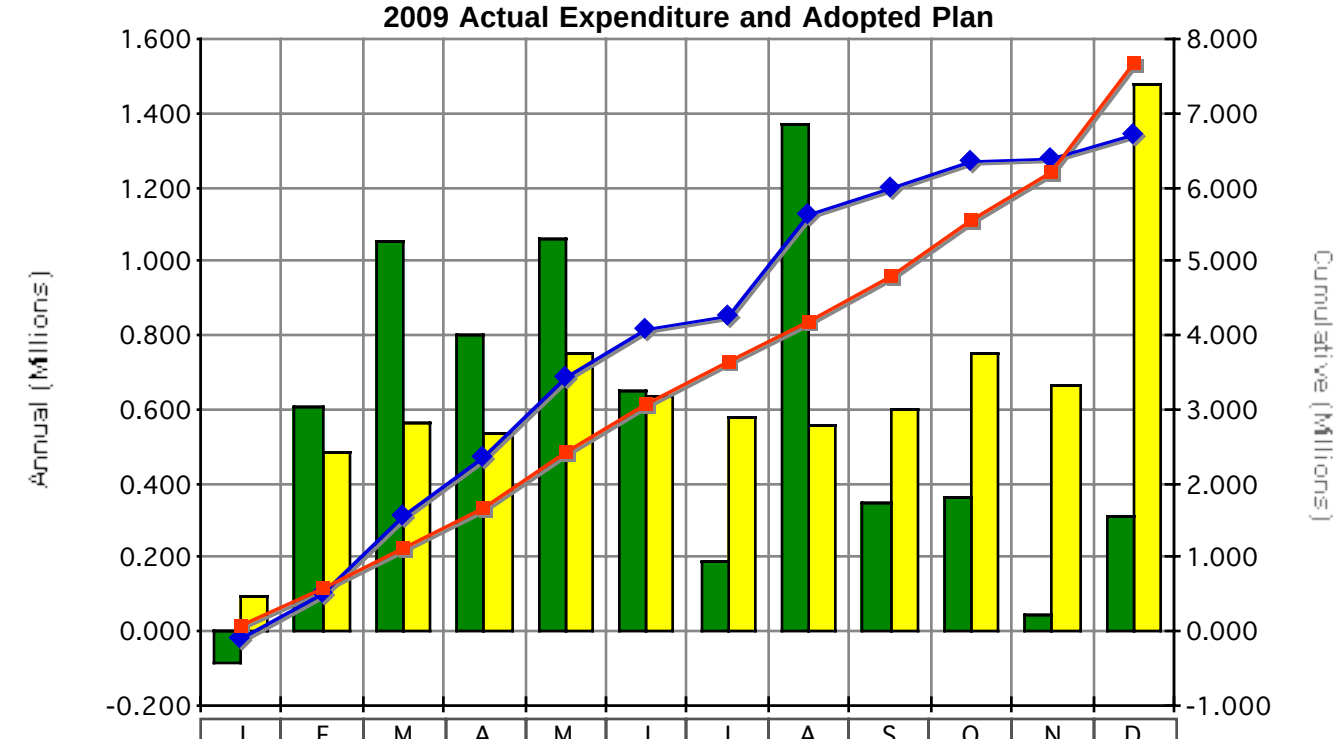
Cost/Budget Adjustments

There were no major adjustments to the project's lifetime budget.

Contract Status

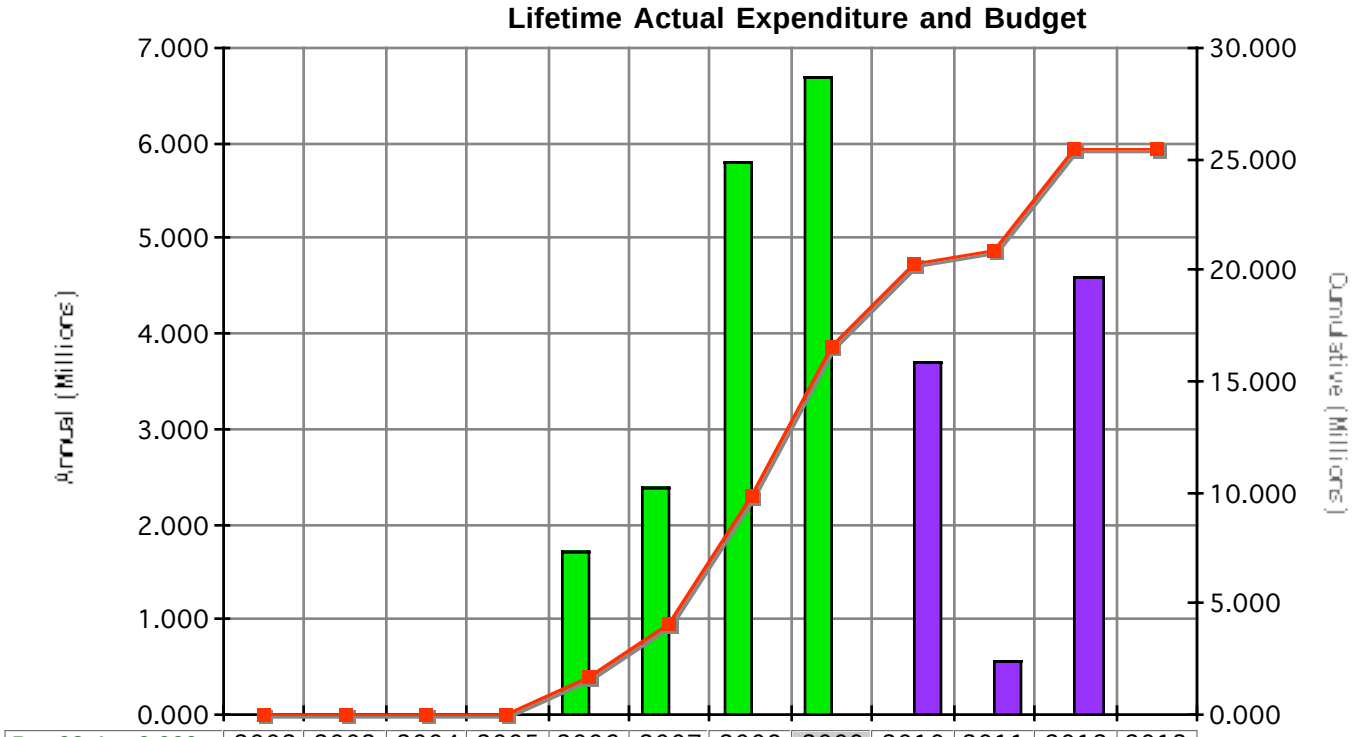
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Brightwater Reclaimed Water System Section 2 C00242C08	$6,647,320	$0	$6,647,320	$129,602	2%	7	$6,776,922	$6,751,410	12	100%
Brightwater Reclaimed Water Conveyance Facility E43010E	$1,918,771	$2,670,893	$4,589,664	$268,607	6%	6	$4,858,270	$4,060,092	211	84%
Brightwater Reclaimed Water System Section 2 Landscape C00374C08	$697,920	$0	$697,920	$0	0%		$697,920	$661,745	7	95%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.088	0.603	1.051	0.798	1.057	0.652	0.189	1.369	0.346	0.360	0.046	0.315
Adopted Plan	0.092	0.484	0.561	0.538	0.753	0.637	0.576	0.553	0.599	0.753	0.660	1.474
Cum. Plan	0.092	0.576	1.137	1.674	2.427	3.064	3.640	4.193	4.792	6.205	6.205	7.679
Cum. Act	-0.088	0.515	1.567	2.364	3.421	4.073	4.262	5.632	5.978	6.337	6.384	6.698

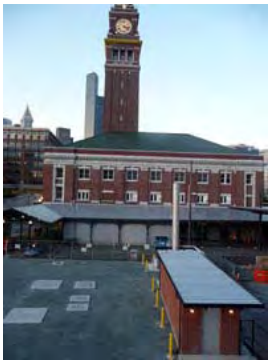
Lifetime Cash Flow



Pre-02 Act 0.000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09					1.705	2.386	5.795	6.700				
Budget									3.695	0.553	4.593	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	1.705	4.091	9.886	16.58	20.28	20.83	25.42	25.42

RWSP Project Report
DECEMBER 2009

423580 King Street Regulator Odor Control



Project Phase: 4 Implementation

Project Description

This project will reduce foul odors emanating from the Elliott Bay Interceptor (EBI) into the south Pioneer Square and stadium areas. As this is part of the old combined sewer system, there are many open connections to the EBI, such as surface drains, that allow a direct path for odors to escape during periods of high flows or slight pressurization in the EBI. The project will also help to reduce corrosion within the EBI by removing hydrogen sulfide.

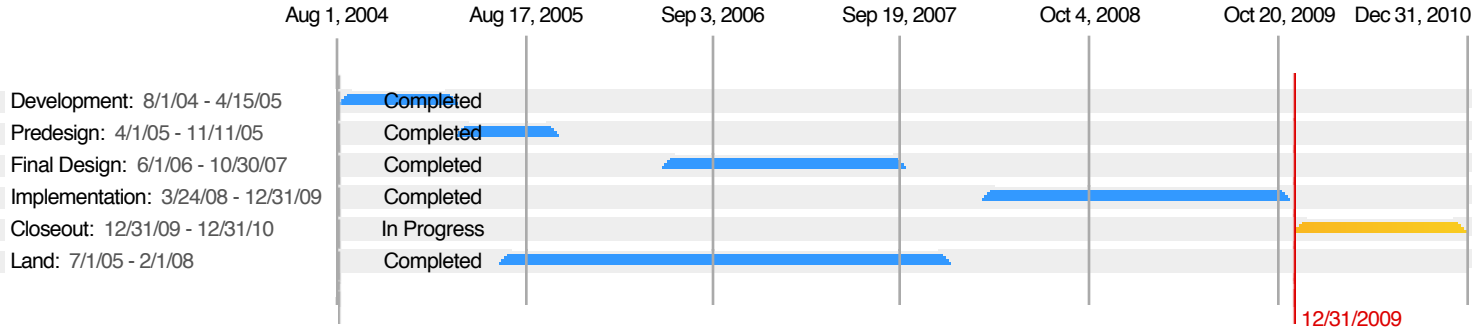
This project achieved substantial completion in December 2009. Major activities in 2009 to complete this project include the following:

- Removed steel shoring sheets that were installed in summer 2008 to stabilize the work site for excavation.
- Installed odor control equipment.
- Completed masonry work.
- Installed mechanical and electrical equipment.
- Conducted operational testing and operations staff training.

Because this project is considered complete, this is the last year it will be included in the RWSP annual report.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/Completed/KingStOC.aspx

Milestone Schedule



Schedule Adjustments

Construction was delayed by six months due to differing site conditions and underground utility conflicts.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	2,177,849	1,494,607	1,451,075	4,087,105	3,982,921	3,360,331
Construction Contracts	2,174,532	1,494,607	1,451,075	4,077,212	3,975,812	3,353,756
Owner Furnished Equipment	3,317	0	0	6,901	3,584	3,584
Other Capital Charges	0	0	0	2,992	3,525	2,992
NON-CONSTRUCTION	739,226	133,280	158,142	2,544,368	1,719,516	1,963,284
Engineering	0	24,795	52,817	33,541	252,309	86,358
Planning & Management Svcs.	69,554	0	0	852,976	634,077	783,422
Permitting & Other Agency Support	-8,039	0	0	59,843	13,251	67,882
Right-of-Way	56,250	0	0	64,186	155,436	7,936
Misc. Services & Materials	50,166	0	0	154,563	22,410	104,398
Staff Labor	571,295	108,485	105,325	1,379,258	642,033	913,288
PROJECT RESERVE		103,000	75,322	0	103,000	75,322
Project Reserve		103,000	75,322	0	103,000	75,322
Total (incl Credits & Revenues)	2,917,075	1,730,887	1,684,539	6,631,473	5,805,437	5,398,938
Total Credits & Revenues						
Total (w/out Credits & Revenues)	2,917,075	1,730,887	1,684,539	6,631,473	5,805,437	5,398,938

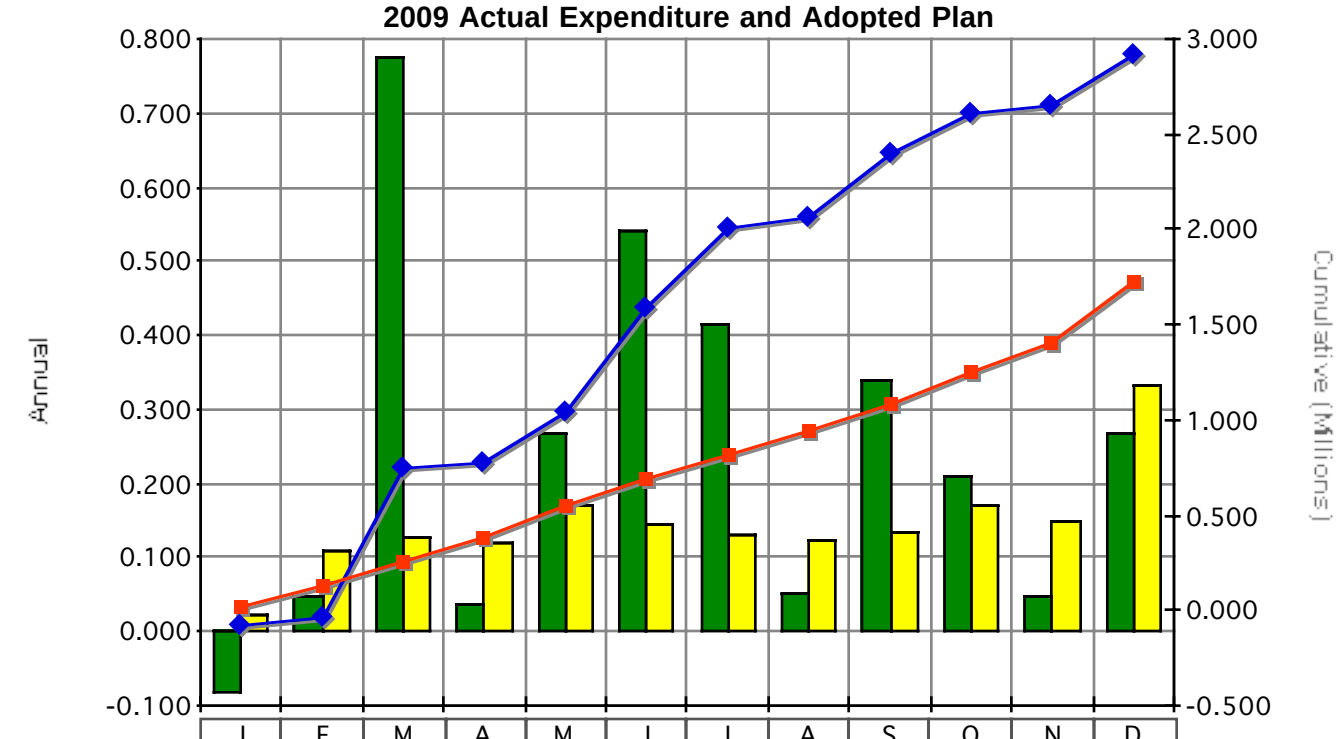
Cost/Budget Adjustments

The differing site conditions and underground utility conflicts increased the cost of construction. The construction delay also resulted in increased expenses associated with construction management, project management, and project control services.

Contract Status

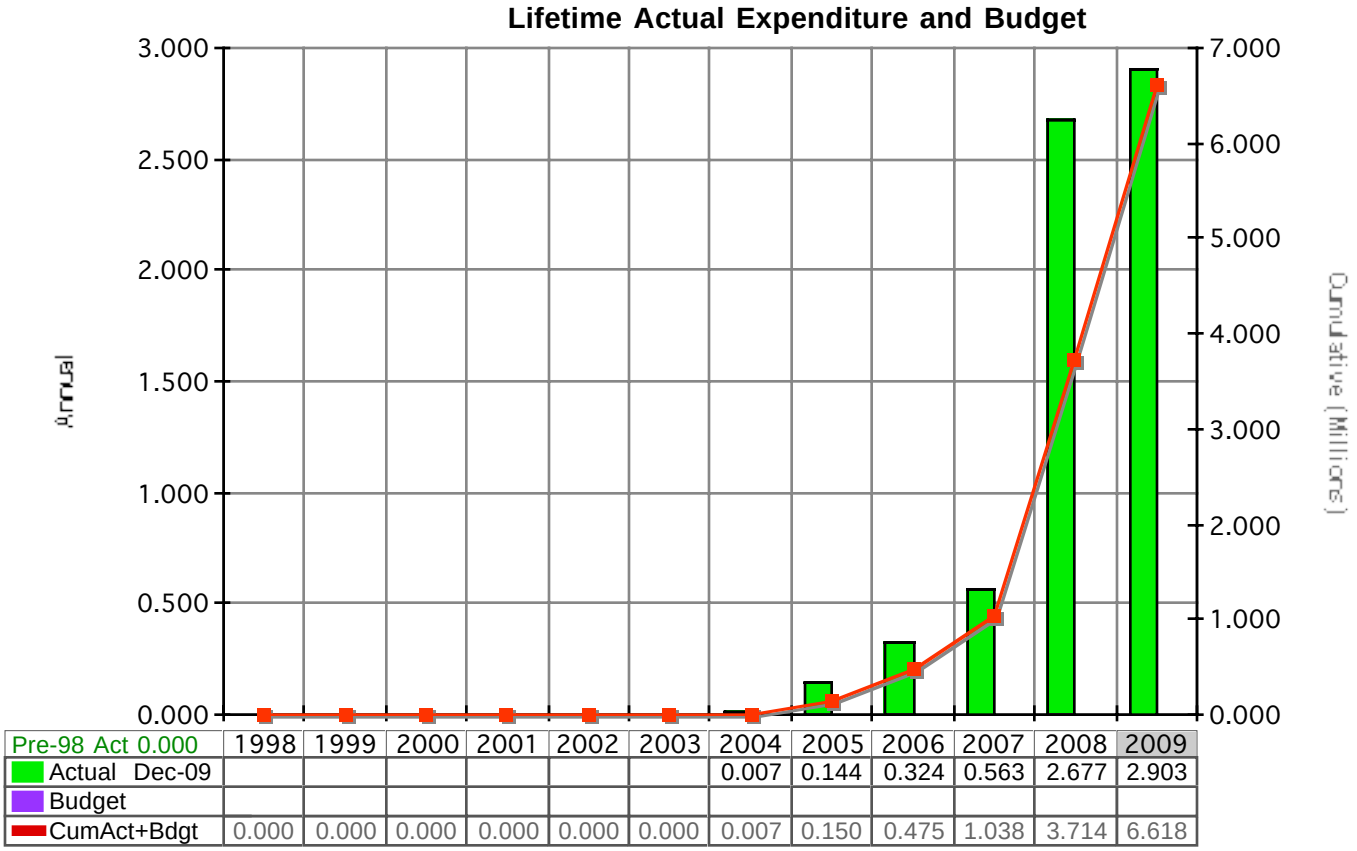
Contract	Original Contract Amount	Phased Amends	Base Contract Amoun	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
King Street Odor Control Facility C00136C07	$3,604,750	$0	$3,604,750	$359,681	10%	11	$3,964,431	$3,898,199	19	98%
King Street Regulator Station and Conveyance System Odor E43024E	$368,892	$142,065	$510,957	$350,723	69%	8	$861,680	$791,458	34	92%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.083	0.048	0.774	0.038	0.268	0.542	0.416	0.052	0.338	0.210	0.046	0.268
Adopted Plan	0.021	0.109	0.126	0.121	0.170	0.144	0.130	0.125	0.135	0.170	0.149	0.332
Cum. Plan	0.021	0.130	0.256	0.377	0.547	0.691	0.820	0.945	1.080	1.399	1.399	1.731
Cum. Act	-0.083	-0.035	0.739	0.777	1.045	1.587	2.003	2.055	2.393	2.603	2.649	2.917

Lifetime Cash Flow



Pre-98 Act 0.000	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Actual Dec-09							0.007	0.144	0.324	0.563	2.677	2.903
Budget												
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.150	0.475	1.038	3.714	6.618

RWSP Project Report
DECEMBER 2009

423521 Bellevue Pump Station

Project Phase: 4 Implementation

Project Description

This project will increase the Bellevue Pump Station's firm capacity to 11 mgd and will improve the station's electrical and control systems. The work is being implemented through two construction contracts: one for the force main, which was completed in 2008, and one for the pump station. All the design work was performed under one consultant design contract.

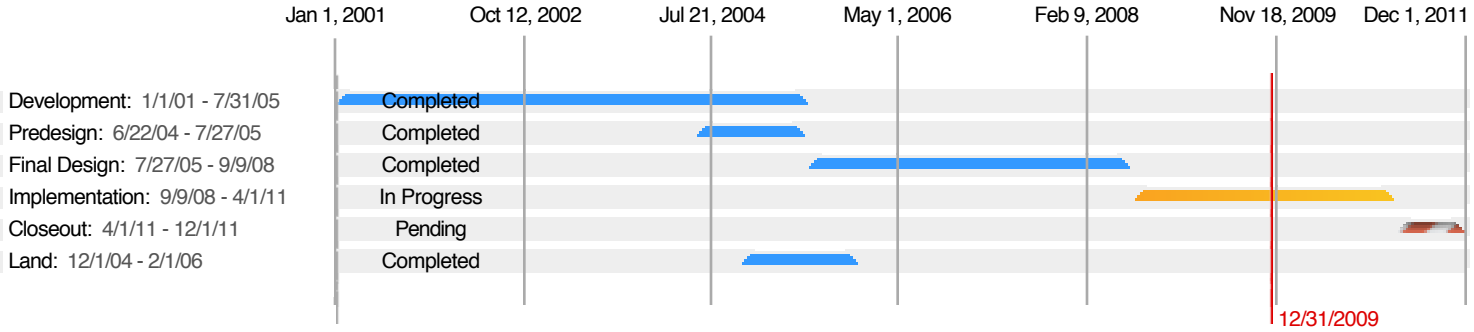
Under the pump station contract, the existing pump station will be expanded and some demolition will occur. All the expansion will occur on King County property. As part of the project, existing equipment, including pumps, generator, electrical system, controls, odor control, and chemical storage will be replaced. Construction on the pump station began in fall 2008 and is expected to be complete by the end of 2010.

Major accomplishments in 2009 include the following:

- A temporary pump station system was installed in the summer to provide continued wastweater service while the existing pump station and generator buildings are taken out of service and demolished.
- Completed demolition of existing pump station and generator buildings in October.
- Completed pile foundations.
- Completed 45 percent of generator/electrical/pump room structure.
- Provided ongoing erosion control and settlement monitoring.
- Continued to update City of Bellevue staff, community groups, and affected property owners on project progress and milestones through project updates, a project Web site, and a 24-hour project hotline.
- The Washington State American Council of Engineering Companies awarded the project a Best in State Silver Award for Engineering Excellence Silver Award in the "Future Value to the Engineering Profession" category.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/East/Bellevue.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes in the schedule.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	3,596,758	3,059,464	6,257,980	19,451,084	25,336,667	24,897,012
Construction Contracts	3,593,560	3,022,899	6,257,980	19,447,886	25,264,602	24,897,012
Outside Agency Construction		36,565	0	0	72,065	0
Other Capital Charges	3,198	0	0	3,198	0	0
NON-CONSTRUCTION	1,393,945	743,897	742,020	8,735,162	8,374,739	8,797,232
Engineering	577,543	197,586	250,000	5,101,751	5,223,810	5,084,208
Planning & Management Svcs.	130,697	175,000	110,000	482,262	385,964	511,566
Permitting & Other Agency Support	22,364	31,999	33,333	166,065	196,838	194,201
Right-of-Way	0	0	0	58,281	58,281	58,281
Misc. Services & Materials	16,826	20,600	15,632	260,760	171,262	259,945
Staff Labor	646,515	318,712	333,055	2,666,043	2,338,583	2,689,032
PROJECT RESERVE		0	0	0	752,889	677,915
Project Reserve		0	0	0	752,889	677,915
Total (incl Credits & Revenues)	4,990,704	3,803,361	7,000,000	28,186,247	34,464,295	34,372,160
Total Credits & Revenues						
Total (w/out Credits & Revenues)	4,990,704	3,803,361	7,000,000	28,186,247	34,464,295	34,372,158

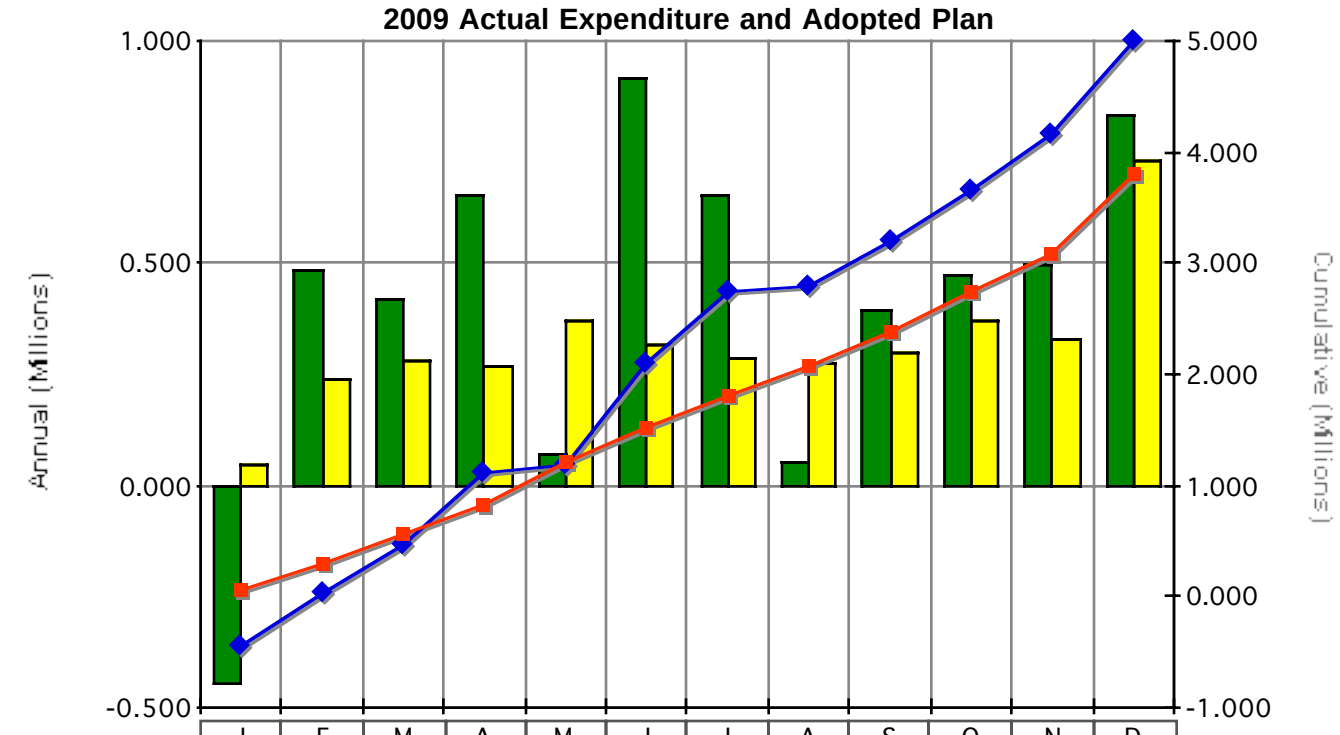
Cost/Budget Adjustments

There were no major adjustments to the project's lifetime budget.

Contract Status

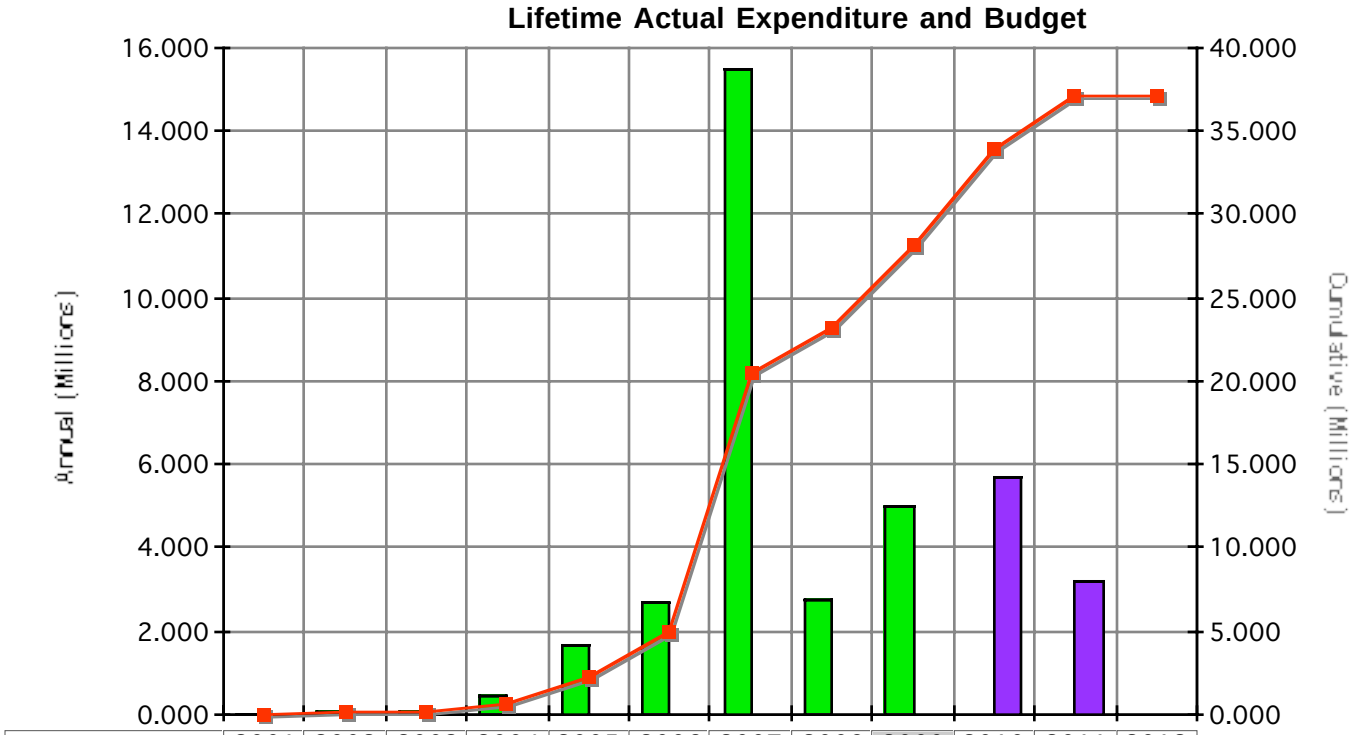
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Bellevue Pump Station Upgrade- Pump Station C00334C08	$8,605,000	$0	$8,605,000	$428,671	5%	6	$9,033,671	$3,780,953	13	42%
Engineering Services for the Bellevue Pump Station E23015E	$775,015	$5,066,666	$5,841,681	$0	0%	8	$5,841,681	$4,722,637	80	81%
Construction management service for Bellevue Pump P00016P06	$298,445	$218,736	$517,182	$0	0%	2	$517,182	$293,323	14	57%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.447	0.483	0.421	0.651	0.071	0.918	0.652	0.051	0.392	0.474	0.494	0.831
Adopted Plan	0.046	0.240	0.278	0.266	0.373	0.316	0.285	0.274	0.297	0.373	0.327	0.730
Cum. Plan	0.046	0.285	0.563	0.829	1.202	1.518	1.803	2.077	2.373	3.073	3.073	3.803
Cum. Act	-0.447	0.035	0.456	1.107	1.178	2.097	2.749	2.800	3.192	3.666	4.159	4.991

Lifetime Cash Flow



Pre-01 Act 0.006	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Actual Dec-09	0.014	0.068	0.072	0.472	1.656	2.658	15.49	2.751	4.992			
Budget										5.703	3.228	0.000
CumAct+Bdgt	0.021	0.088	0.161	0.632	2.288	4.946	20.44	23.19	28.18	33.89	37.11	37.11

RWSP Project Report
DECEMBER 2009

423615 Black Diamond Storage Facility

Project Phase: Hold

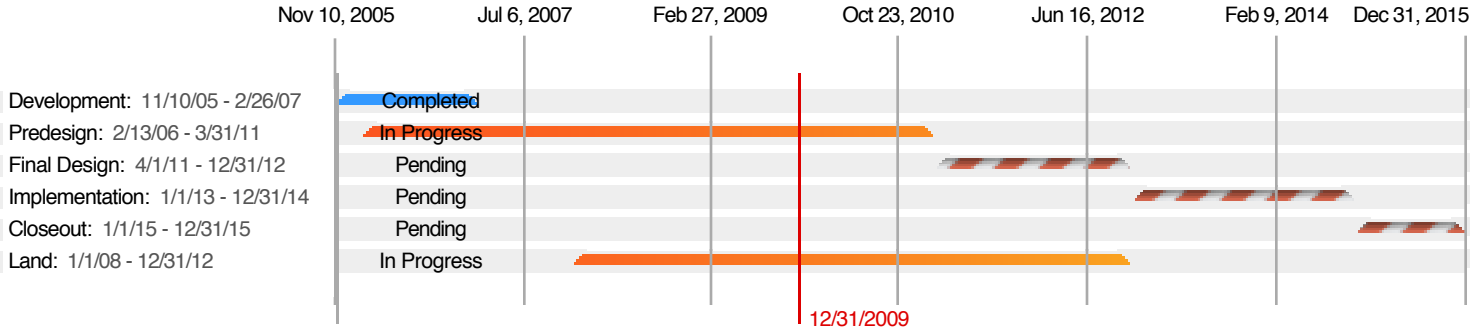
Project Description

This project includes building an enclosed peak-flow equalization storage facility in the City of Black Diamond. The facility will store peak flows entering the pump station in Black Diamond and release them slowly over time to avoid overwhelming the downstream conveyance system. It will extend the life of existing equipment and defer the need to build additional new pumping and conveyance facilities for several years.

As reported in the RWSP 2008 Annual Report, no additional project work on the Black Diamond storage facility was scheduled to occur in 2009. The project is on temporary hold due to a significant slowdown in the pace of activity in Black Diamond associated with their master-planned development. The need for additional wastewater capacity in the Black Diamond area is driven by the projected increase in residents in the master-planned areas.

WTD continues to coordinate with the City of Black Diamond. In late 2010, the city expects to be able to provide WTD with a schedule that details when actual development permits will be issued and construction will occur for the master-planned areas of Black Diamond. This information will determine when the Black Diamond Storage Facility project is needed so that it can be constructed on time to meet the city's wastewater capacity needs.

Milestone Schedule



Schedule Adjustments

This project is on temporary hold.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION		0	0	0	8,352,252	8,112,405
Construction Contracts		0	0	0	8,134,421	7,897,497
Outside Agency Construction		0	0	0	217,830	214,908
NON-CONSTRUCTION	163,370	763,999	152,399	613,156	2,807,206	2,788,039
Engineering	75,764	0	75,000	199,635	1,427,795	787,020
Planning & Management Svcs.	0	0	0	101,452	27,202	101,452
Permitting & Other Agency Support		103,000	0	0	103,000	109,297
Right-of-Way		581,278	0	0	722,144	651,909
Misc. Services & Materials	13,360	12,036	11,685	26,257	25,036	24,582
Staff Labor	74,246	67,685	65,714	285,813	502,030	1,113,780
PROJECT RESERVE		0	0	0	1,601,100	2,530,524
Project Reserve		0	0	0	1,601,100	2,530,524
ADJUSTMENTS			0	0		185,999
Adjustments			0	0		185,999
Total (incl Credits & Revenues)	163,370	763,999	152,399	613,156	12,760,558	13,616,96
Total Credits & Revenues						
Total (w/out Credits & Revenues)	163,370	763,999	152,399	613,156	12,760,558	13,616,967

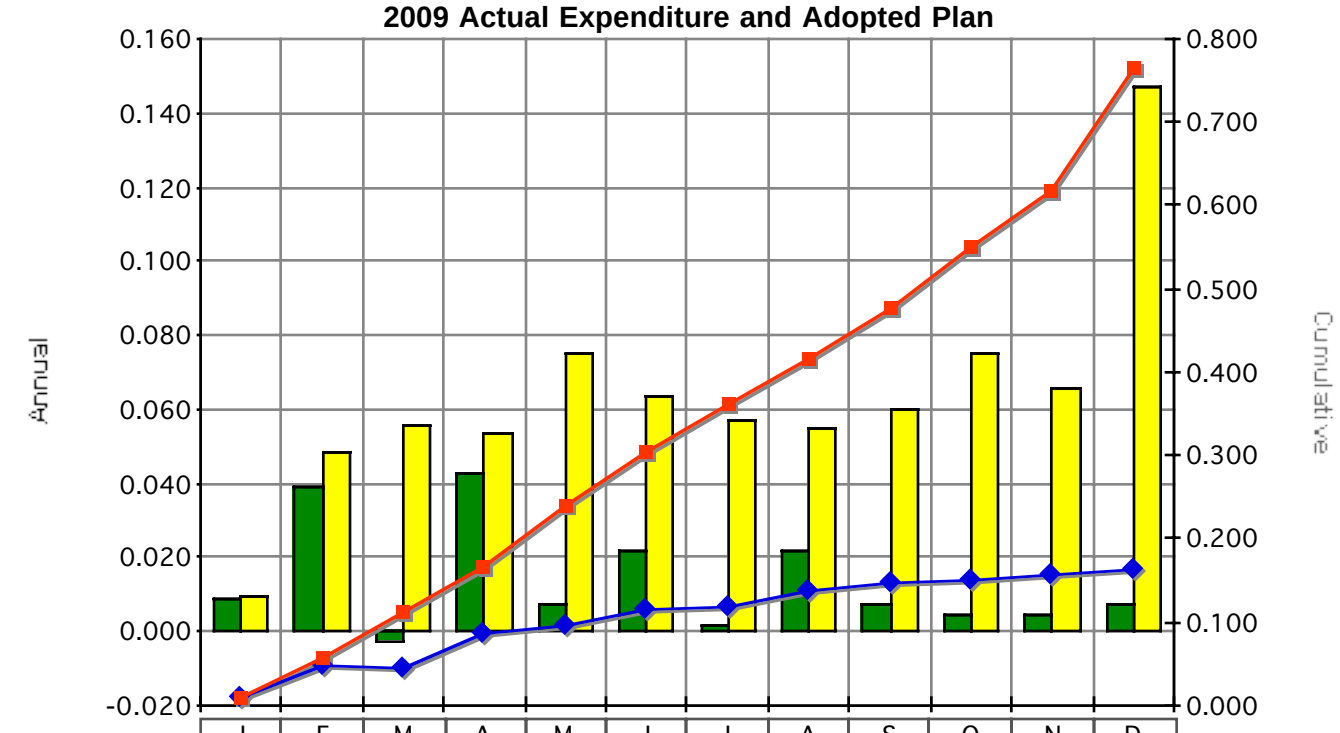
Cost/Budget Adjustments

There were no cost adjustments made to the project in 2009. An updated budget will be developed when the project is restarted.

Contract Status

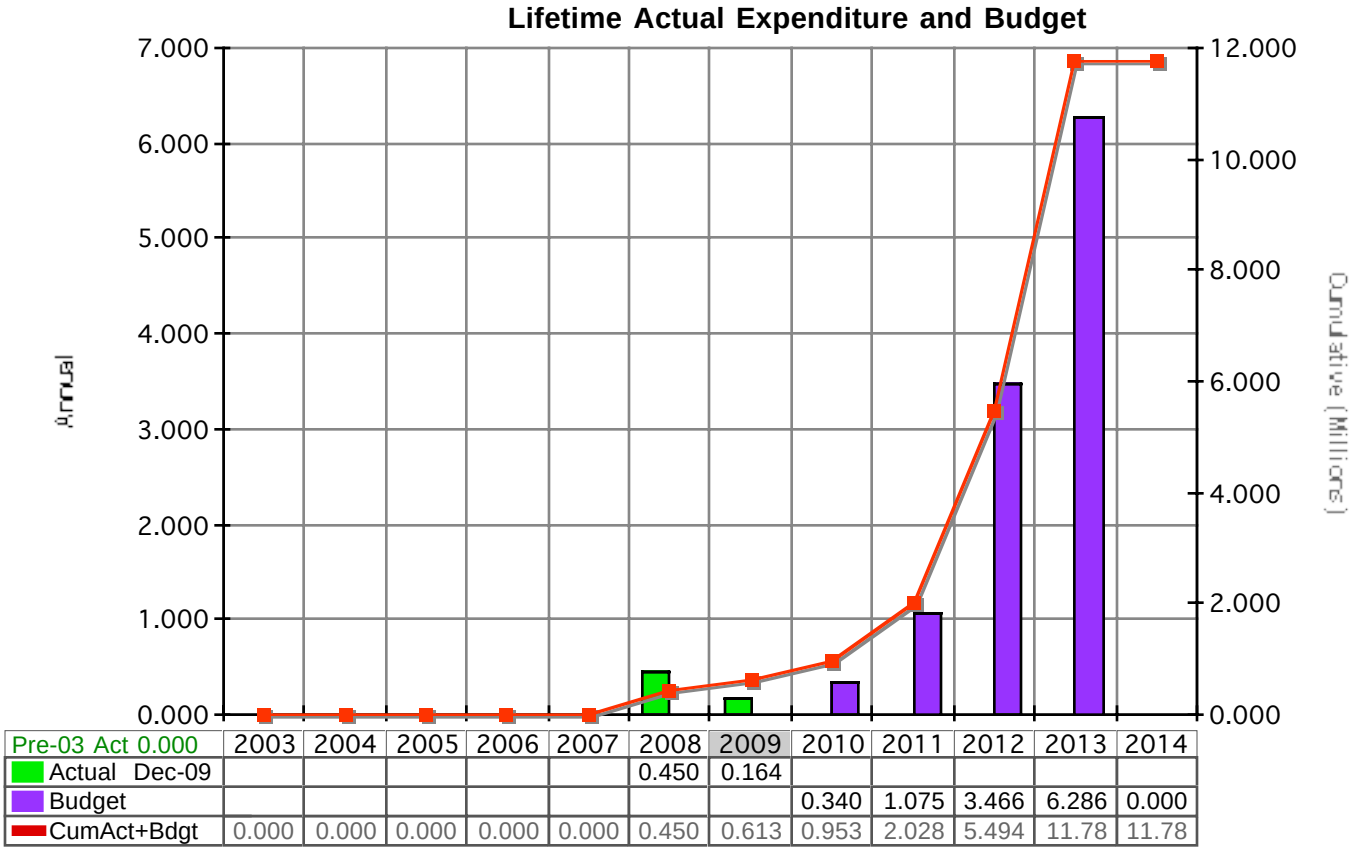
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Black Diamond Storage Facility E00003E06	$617,610	$0	$617,610	$301,239	49%	3	$918,849	$582,175	27	63%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	0.008	0.039	-0.003	0.042	0.007	0.021	0.001	0.022	0.007	0.005	0.005	0.008
Adopted Plan	0.009	0.048	0.056	0.053	0.075	0.063	0.057	0.055	0.060	0.075	0.066	0.147
Cum. Plan	0.009	0.057	0.113	0.167	0.241	0.305	0.362	0.417	0.477	0.617	0.617	0.764
Cum. Act	0.008	0.048	0.045	0.087	0.095	0.116	0.118	0.139	0.146	0.151	0.156	0.163

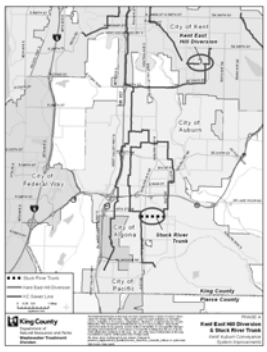
Lifetime Cash Flow



Pre-03 Act 0.000	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Actual Dec-09						0.450	0.164					
Budget								0.340	1.075	3.466	6.286	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	0.450	0.613	0.953	2.028	5.494	11.78	11.78

423582 SW Interceptor
(Kent/Auburn Conveyance System Improvements)

Project Phase: 3 Final Design



Project Description

This project will construct approximately 3 miles of new sewer in Auburn, Kent, Algona, and Pacific. The project consists of four individual pipelines that will be built in two phases (Phase A and Phase B).

Phase A pipelines (the Stuck River Trunk and Kent East Diversion Hill) are expected to be in service in 2013. The Stuck River Trunk includes approximately 3,900 feet of new 27-inch-diameter gravity sewer pipe to divert flows upstream of the M Street Trunk to the Lakeland Hills Trunk. The Kent East Hill Diversion includes 1,800 feet of new 24-inch-diameter gravity sewer pipe to divert flows from the Mill Creek Interceptor to the South 277th Street Interceptor.

Phase B pipelines are expected to be in service in 2016. They include the Pacific Pump Station Discharge and the Auburn West Interceptor Parallel in Auburn. The Pacific Pump Station Discharge includes approximately 7,900 feet of new pipe to carry flow north from the Pacific Pump Station to the Auburn West Interceptor. The Auburn West Interceptor Parallel includes approximately 2,600 feet of new gravity pipe to parallel an existing portion of the Auburn West Interceptor.

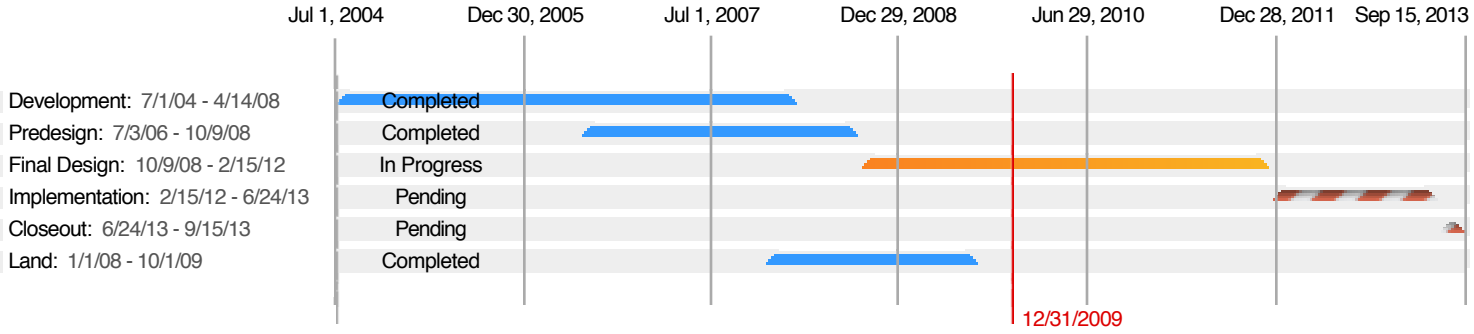
This project number reflects all the work associated with Phase A pipelines and work through 50 percent of design and easement acquisition of Phase B pipelines. Phase B will be completed under a different project number.

Project activities in 2009 include the following:

- Completed geotechnical work for Phase A pipelines.
- Produced and reviewed 90 percent design documents for Phase A pipelines.
- Prepared permit applications for Phase A pipelines.
- Completed bid documents and obtained easements and permits for Phase A pipelines.
- Geotechnical and easement acquisition work was under way on Phase B pipelines.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/South/KentAuburn.aspx

Milestone Schedule



Schedule Adjustments

Construction has been delayed to 2012 due to budget constraints.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	0	940,357	42,568	5,294	8,087,638	9,798,966
Construction Contracts		896,512	0	0	7,993,338	9,704,588
Other Capital Charges	0	43,845	42,568	5,294	94,300	94,378
NON-CONSTRUCTION	2,086,774	1,787,496	1,880,615	5,943,833	8,071,228	8,449,807
Engineering	1,559,530	750,000	850,000	4,296,664	3,747,974	4,905,134
Planning & Management Svcs.	0	318,940	159,650	4,000	728,083	293,084
Permitting & Other Agency Support	39,606	0	13,050	45,988	277,388	19,432
Right-of-Way	100,212	0	160,700	100,212	491,727	160,700
Misc. Services & Materials	46,602	196,797	191,065	138,447	561,364	491,691
Staff Labor	340,824	521,760	506,150	1,358,523	2,264,693	2,579,767
PROJECT RESERVE			0	0		1,701,206
Project Reserve			0	0		1,701,206
Total (incl Credits & Revenues)	2,086,774	2,727,854	1,923,183	5,949,127	16,158,866	19,949,980
Total Credits & Revenues						
Total (w/out Credits & Revenues)	2,086,774	2,727,854	1,923,183	5,949,127	16,158,866	19,949,980

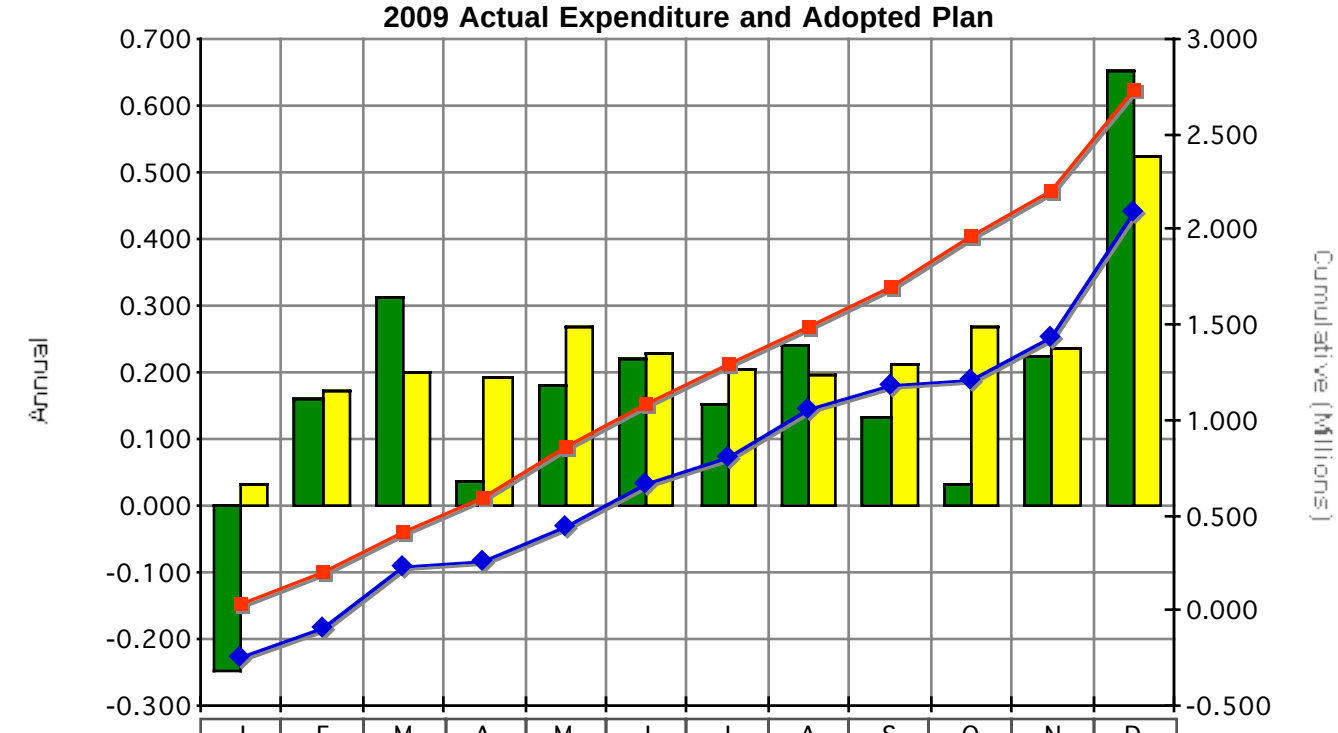
Cost/Budget Adjustments

The increase in estimated lifetime budget costs reflects inflation associated with delaying construction.

Contract Status

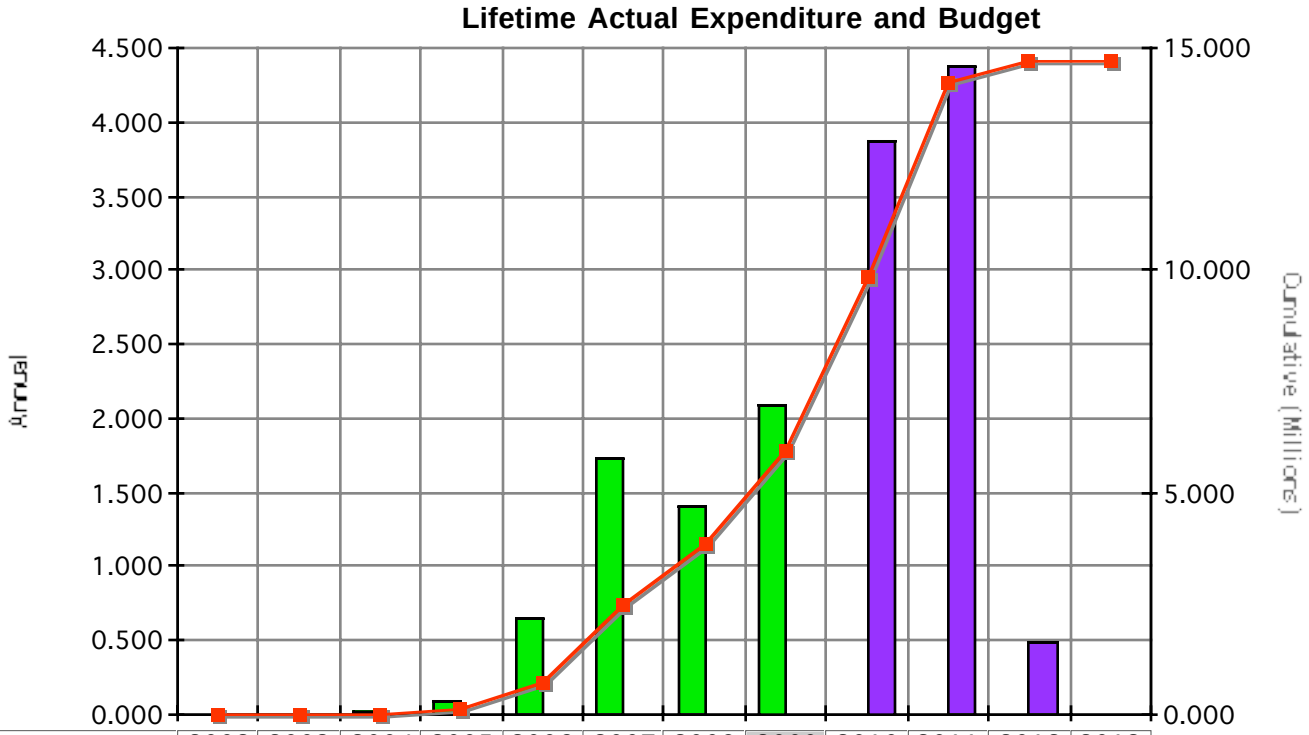
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Engineering Services for Kent Auburn Conveyance System E53009E	$2,686,967	$2,107,416	$4,794,383	$468,462	10%	4	$5,262,845	$2,995,496	31	57%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.247	0.159	0.312	0.034	0.180	0.219	0.152	0.238	0.130	0.033	0.224	0.653
Adopted Plan	0.033	0.172	0.199	0.191	0.267	0.226	0.205	0.196	0.213	0.267	0.235	0.524
Cum. Plan	0.033	0.205	0.404	0.595	0.862	1.088	1.293	1.489	1.702	2.204	2.204	2.728
Cum. Act	-0.247	-0.089	0.223	0.258	0.438	0.657	0.809	1.047	1.177	1.211	1.434	2.087

Lifetime Cash Flow



Pre-02 Act 0.000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09			0.015	0.087	0.643	1.721	1.396	2.087				
Budget									3.868	4.376	0.490	0.000
CumAct+Bdgt	0.000	0.000	0.015	0.102	0.745	2.466	3.862	5.950	9.818	14.19	14.68	14.68

RWSP Project Report
DECEMBER 2009

423596 North Creek Pipeline

Project Phase: 4 Implementation

Project Description

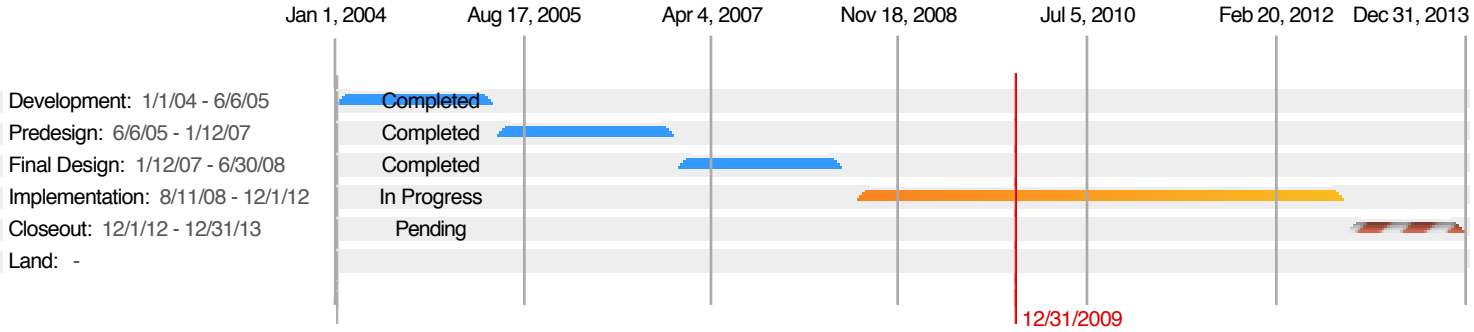
Improvements to the County's North Creek Interceptor and Alderwood Water and Wastewater District's (AWWD) Olympus Meadows Trunk Sewer are necessary to avoid overflows and meet planned growth needs in southwestern Snohomish County. The project, located in unincorporated Snohomish County and the City of Bothell, includes constructing 16,400 feet of 21- to 48-inch gravity sewer pipes. The pipes will be installed using open-cut construction and by microtunneling where the pipe crosses areas with high potential for traffic or environmental impacts.

In 2005, King County signed an interlocal agreement with the AWWD. Under the agreement, the County was responsible for project costs and review and approval of design documents and key project decisions; AWWD was responsible for managing design and construction of the project.

In 2008, AWWD contracted with Frank Coluccio Construction Company to construct the North and South Segment Contracts. In spring 2009, AWWD initiated a process to terminate for convenience the construction contracts after the pipelines had been partially constructed. Resolution is ongoing.

The County has decided to proceed with construction of improvements to its North Creek Interceptor, and AWWD will complete construction of its Olympus Meadows Trunk Sewer. The County is negotiating an agreement with AWWD to transfer the consultant contract from AWWD to the County. The project scope, schedule, and budget will be revised in 2010.

Milestone Schedule



Schedule Adjustments

The schedule to complete construction will be determined in 2010, once the project is officially transferred to the County.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	13,671,381	23,462,553	6,000,000	13,671,381	38,093,460	28,507,750
Construction Contracts	13,671,381	23,462,553	6,000,000	13,671,381	38,093,460	28,507,750
Outside Agency Construction		0	0	0	0	0
NON-CONSTRUCTION	-891,553	1,734,033	2,000,000	9,425,770	6,884,142	19,904,992
Engineering	-5,566,863	350,000	300,000	3,276,587	3,651,824	9,743,450
Planning & Management Svcs.	1,293,776	1,215,790	1,000,000	1,293,776	2,295,880	5,500,000
Permitting & Other Agency Support	1,616,822	0	95,000	1,616,822	0	392,763
Right-of-Way				0		
Misc. Services & Materials	426,157	0	144,200	669,501	45,854	959,174
Staff Labor	1,338,555	168,243	460,800	2,569,085	890,584	3,309,606
ADJUSTMENTS			0	0		0
Adjustments			0	0		0
Total (incl Credits & Revenues)	12,779,828	25,196,587	8,000,000	23,097,152	44,977,602	48,412,743
Total Credits & Revenues						
Total (w/out Credits & Revenues)	12,779,828	25,196,587	8,000,000	23,097,152	44,977,602	48,412,742

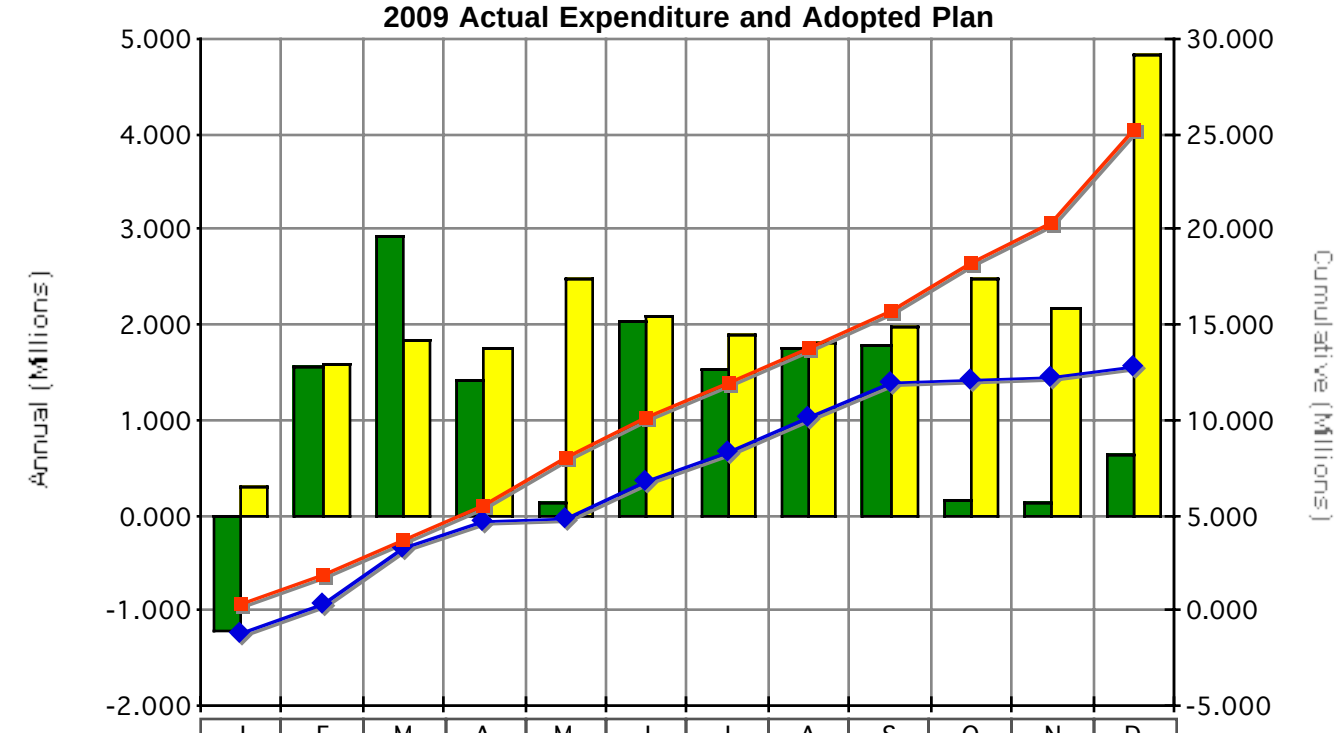
Cost/Budget Adjustments

The construction contracts will be terminated for convenience in 2010 or 2011. Redesign and bidding the project will increase project costs. The County plans to establish updated project cost baselines in 2010.

Contract Status

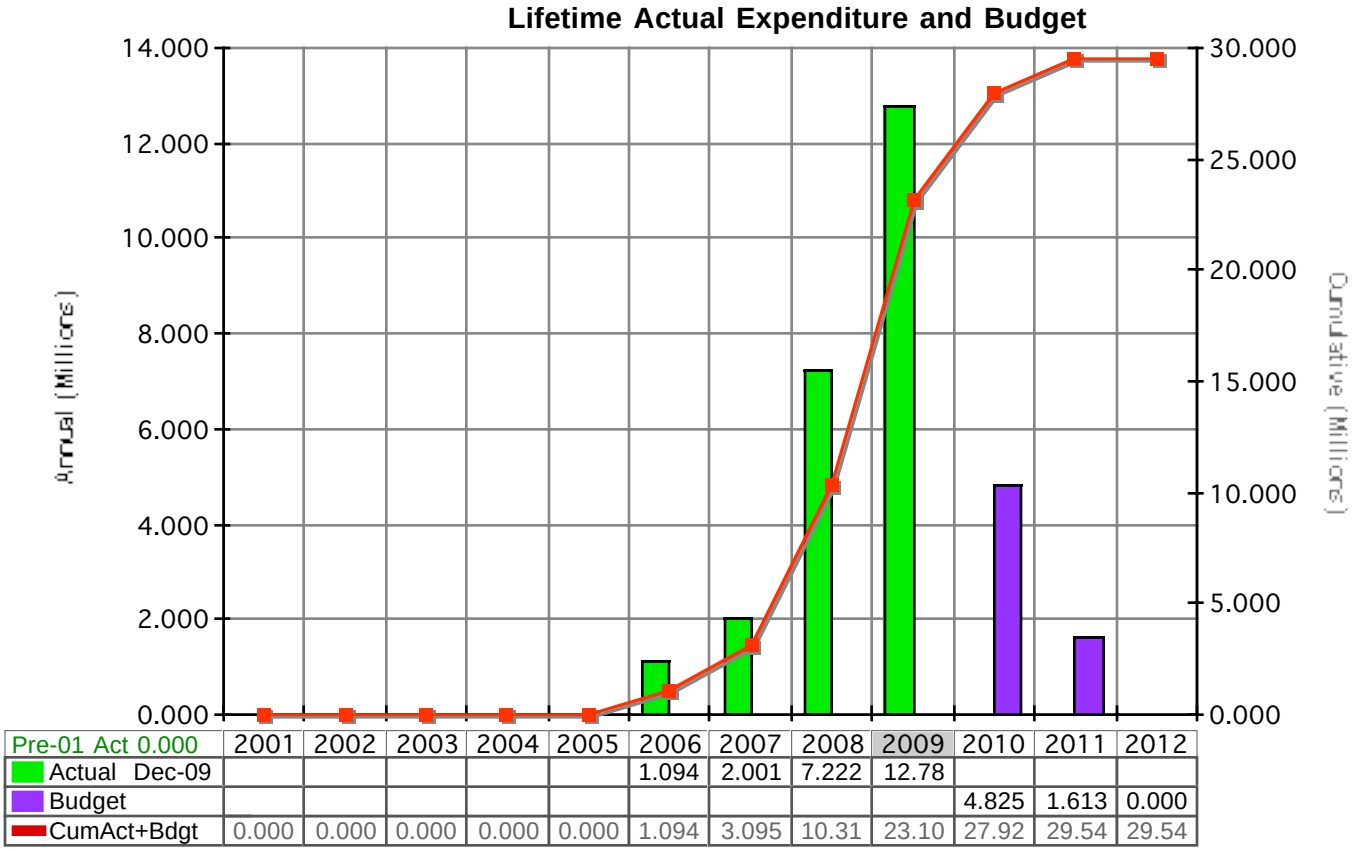
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
North Creek Interceptor Improvements A-NCI-2005	$31,100,000	$0	$31,100,000	$0	0%		$31,100,000	$20,056,795	51	64%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-1.223	1.543	2.918	1.422	0.133	2.030	1.534	1.749	1.788	0.146	0.123	0.618
Adopted Plan	0.302	1.587	1.839	1.764	2.469	2.091	1.890	1.814	1.965	2.469	2.167	4.838
Cum. Plan	0.302	1.890	3.729	5.493	7.962	10.05	11.94	13.75	15.72	20.35	20.35	25.19
Cum. Act	-1.223	0.320	3.237	4.659	4.792	6.822	8.356	10.10	11.89	12.03	12.16	12.78

Lifetime Cash Flow



Pre-01 Act 0.000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Actual Dec-09						1.094	2.001	7.222	12.78			
Budget										4.825	1.613	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	1.094	3.095	10.31	23.10	27.92	29.54	29.54

RWSP Project Report
DECEMBER 2009

423626 Bellevue Influent Trunk Improvements

Project Phase: 3 Final Design

Project Description

This project, located in the City of Bellevue, will provide additional needed capacity to approximately 1,600 feet of the existing Bellevue Influent Trunk to meet the projected 20-year peak flow storm design standard. The trunk conveys flows to the Bellevue Pump Station. This project will also design and construct a new portion of the City of Bellevue's West Central Business District (CBD) Trunk in order to connect the City's flows to the Bellevue Influent Trunk (BIT) further upstream than they currently connect. The City will cover the costs associated with the improvements to the City's West CBD Trunk and also share a portion of the BIT design, construction, and staff labor costs. Construction is expected to begin in spring 2011.

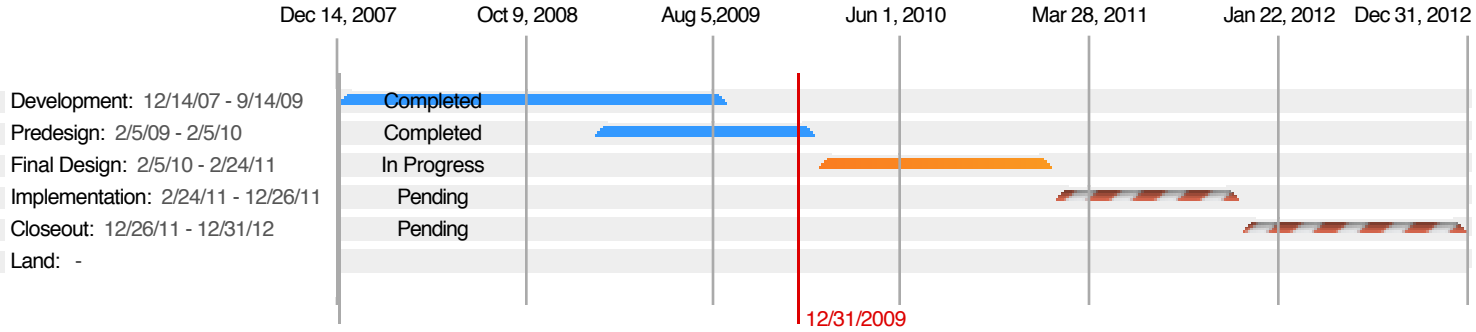
Efforts in 2009 focused on project planning and alternatives analysis. Highlights of achievements are as follows:

- Issued a notice to proceed to Jacobs Engineering in February.
- Gathered soil, groundwater, utility, and infrastructure data to assess soil conditions, which will help to determine construction approaches.
- Completed alternatives analysis in August.
- Completed final predesign report in December.
- Provided project updates to potentially affected residents and businesses.

The project team will continue to work closely with the City of Bellevue and affected residents and businesses throughout the project.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/East/BellevueInfluentTrunk.aspx

Milestone Schedule



Schedule Adjustments

There were no major schedule adjustments in 2009. The baseline budget and schedule are expected to be established in 2010.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	21,316	0	0	21,316	1,372,596	1,756,112
Construction Contracts	14,711	0	0	14,711	1,368,445	1,751,961
Other Capital Charges	6,605	0	0	6,605	4,151	4,151
NON-CONSTRUCTION	565,055	430,190	581,357	565,055	1,504,481	1,574,825
Engineering	414,235	353,523	503,202	414,235	1,115,887	1,111,730
Planning & Management Svcs.	66	3,443	3,342	66	14,402	13,983
Permitting & Other Agency Support	782	0	0	782	18,032	17,489
Misc. Services & Materials	7,950	6,025	6,025	7,950	25,205	25,205
Staff Labor	142,023	67,200	68,788	142,023	330,955	406,418
PROJECT RESERVE		0	0	0	0	845,308
Project Reserve		0	0	0	0	845,308
Total (incl Credits & Revenues)	586,371	430,190	581,357	586,371	2,877,077	4,176,245
Total Credits & Revenues						
Total (w/out Credits & Revenues)	586,371	430,190	581,357	586,371	2,877,077	4,176,245

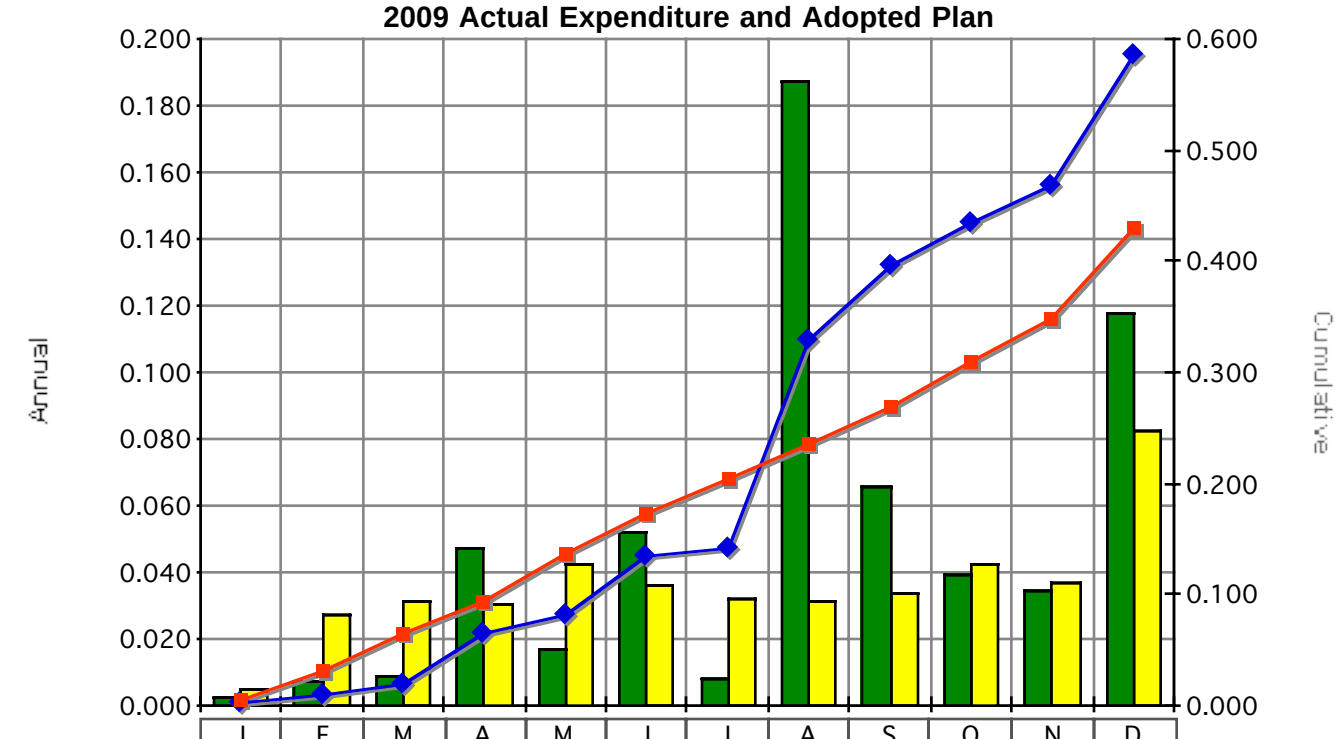
Cost/Budget Adjustments

The budget forecast is $1.2 million higher in 2009 than the original planning level-estimate. This is due to an increase in forecasted construction costs (approximately $400,000) to include funds for lining or rehabilitation of the existing Bellevue Influent Trunk and adding project contingency funds (approximately $800,000) which were inadvertently left out of the final lifetime budget forecast. The baseline budget and schedule are expected to be established in 2010 and will more accurately reflect the elements of the selected alternative.

Contract Status

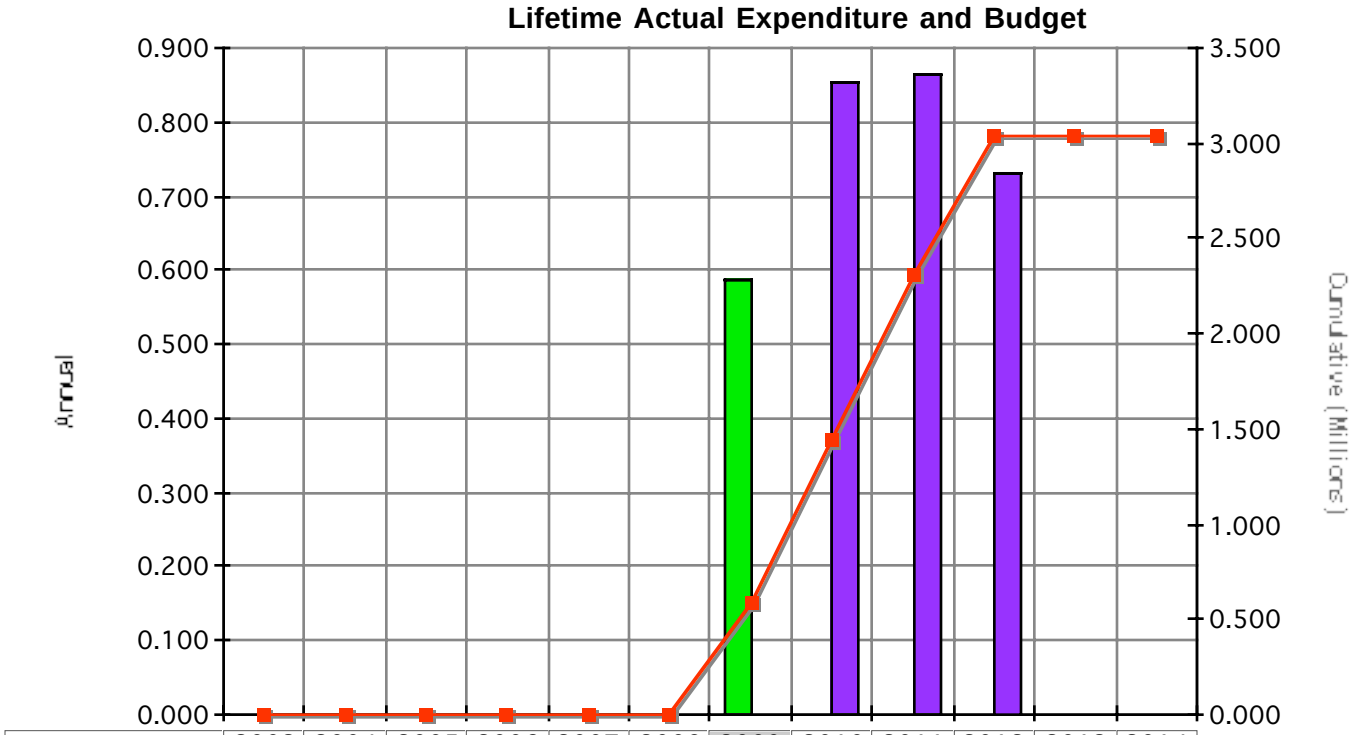
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Engineering Services for the Bellevue Influent Trunk E00119E08	$579,513	$0	$579,513	$614,290	106%	2	$1,193,803	$316,300	7	26%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	0.003	0.007	0.008	0.047	0.017	0.052	0.008	0.187	0.065	0.039	0.035	0.118
Adopted Plan	0.005	0.027	0.031	0.030	0.042	0.036	0.032	0.031	0.034	0.042	0.037	0.083
Cum. Plan	0.005	0.032	0.064	0.094	0.136	0.172	0.204	0.235	0.268	0.348	0.348	0.430
Cum. Act	0.003	0.010	0.018	0.066	0.082	0.134	0.143	0.330	0.395	0.434	0.469	0.586

Lifetime Cash Flow



Pre-03 Act 0.000	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Actual Dec-09							0.586					
Budget								0.854	0.863	0.730	0.000	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	0.000	0.586	1.440	2.303	3.033	3.033	3.033

RWSP Project Report
DECEMBER 2009

423627 Sunset/Heathfield Pump Station Replacement and Force Main Upgrade

Project Phase: 1 Development

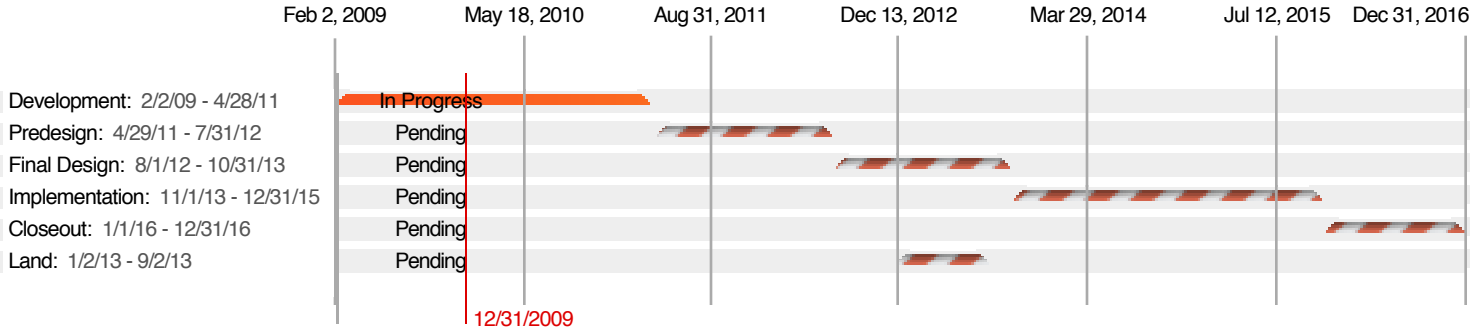
Project Description

This project, located in the City of Bellevue will either modify or replace the existing Sunset and Heathfield Pump Stations and the Vasa Park force mains to address identified capacity needs and meet the 20-year peak flow storm design standard and future growth needs in the South Lake Sammamish Basin. Adding capacity will allow WTD to continue to safely and reliably convey wastewater flows from areas in Sammamish, Issaquah, and Bellevue to the South Treatment Plant.

Efforts in 2009 focused on project planning and development and conducting technical analyses and assessments of the facilities' existing equipment. A Request for Proposal was issued in August and consultant selection occurred in December. Contract negotiations are expected to be initiated in early 2010.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/East/SunsetHeathfield.aspx

Milestone Schedule



Schedule Adjustments

There were no major adjustments made to the schedule. The project's baseline budget and schedule are expected to be established in 2011.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION		0	0	0	38,319,486	35,342,827
Construction Contracts		0	0	0	38,319,486	35,342,827
NON-CONSTRUCTION	162,033	940,868	255,834	162,033	13,746,038	13,170,669
Engineering		748,842	100,000	0	6,099,304	5,558,371
Planning & Management Svcs.	0	10,300	0	0	261,247	3,119,370
Permitting & Other Agency Support		0	0	0	712,131	718,686
Right-of-Way		0	0	0	157,091	158,730
Misc. Services & Materials	17,248	0	0	17,248	563,077	570,705
Staff Labor	144,785	181,727	155,834	144,785	5,953,188	3,044,806
PROJECT RESERVE		0	0	0	18,850,155	22,397,172
Project Reserve		0	0	0	18,850,155	22,397,172
Total (incl Credits & Revenues)	162,033	940,868	255,834	162,033	70,915,679	70,910,66
Total Credits & Revenue s						
Total (w/out Credits & Revenues)	162,033	940,868	255,834	162,033	70,915,679	70,910,668

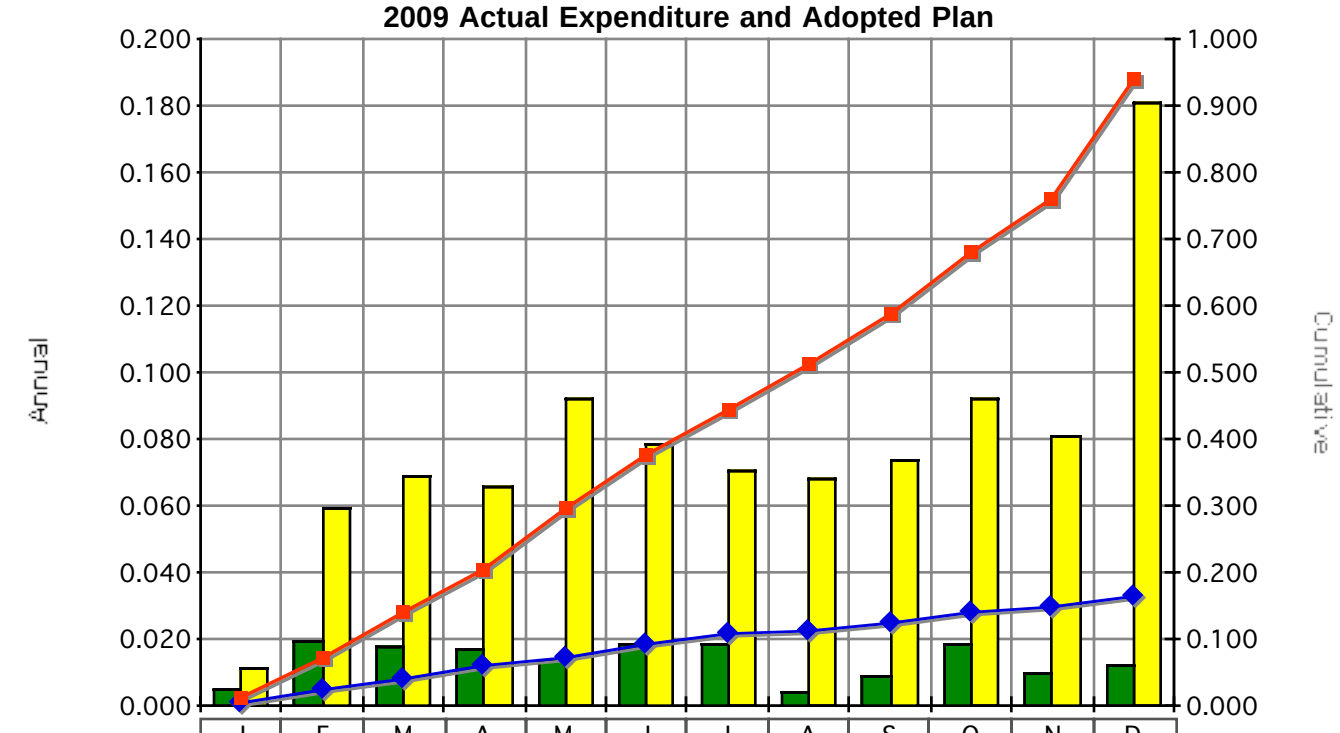
Cost/Budget Adjustments

The project's baseline budget and schedule are expected to be established in 2011.

Contract Status

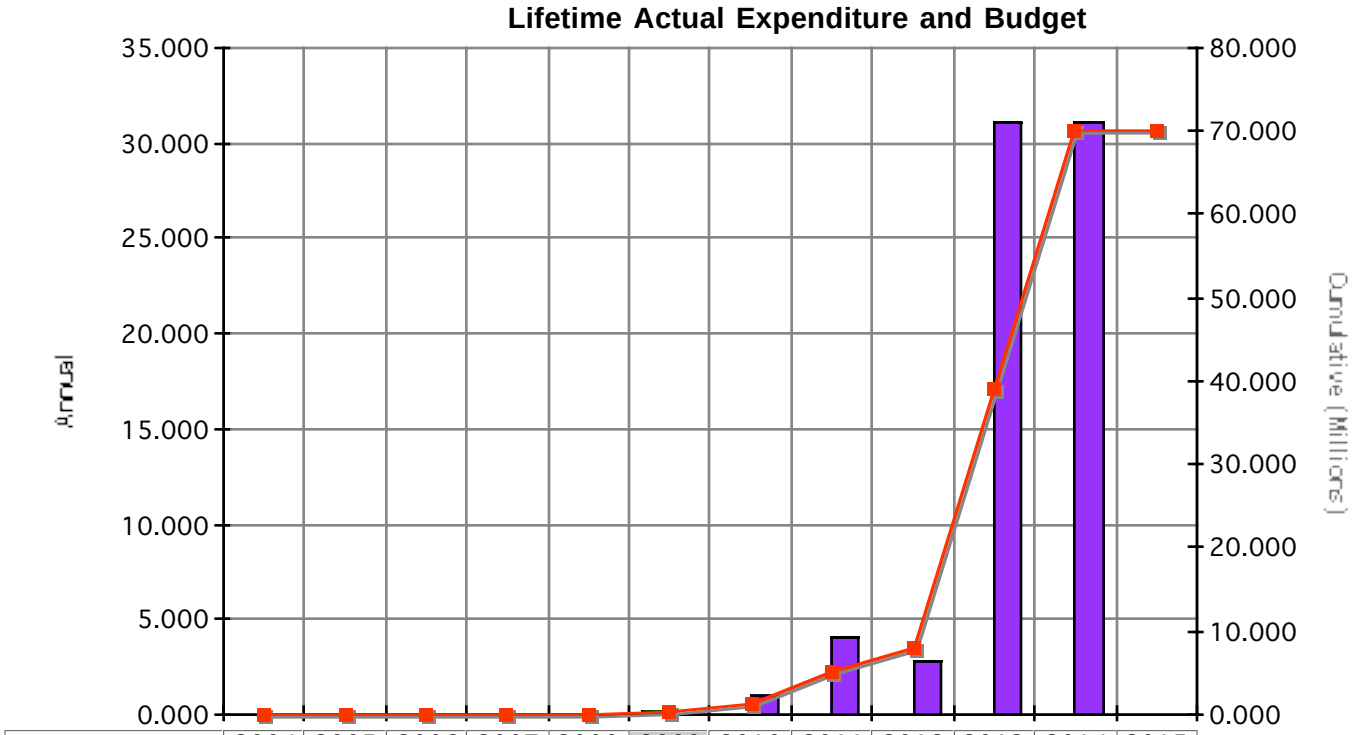
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	0.005	0.019	0.018	0.017	0.013	0.019	0.019	0.004	0.009	0.018	0.009	0.012
Adopted Plan	0.011	0.059	0.069	0.066	0.092	0.078	0.071	0.068	0.073	0.092	0.081	0.181
Cum. Plan	0.011	0.071	0.139	0.205	0.297	0.375	0.446	0.514	0.587	0.760	0.760	0.941
Cum. Act	0.005	0.024	0.042	0.059	0.072	0.091	0.109	0.114	0.122	0.140	0.150	0.162

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09						0.162						
Budget							1.021	4.066	2.745	31.07	31.07	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	0.162	1.183	5.249	7.994	39.06	70.13	70.13

RWSP Project Report
DECEMBER 2009

423373 RWSP Conveyance System Improvements 368 Decennial Flow Monitoring

Project Phase: 4 Implementation

Project Description

To confirm assumptions and conveyance improvement needs, RWSP conveyance policies call for WTD to conduct systemwide flow monitoring every 10 years to correspond with the population census. Per this direction, the Decennial Flow Monitoring project started up in 2009 to collect accurate flow data over two wet seasons coincident with the 2010 population census. The data will be used to update the prioritization, timing, and sizing of conveyance system improvement capital projects and will also be helpful in project design. The data will also be available to the local agencies for their use in planning and design.

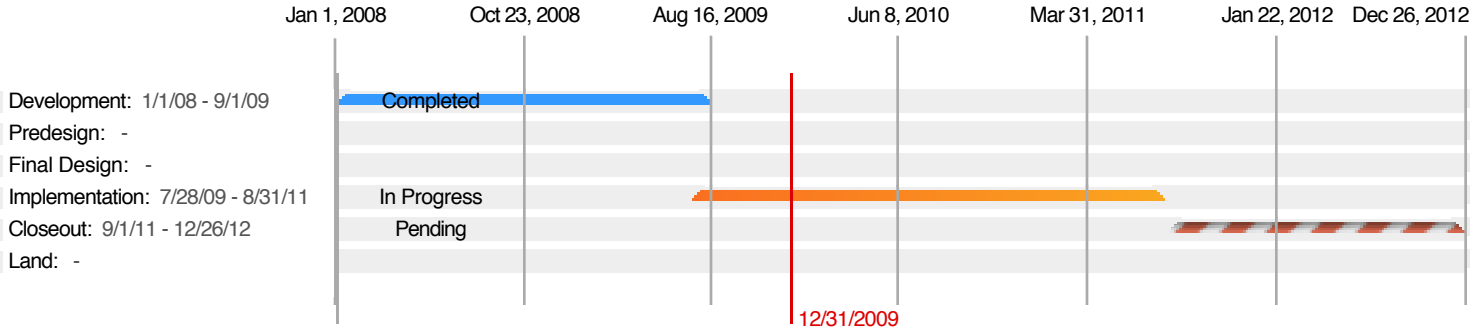
Highlights of activities in 2009 include the following:

- Awarded contract to purchase flow metering equipment.
- Hired field and data analysis term-limited temporary staff.
- Acquired necessary rights-of-entry, rights-of-way, and street use permits from local agencies and property owners.
- Installed flow monitoring units and established 232 monitoring locations in the separated portions of WTD's service area. The flow monitoring units include 219 portable area-velocity flow meters and 13 pump station meters.
- Began official monitoring in September.
- Launched project website.

Other activities include ongoing data review and analysis and maintenance of flow meters as needed.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wastewater/CSI/FlowMonitoring/DecennialFM.aspx

Milestone Schedule



Schedule Adjustments

No major schedule adjustments are anticipated.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	1,305,532	0	2,151,100	1,305,532	0	2,151,100
Owner Furnished Equipment	1,305,532	0	2,151,100	1,305,532	0	2,151,100
NON-CONSTRUCTION	652,395	1,111,514	1,212,000	735,423	5,524,446	3,267,136
Permitting & Other Agency Support	3,735	0	0	3,735	0	0
Misc. Services & Materials	118,612	152,976	440,000	119,029	2,767,871	654,501
Staff Labor	530,048	958,539	772,000	612,658	2,756,575	2,612,635
Total (incl Credits & Revenues)	1,957,927	1,111,514	3,363,100	2,040,955	5,524,446	5,418,236
Total Credits & Revenues						
Total (w/out Credits & Revenues)	1,957,927	1,111,514	3,363,100	2,040,955	5,524,446	5,418,236

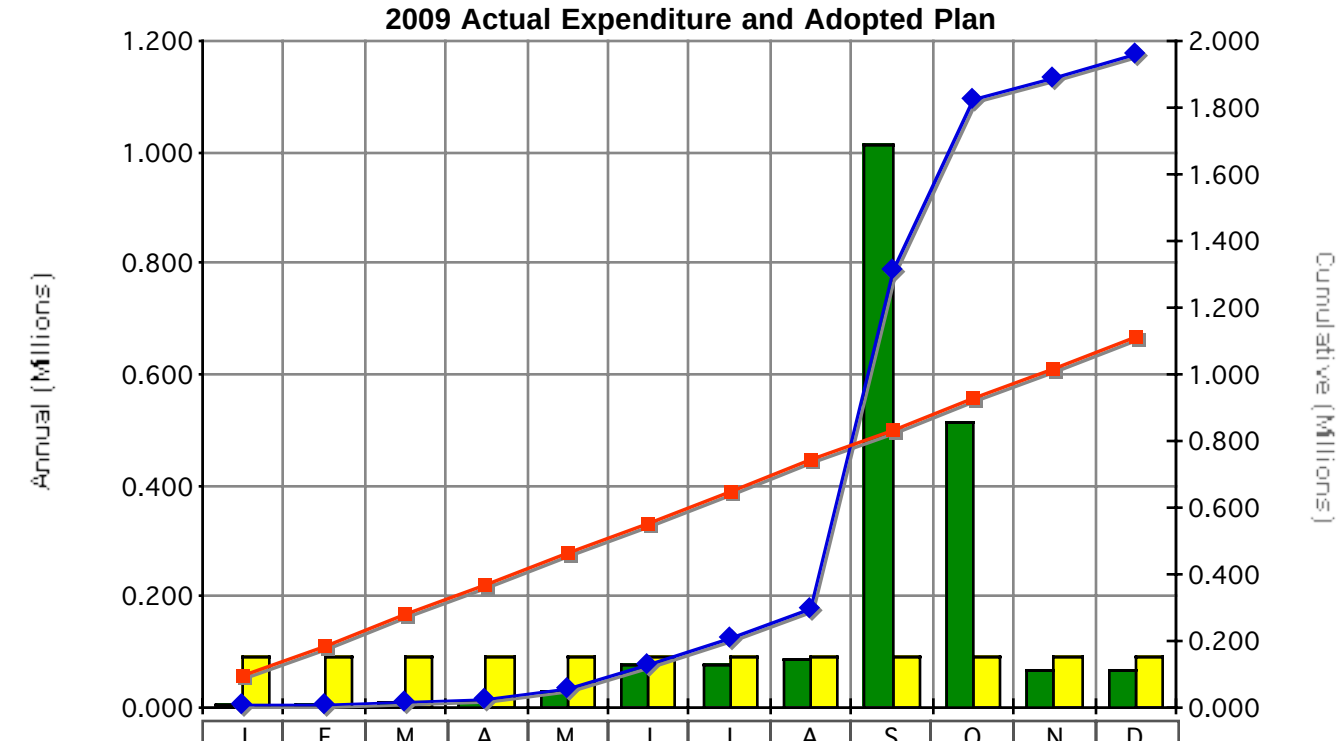
Cost/Budget Adjustments

No major adjustments to the lifetime budget are anticipated.

Contract Status

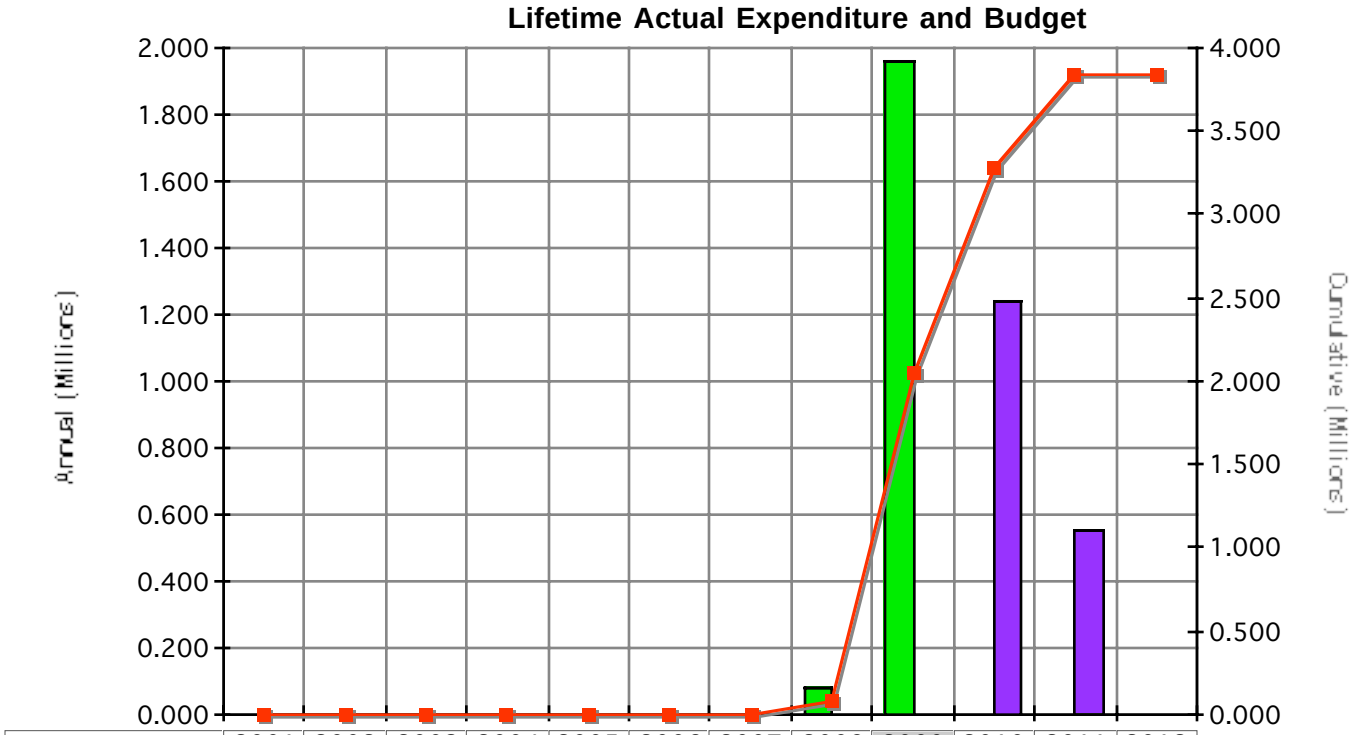
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	0.006	0.003	0.008	0.009	0.029	0.076	0.075	0.088	1.015	0.514	0.066	0.069
Adopted Plan	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093
Cum. Plan	0.093	0.185	0.278	0.371	0.463	0.556	0.648	0.741	0.834	1.019	1.019	1.112
Cum. Act	0.006	0.009	0.016	0.025	0.055	0.130	0.206	0.294	1.309	1.823	1.889	1.958

Lifetime Cash Flow



Pre-01 Act 0.000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Actual Dec-09								0.083	1.958			
Budget										1.239	0.552	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	2.041	3.280	3.832	3.832

RWSP Project Report
DECEMBER 2009

423618 RWSP Local Systems I/I Implementation (Initial I/I Reduction Projects)

Project Phase: 3 Final Design

Project Description

The purpose of this project is to implement the Executive's Recommended Infiltration and Inflow (I/I) Control Program that was approved by the King County Council in May 2006 through Motion 12292. The recommended program calls for the County and the local agencies to select, implement, and evaluate two or three "initial" I/I reduction projects to test the effectiveness of I/I reduction on a larger scale than the pilot projects that were completed in 2004. A primary goal is to determine whether and under what conditions it is possible to cost-effectively remove enough I/I from the collection system to delay, reduce, or eliminate a planned regional conveyance system improvement project. The results of the initial projects will be used to develop recommendations to the King County Council regarding long-term I/I reduction and control.

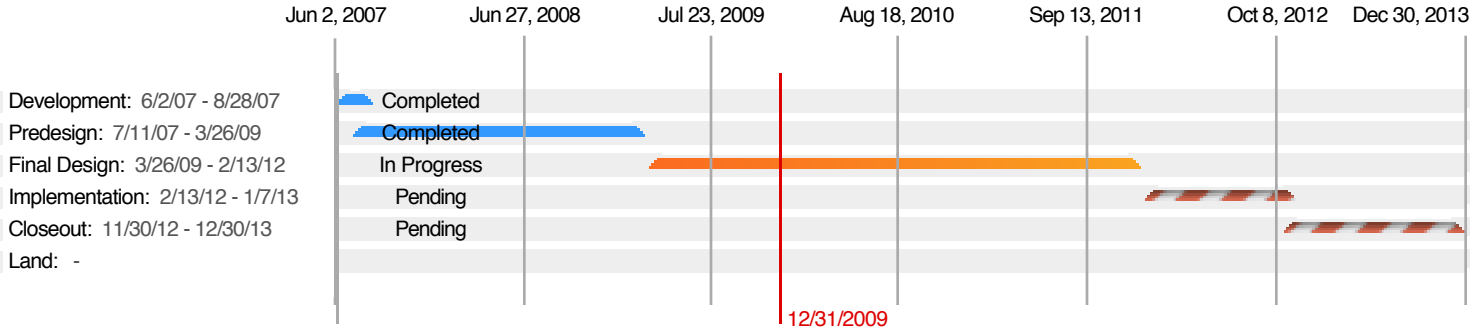
Accomplishments in 2009 include the following:

- Completed alternatives analysis report in spring. The report documents the results of the alternatives analysis and process to select the final initial I/I reduction projects. (The analysis was conducted in 2008 and results were summarized in the RWSP 2008 Annual Report.)
- Completed 30 percent presdesign on the selected initial I/I reduction projects: Skyway Initial I/I reduction project and combined Issaquah/Bellevue Initial I/I reduction project.
- Coordinated with projects' host local agencies on design review and public involvement and right of entry planning (approximately 570 right-of-entry agreements will need to be obtained during 2010-2011 timeframe).

WTD continues to work closely with the Metropolitan Water Pollution Abatement Advisory Committee to review project results and develop conclusions and recommendations on long-term I/I reduction and control.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wastewater/II/InitialProjects.aspx

Milestone Schedule



Schedule Adjustments

There were no major schedule adjustments.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	0	27,192	0	204,004	14,637,566	9,434,180
Construction Contracts	0	0	0	204,004	14,376,770	9,434,180
Owner Furnished Equipment		27,192	0	0	260,796	0
NON-CONSTRUCTION	849,283	1,140,804	832,809	1,767,020	4,360,346	4,727,904
Engineering	649,677	721,000	613,000	1,272,678	2,331,389	2,698,473
Planning & Management Svcs.	0	0	0	779	0	3,963
Permitting & Other Agency Support	0	28,091	0	559	52,202	83,743
Misc. Services & Materials	22,350	32,656	32,656	45,806	156,194	150,445
Staff Labor	177,256	359,057	187,153	447,198	1,820,561	1,791,280
PROJECT RESERVE		0	0	0	776,134	1,991,654
Project Reserve		0	0	0	776,134	1,991,654
ADJUSTMENTS			0	0		-1
Adjustments			0	0		-1
Total (incl Credits & Revenues)	849,283	1,167,996	832,809	1,971,025	19,774,046	16,153,737
Total Credits & Revenues						
Total (w/out Credits & Revenues)	849,283	1,167,996	832,809	1,971,025	19,774,046	16,153,737

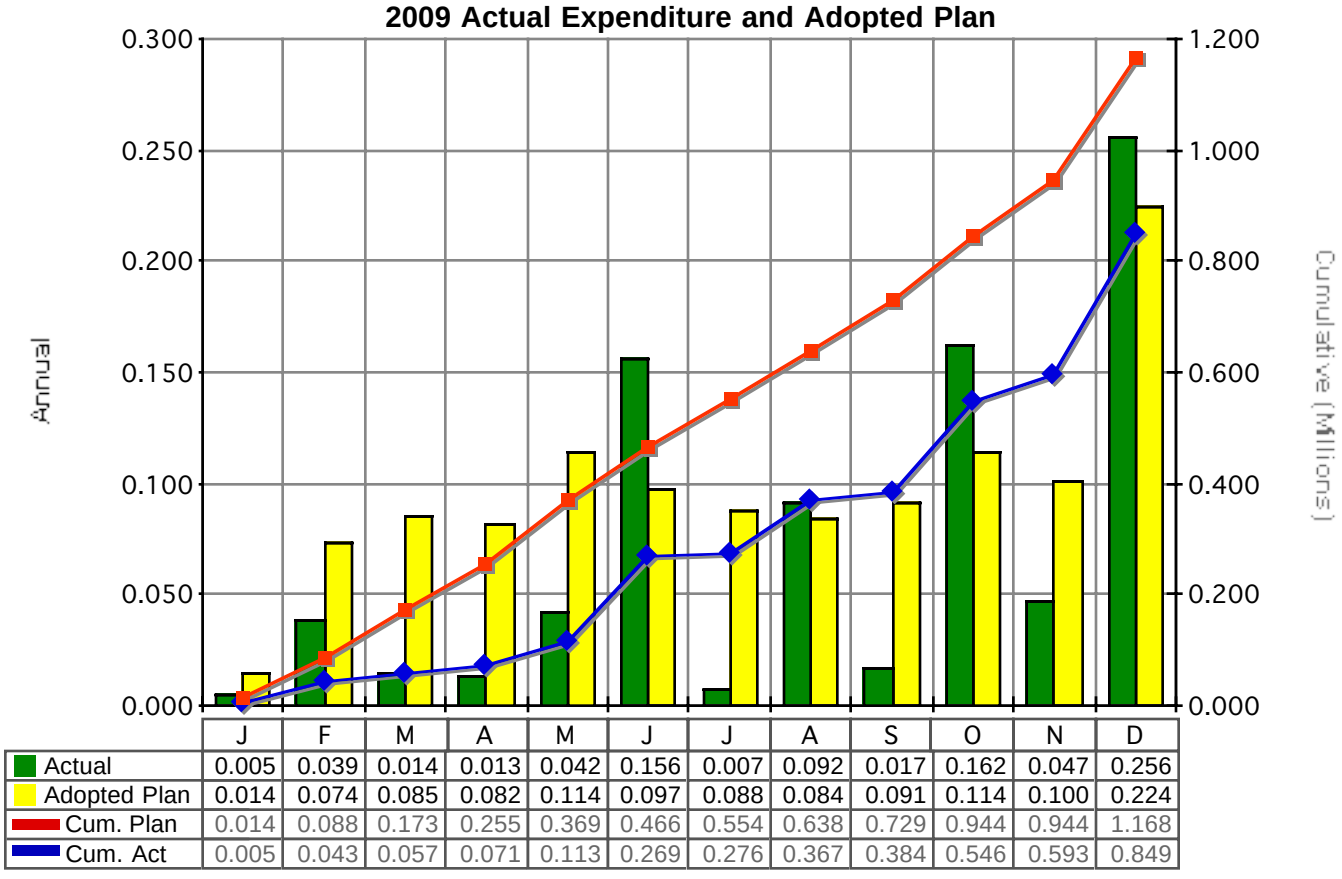
Cost/Budget Adjustments

The lifetime budget was reduced by $3.7 million because the alternatives selected have a lower total project cost than the amount allowed for in the planning level budget.

Contract Status

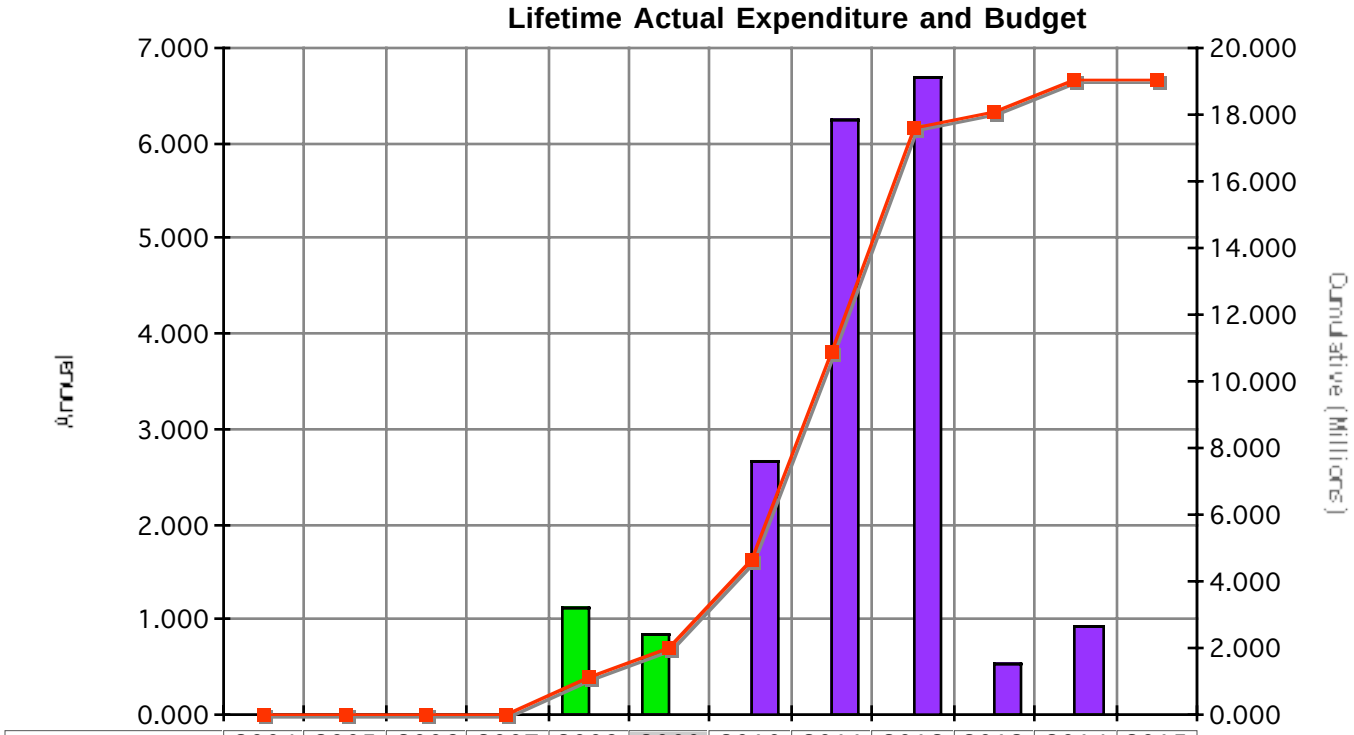
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Engineering Services for Initial Infiltration/Inflow Reduction E00057E07	$1,393,139	$1,388,756	$2,781,895	$18,741	1%	4	$2,800,635	$1,472,960	28	53%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	0.005	0.039	0.014	0.013	0.042	0.156	0.007	0.092	0.017	0.162	0.047	0.256
Adopted Plan	0.014	0.074	0.085	0.082	0.114	0.097	0.088	0.084	0.091	0.114	0.100	0.224
Cum. Plan	0.014	0.088	0.173	0.255	0.369	0.466	0.554	0.638	0.729	0.944	0.944	1.168
Cum. Act	0.005	0.043	0.057	0.071	0.113	0.269	0.276	0.367	0.384	0.546	0.593	0.849

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09					1.122	0.850						
Budget							2.654	6.258	6.698	0.534	0.919	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	1.122	1.971	4.626	10.88	17.58	18.11	19.03	19.03

423593 WP Digestion Improvements

Project Phase: 3 Final Design

Project Description

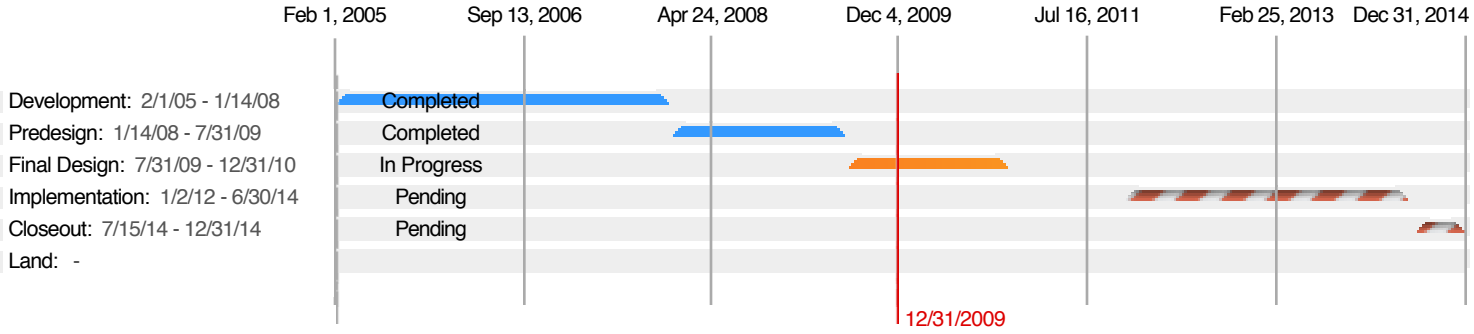
The purpose of this project is to increase system reliability, optimize operations, and provide emergency capacity of the West Point Treatment Plant solids digestion system. Improvements will include:

- Making modifications to the blending storage tank (Digester 6) to enable its use as an emergency backup digester in the event of system instability or failure.
- Providing more tools for operators to manage the system, such as flow meters and liquid level sensors, to increase the efficiency and effectiveness of operations and allow accurate measurement and control of feed to each digester.
- Improving the Digester 4 and 5 mixing to provide robust and reliable mixing and repair digester gas leaks.
- Improving the digester feed system by installing grinders, upgrading feed pumps, and installing a preheat loop and heat exchanger.

Activities in 2009 include the following:

- Issued final design notice to proceed in July. Final design is expected to be complete in 2010.
- Conducted technical evaluations to reduce predesign risks, including hydraulic testing, preparation of 30 percent process and instrumentation drawings, and an evaluation of process safety requirements.
- Held a construction phasing workshop in November. The purpose of the workshop was to develop recommendations on ways to reduce costs and phase the project elements to provide budget and plant staff flexibility.

Milestone Schedule



Schedule Adjustments

There were no major adjustments to the schedule.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	0	0	0	92	6,167,349	6,349,480
Construction Contracts		0	0	0	6,151,807	6,349,388
Owner Furnished Equipment	0	0	0	92	92	92
Other Capital Charges		0	0	0	15,450	0
NON-CONSTRUCTION	335,244	424,189	332,978	1,168,771	3,680,760	3,748,206
Engineering	175,466	237,257	145,737	538,958	1,715,110	1,786,768
Planning & Management Svcs.		30,900	0	0	177,654	99,985
Misc. Services & Materials	7,393	4,120	0	51,038	100,624	108,591
Staff Labor	152,385	151,912	187,241	578,774	1,687,372	1,752,862
PROJECT RESERVE		0	0	0	1,357,352	1,398,073
Project Reserve		0	0	0	1,357,352	1,398,073
Total (incl Credits & Revenues)	335,244	424,189	332,978	1,168,863	11,205,462	11,495,75
Total Credits & Revenues						
Total (w/out Credits & Revenues)	335,244	424,189	332,978	1,168,863	11,205,462	11,495,759

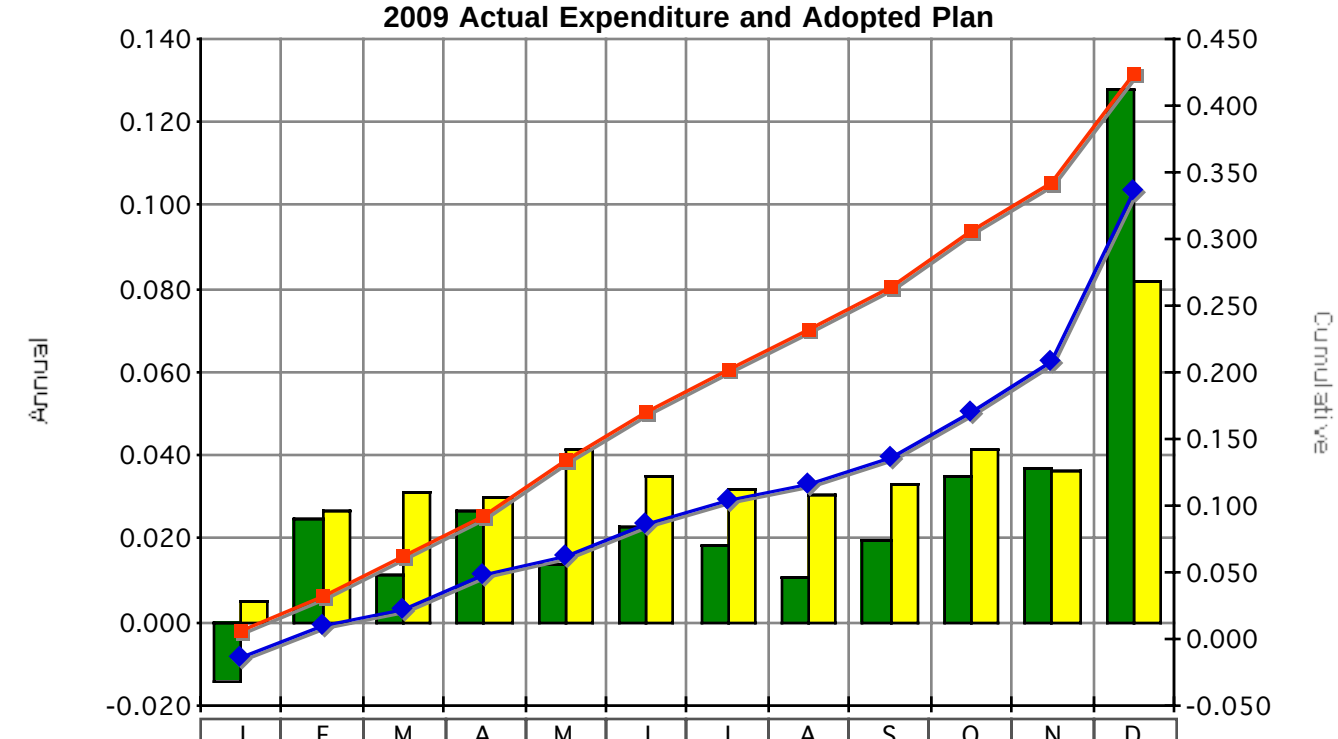
Cost/Budget Adjustments

There were no major adjustments to the project's lifetime budget.

Contract Status

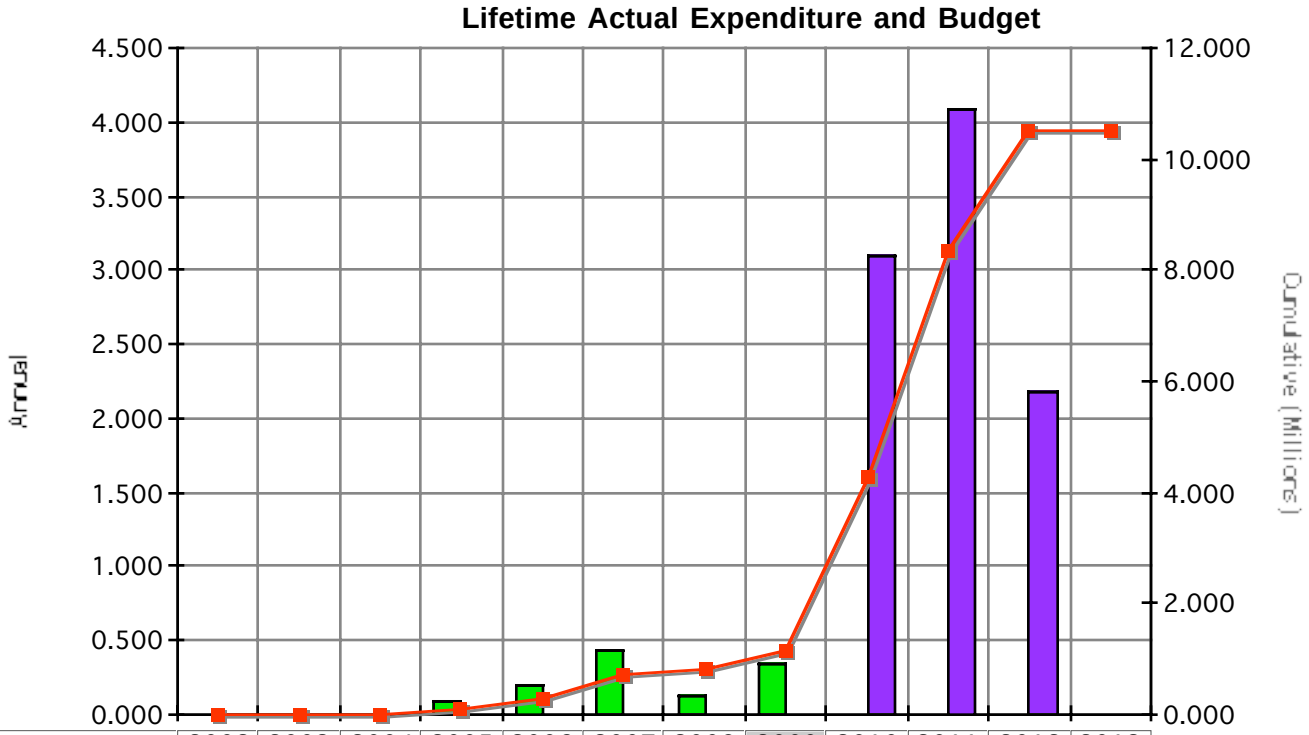
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
West Point Treatment Plant Digestion System E53025E	$382,148	$893,799	$1,275,947	$0	0%	7	$1,275,947	$499,620	32	39%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.014	0.025	0.011	0.027	0.014	0.023	0.019	0.011	0.020	0.035	0.037	0.128
Adopted Plan	0.005	0.027	0.031	0.030	0.042	0.035	0.032	0.031	0.033	0.042	0.036	0.081
Cum. Plan	0.005	0.032	0.063	0.092	0.134	0.169	0.201	0.232	0.265	0.343	0.343	0.424
Cum. Act	-0.014	0.010	0.022	0.049	0.063	0.086	0.105	0.115	0.135	0.170	0.208	0.335

Lifetime Cash Flow



Pre-02 Act 0.000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09				0.088	0.194	0.426	0.125	0.335				
Budget									3.102	4.081	2.180	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.088	0.283	0.709	0.834	1.169	4.271	8.352	10.53	10.53

RWSP Project Report
DECEMBER 2009

423607 CSO Control & Improvements - Magnolia

Project Phase: 1 Development

Project Description

This project is one of four Combined Sewer Overflow (CSO) control projects along Puget Sound beaches. To meet state regulations, King County's goal is to reduce the number of CSOs each year, with a long-term goal of no more than one untreated discharge per location per year.

Efforts in 2009 focused on developing, evaluating, and selecting alternatives for further analyis. Approaches looked at include storage, on-site treatment, conveyance and treatment, and peak flow reduction (demand management). A workshop was held in May to discuss the range of approaches with tribes and state and local agencies, and a public open house and a community meeting were held in October.

In December, the following three alternatives were identified for further refinement and evaluation in 2010:

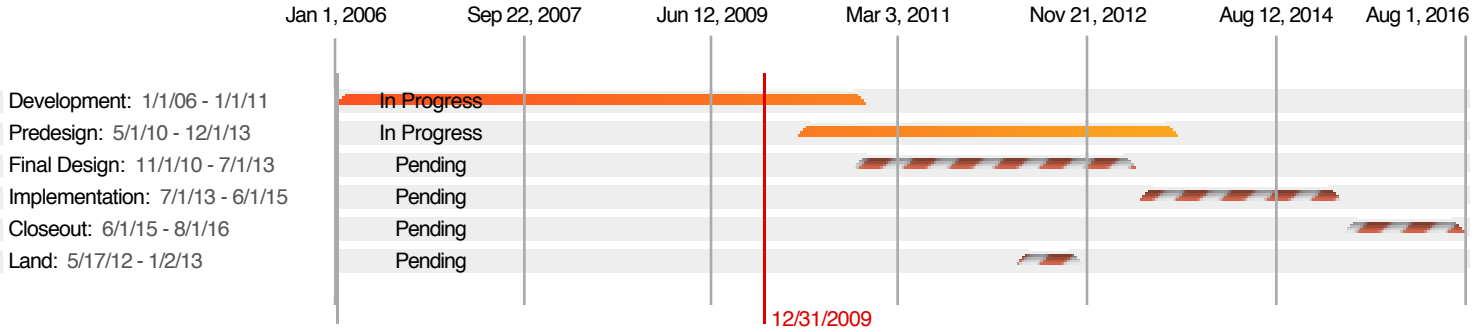
- **32nd Avenue W (Bottom-of-Basin Underground Storage).** The elements of this alternative are an underground 1.8 million gallon storage tank located in Seattle Parks Department property along 32nd Avenue W.; odor control and electrical facilities; and an underground diversion structure to send flows to the storage tank.

- **32nd Avenue W to 23rd Avenue W (Out-of-Basin Storage).** The elements of this project are an underground 1.8 million gallon rectangular concrete storage tank, located outside the basin on Port of Seattle property and odor control and electrical facilities. The project also includes a new gravity sewer between the diversion structure in the street right-of-way on 32nd Avenue W. and the storage tank.

- **32nd Avenue W to Interbay Pump Station (Out-of-Basin Pipe Storage)**. The elements of this alternative are a 2,100 feet of buried storage pipe or similar size precast concrete box section, located on Port of Seattle property adjacent to the existing S. Magnolia Trunk sewer and odor control and electrical facilities. The project includes a new gravity sewer between the diversion structure and the storage pipe.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Basins/SouthMagnolia.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes to the schedule in 2009.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	-37,425	11,058	664	0	4,511,917	4,720,564
Construction Contracts	-3,090	0	0	0	4,396,185	4,675,701
Owner Furnished Equipment	-34,335	0	0	0	0	34,335
Outside Agency Construction		0	0	0	9	0
Other Capital Charges		11,058	664	0	115,723	10,528
NON-CONSTRUCTION	447,014	668,498	299,337	884,060	2,632,392	2,329,361
Engineering	194,590	488,236	178,612	416,179	1,476,441	1,118,601
Planning & Management Svcs.	88,279	1	0	137,969	8	49,690
Permitting & Other Agency Support		0	0	0	83,588	84,816
Right-of-Way		0	0	0	35,981	36,510
Misc. Services & Materials	12,889	0	4,643	24,108	4,565	74,935
Staff Labor	151,256	180,261	116,082	305,804	1,031,811	964,808
PROJECT RESERVE		0	0	0	984,246	790,872
Project Reserve		0	0	0	984,246	790,872
Total (incl Credits & Revenues)	409,588	679,556	300,000	884,060	8,128,556	7,840,796
Total Credits & Revenues						
Total (w/out Credits & Revenues)	409,588	679,556	300,000	884,060	8,128,556	7,840,797

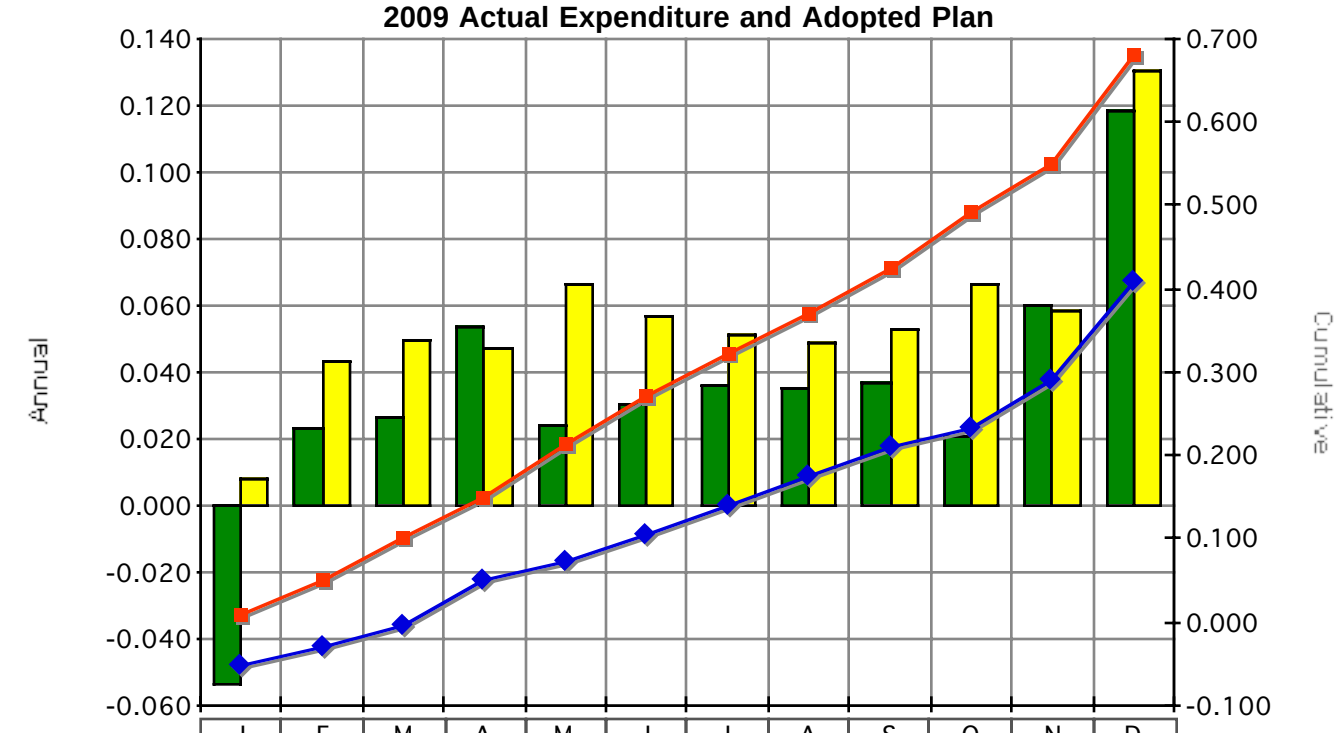
Cost/Budget Adjustments

The lifetime budget reflects the 1998 planning-level cost estimate that was developed as part of the RWSP, adjusted for inflation. Baseline estimates for the CSO Puget Sound Beach projects will be developed at the end of predesign.

Contract Status

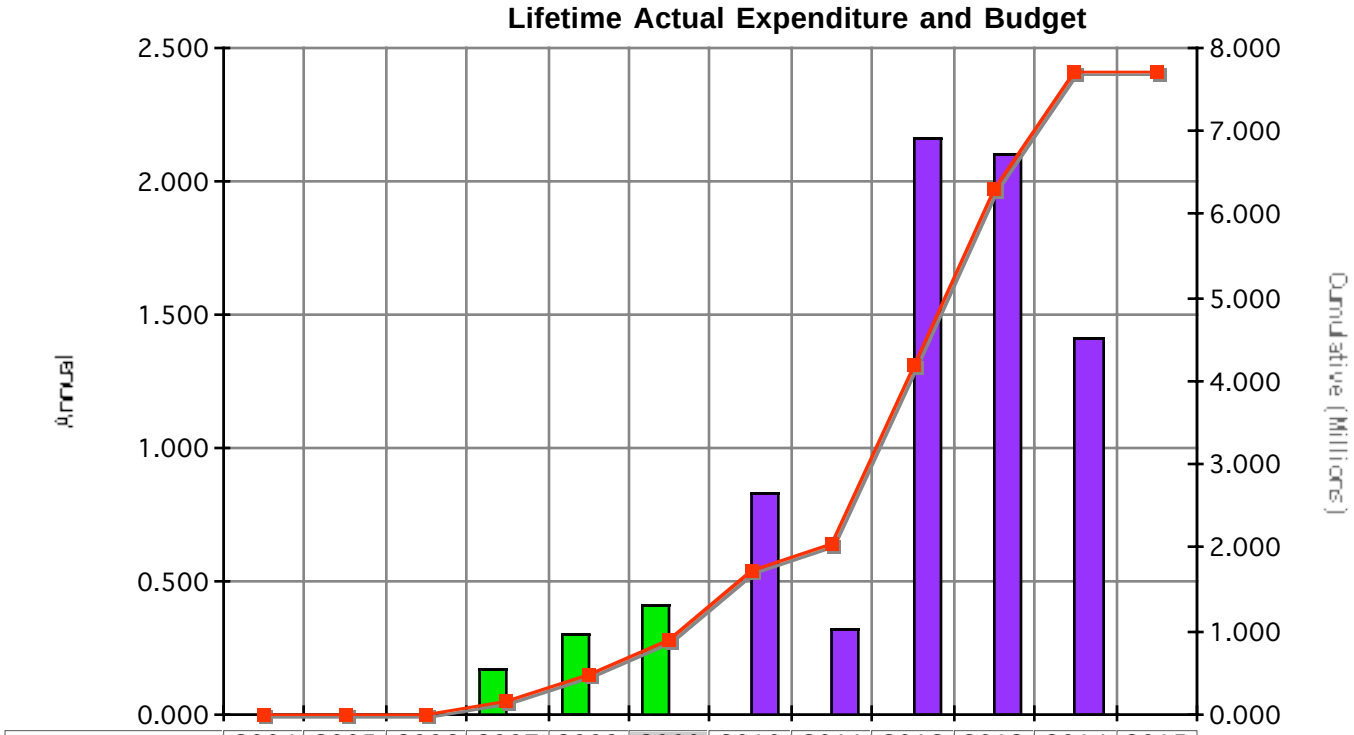
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Barton, Murray, Magnolia, & North Beach Combined Sewer E00022E06	$4,468,869	$0	$4,468,869	$1,545,006	35%	3	$6,013,874	$1,769,136	32	29%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.053	0.023	0.027	0.054	0.024	0.030	0.036	0.035	0.037	0.021	0.060	0.118
Adopted Plan	0.008	0.043	0.050	0.048	0.067	0.056	0.051	0.049	0.053	0.067	0.058	0.130
Cum. Plan	0.008	0.051	0.101	0.148	0.215	0.271	0.322	0.371	0.424	0.549	0.549	0.680
Cum. Act	-0.053	-0.031	-0.004	0.050	0.073	0.103	0.140	0.175	0.211	0.232	0.292	0.410

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09				0.172	0.302	0.410						
Budget							0.830	0.323	2.159	2.101	1.406	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.172	0.474	0.884	1.714	2.038	4.197	6.298	7.703	7.703

RWSP Project Report
DECEMBER 2009

423608 CSO Control & Improvements - Murray

Project Phase: 1 Development

Project Description

This project is one of four CSO control projects along Puget Sound beaches. To meet state regulations, King County's goal is to reduce the number of CSOs each year, with a long-term goal of no more than one untreated discharge per location per year.

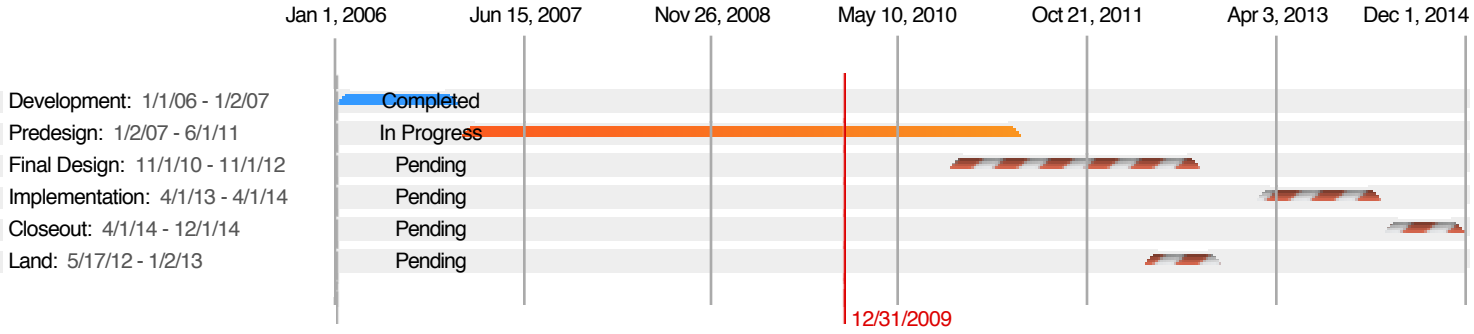
Efforts in 2009 focused on developing, evaluating, and selecting alternatives for further analysis. Approaches looked at include storage, on-site treatment, conveyance and treatment, and peak flow reduction (demand management). A workshop was held in May to discuss the range of approaches with tribes and state and local agencies, and a public open house and a community meeting were held in October.

In December, the following three alternatives were identified for further refinement and evaluation in 2010:

- **Lowman Beach Park (Underground Storage)**. The elements of this alternative are an underground storage tank at Lowman Beach Park, odor control and electrical facilities, and an underground diversion structure to send flows to the storage tank.
- **Beach Drive SW and Murray Avenue SW (Underground Storage)**. The elements of this alternative are two large diameter underground storage pipes in Beach Drive and Murray Avenue, odor control and electrical facilities, and a diversion structure in Lowman Beach Park to send flows to the storage pipes.
- **Beach Drive area (Underground Storage)**. The elements of this alternative are an underground storage tank located on private property and potential for additional pipe storage in Beach Drive, odor control and electrical facilities, and an underground diversion structure to send flows to the storage tank.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Basins/Murray.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes to the schedule in 2009.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	-30,163	8,318	428	0	3,332,087	3,582,164
Construction Contracts	-2,491	0	0	0	3,245,032	3,546,660
Owner Furnished Equipment	-27,672	0	0	0	0	27,672
Outside Agency Construction		0	0	0	9	9
Other Capital Charges		8,318	428	0	87,046	7,822
NON-CONSTRUCTION	442,945	640,229	299,573	1,193,741	2,557,077	2,647,712
Engineering	182,666	546,641	196,752	430,003	1,631,560	1,291,044
Planning & Management Svcs.	72,671	0	0	105,379	7	32,715
Permitting & Other Agency Support	0	0	0	1,303	62,875	64,178
Right-of-Way	0	0	0	318,292	113,370	433,338
Misc. Services & Materials	13,343	0	2,352	23,589	2,374	55,835
Staff Labor	174,266	93,588	100,469	315,176	746,891	770,603
PROJECT RESERVE		0	0	0	1,261,916	949,790
Project Reserve		0	0	0	1,261,916	949,790
Total (incl Credits & Revenues)	412,782	648,547	300,000	1,193,741	7,151,081	7,179,666
Total Credits & Revenues						
Total (w/out Credits & Revenues)	412,782	648,547	300,000	1,193,741	7,151,081	7,179,666

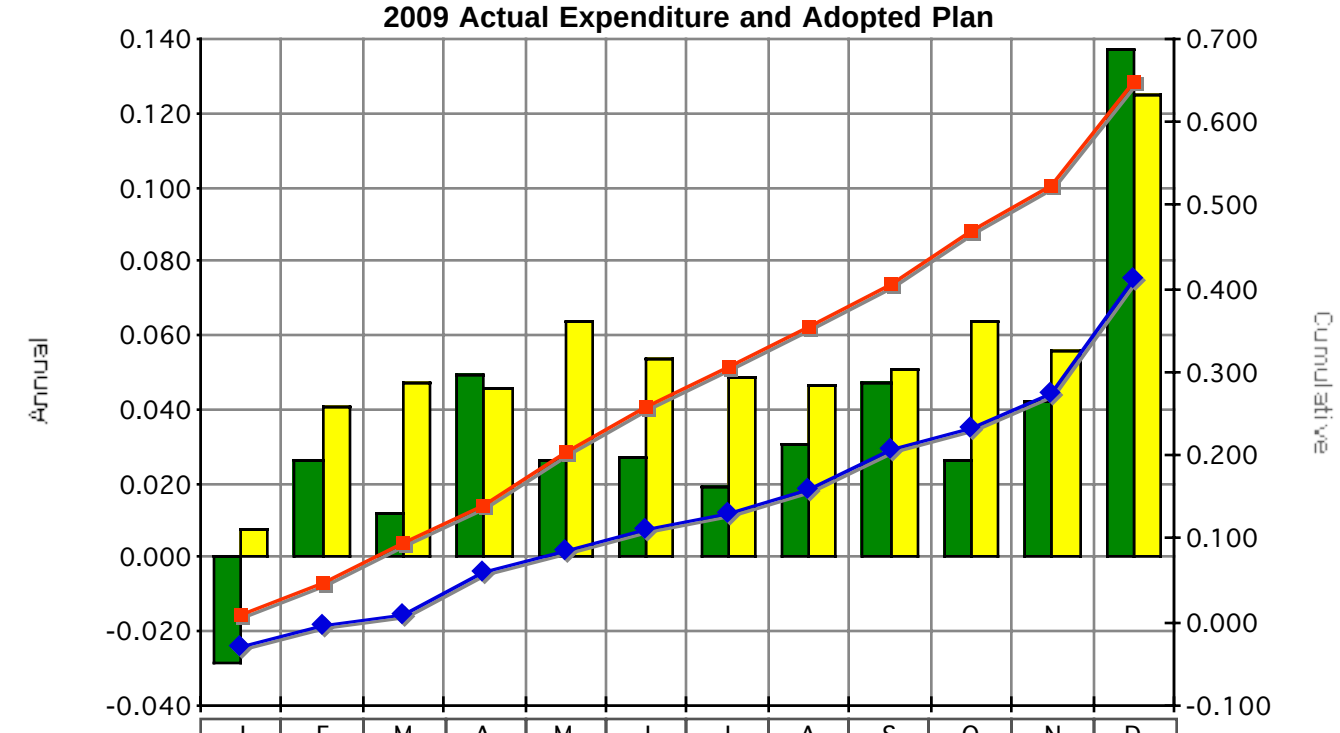
Cost/Budget Adjustments

The lifetime budget reflects the 1998 planning-level cost estimate that was developed as part of the RWSP, adjusted for inflation. Baseline estimates for the CSO Puget Sound Beach projects will be developed at the end of predesign.

Contract Status

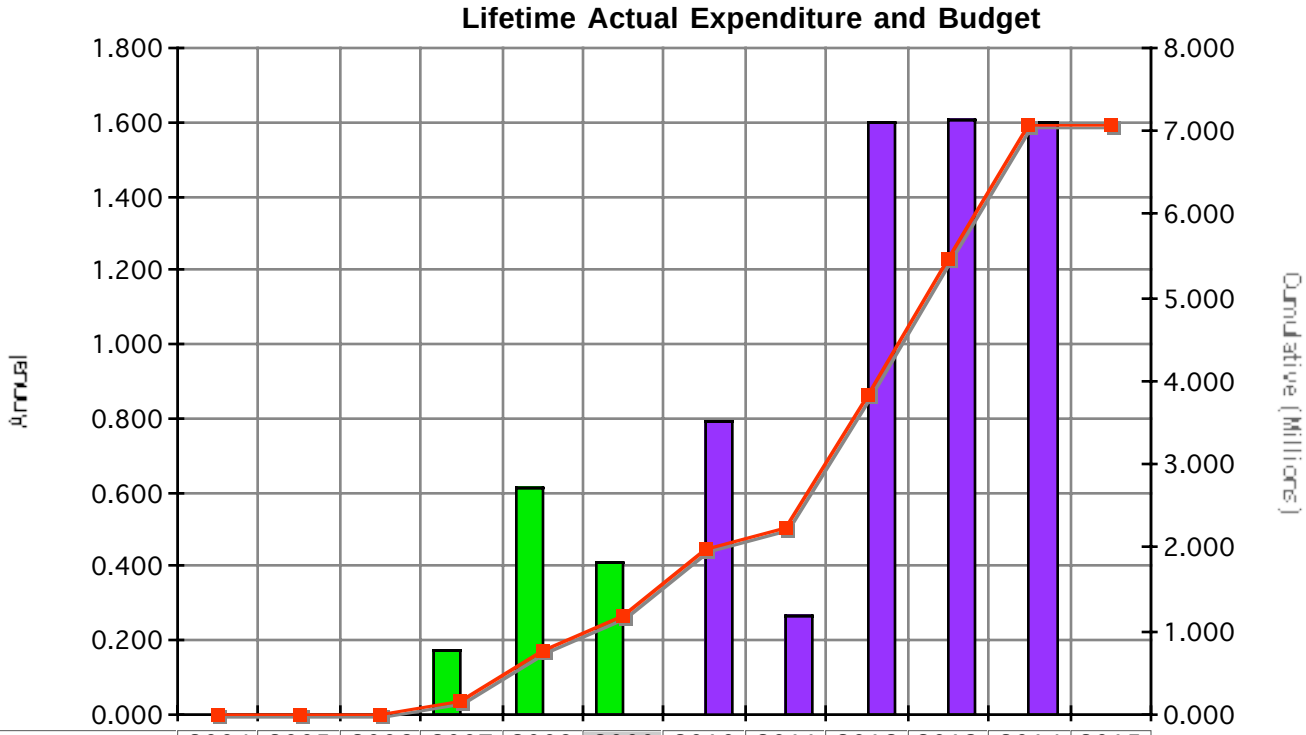
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Barton, Murray, Magnolia, & North Beach Combined Sewer E00022E06	$4,468,869	$0	$4,468,869	$1,545,006	35%	3	$6,013,874	$1,769,136	32	29%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.029	0.026	0.012	0.049	0.026	0.027	0.019	0.030	0.047	0.026	0.042	0.137
Adopted Plan	0.008	0.041	0.047	0.045	0.064	0.054	0.049	0.047	0.051	0.064	0.056	0.125
Cum. Plan	0.008	0.049	0.096	0.141	0.205	0.259	0.307	0.354	0.405	0.524	0.524	0.649
Cum. Act	-0.029	-0.003	0.009	0.058	0.085	0.111	0.130	0.161	0.208	0.234	0.276	0.413

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09				0.170	0.611	0.413						
Budget							0.794	0.266	1.600	1.604	1.599	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.170	0.781	1.194	1.988	2.254	3.853	5.458	7.057	7.057

RWSP Project Report
DECEMBER 2009

423609 CSO Control & Improvements - North Beach

Project Phase: 1 Development

Project Description

This project is one of four CSO control projects along Puget Sound beaches. To meet state regulations, King County's goal is to reduce the number of CSOs each year, with a long-term goal of no more than one untreated discharge per location per year.

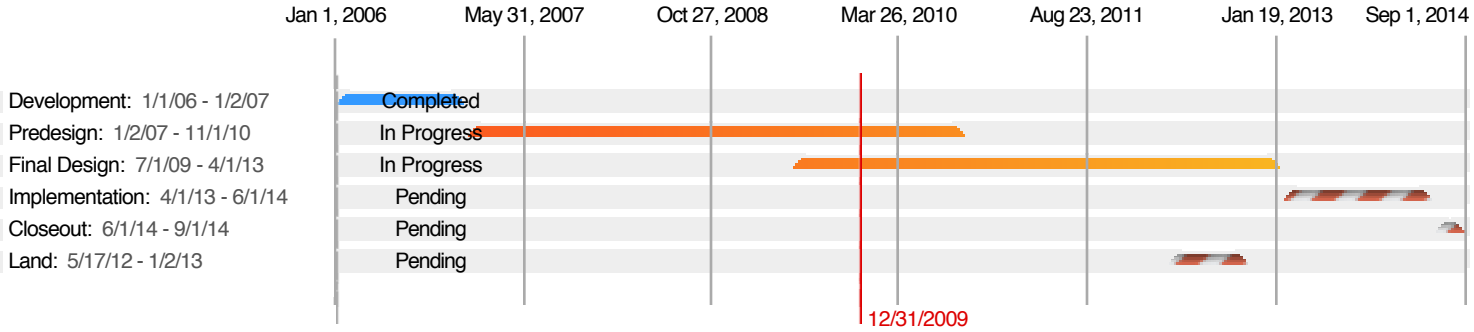
Efforts in 2009 focused on developing, evaluating, and selecting alternatives for further analysis. Approaches looked at include storage, on-site treatment, conveyance and treatment, and peak flow reduction (demand management). A workshop was held in May to discuss the range of approaches with tribes and state and local agencies. A public open house was held in October, and community meetings were held in September and November.

In December, the following three alternatives were identified for further refinement and evaluation in 2010:

- **Blue Ridge Park (Underground Storage)**. The elements of this alternative are an underground storage tank in Blue Ridge Park and odor control and electrical facilities--these facilities may be partially located on existing county property.
- **NW Blue Ridge Drive (Underground Storage)**. The elements of this alternative are an underground storage pipe in street right-of-way and above ground odor control and electrical facilities located on existing county property.
- **Blue Ridge Park to Crown Hill at Holman Road (Conveyance and Storage)**. The elements of this alternative are a pump station in Blue Ridge Park; aboveground odor control and electrical facilities; an underground storage tank in Blue Ridge Park; new force mains from pump station to Holman Road NW; gravity sewer to 8th Avenue Interceptor; and a drop structure on Seattle Parks property at Crown Hill.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Basins/NorthBeach.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes to the schedule in 2009.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	-16,449	4,607	369	0	2,534,731	2,695,597
Construction Contracts	-3,090	0	0	0	2,486,511	2,676,379
Owner Furnished Equipment	-13,359	0	0	0	0	13,359
Outside Agency Construction		0	0	0	9	9
Other Capital Charges		4,607	369	0	48,211	5,850
NON-CONSTRUCTION	312,371	588,637	299,631	765,660	2,291,382	2,075,329
Engineering	89,721	443,669	196,556	292,906	1,354,783	1,001,126
Planning & Management Svcs.	70,045	0	0	122,224	7	52,185
Permitting & Other Agency Support		0	0	0	32,505	32,986
Right-of-Way		0	0	0	43,617	44,261
Misc. Services & Materials	11,351	0	2,151	24,465	4,915	42,277
Staff Labor	141,254	144,967	100,924	326,065	855,556	902,493
PROJECT RESERVE		0	0	0	1,131,443	917,153
Project Reserve		0	0	0	1,131,443	917,153
Total (incl Credits & Revenues)	295,923	593,244	300,000	765,660	5,957,556	5,688,07
Total Credits & Revenues						
Total (w/out Credits & Revenues)	295,923	593,244	300,000	765,660	5,957,556	5,688,078

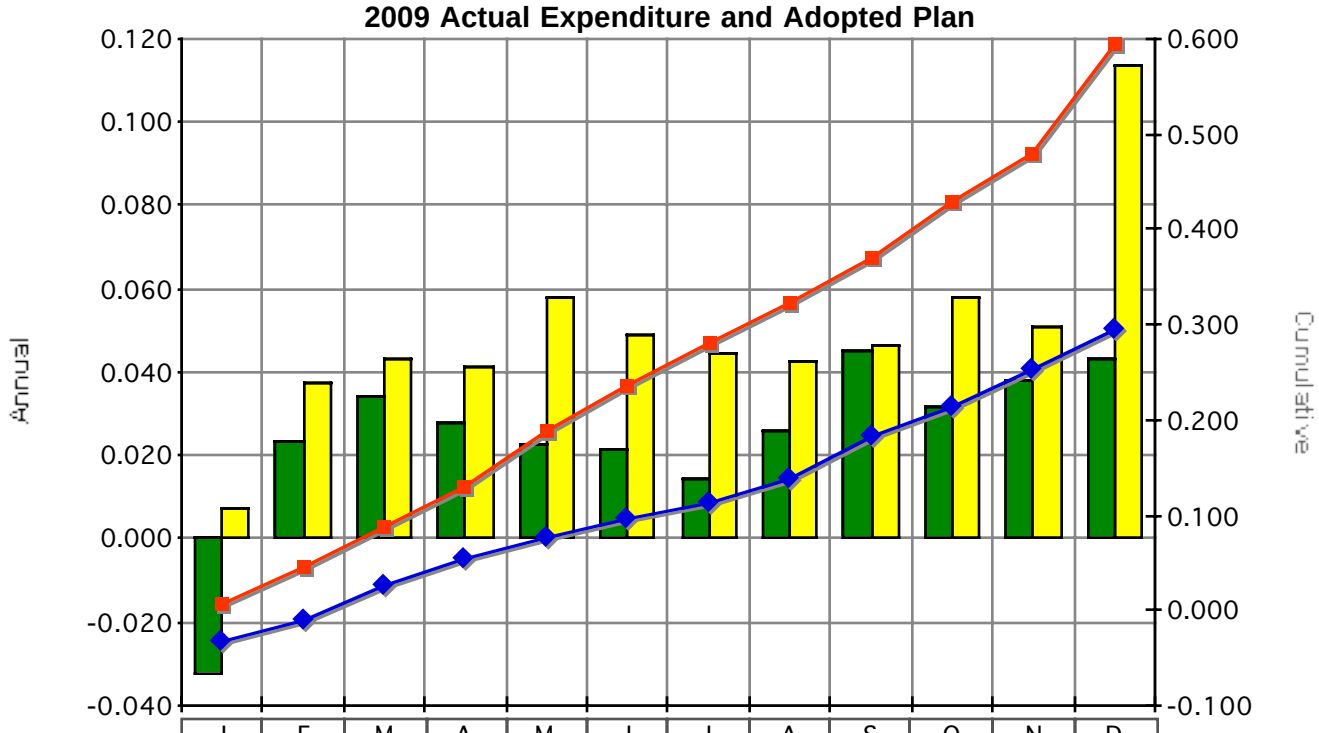
Cost/Budget Adjustments

The lifetime budget reflects the 1998 planning-level cost estimate that was developed as part of the RWSP, adjusted for inflation. Baseline estimates for the CSO Puget Sound Beach projects will be developed at the end of predesign.

Contract Status

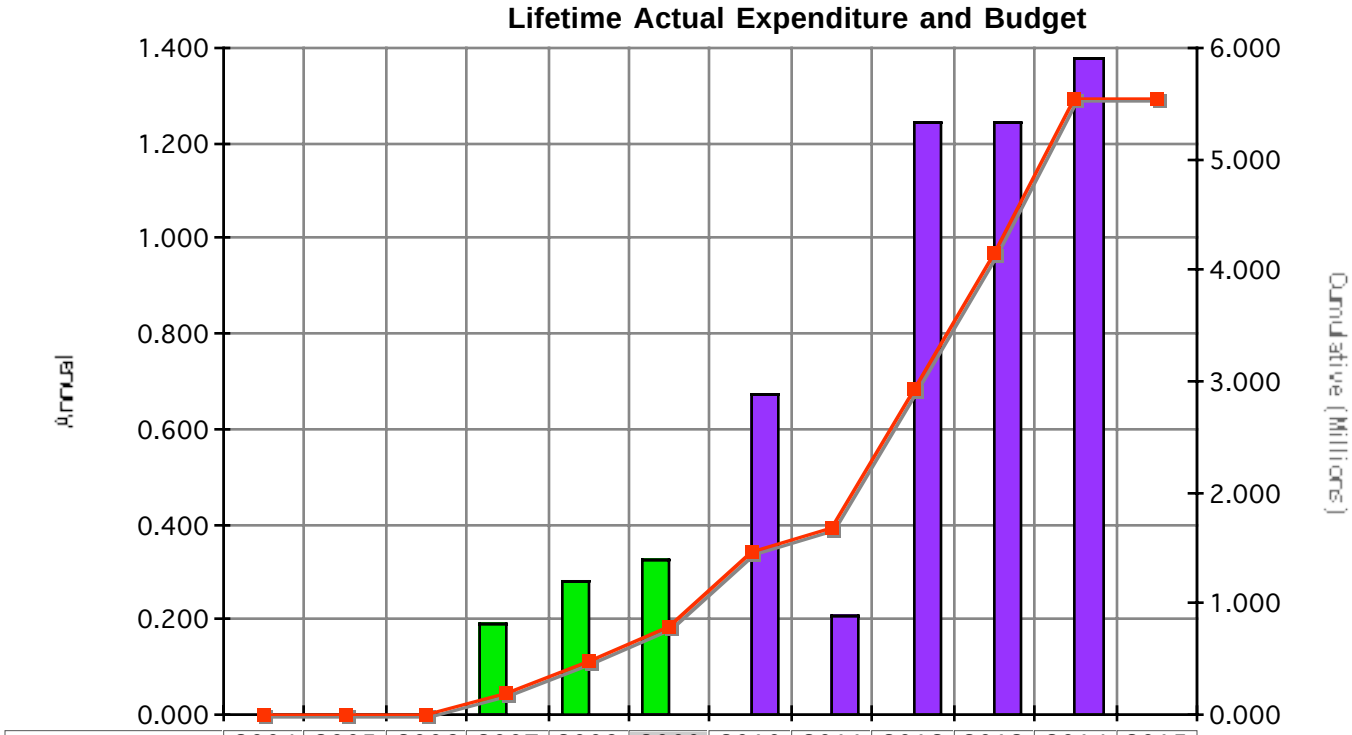
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Barton, Murray, Magnolia, & North Beach Combined Sewer E00022E06	$4,468,869	$0	$4,468,869	$1,545,006	35%	3	$6,013,874	$1,769,136	32	29%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.032	0.023	0.034	0.028	0.023	0.021	0.014	0.026	0.045	0.032	0.038	0.043
Adopted Plan	0.007	0.037	0.043	0.042	0.058	0.049	0.044	0.043	0.046	0.058	0.051	0.114
Cum. Plan	0.007	0.044	0.088	0.129	0.187	0.237	0.281	0.324	0.370	0.479	0.479	0.593
Cum. Act	-0.032	-0.009	0.025	0.053	0.076	0.097	0.111	0.137	0.183	0.214	0.253	0.296

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09				0.190	0.280	0.326						
Budget							0.671	0.208	1.243	1.242	1.377	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.190	0.470	0.795	1.467	1.675	2.918	4.160	5.537	5.537

RWSP Project Report
DECEMBER 2009

423610 CSO Control & Improvements - Barton

Project Phase: 1 Development

Project Description

This project is one of four CSO control projects along Puget Sound beaches. To meet state regulations, King County's goal is to reduce the number of CSOs each year, with a long-term goal of no more than one untreated discharge per location per year.

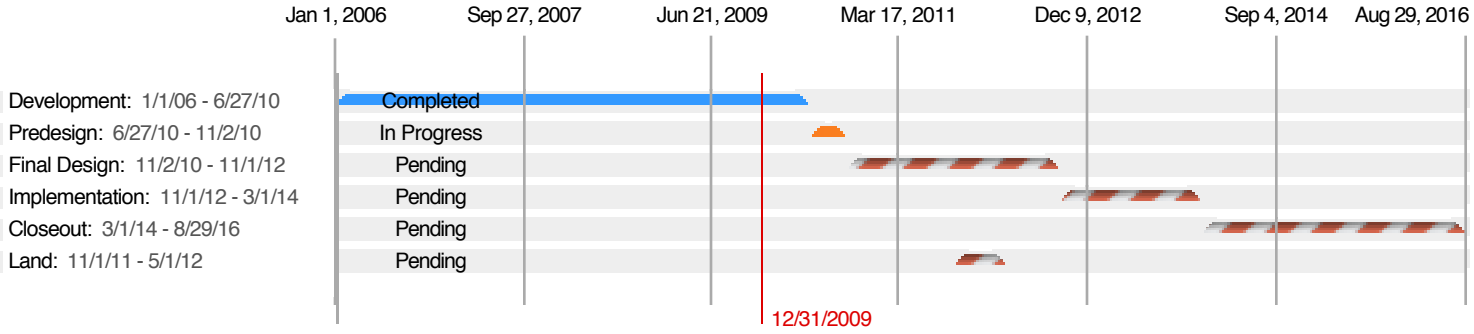
Efforts in 2009 focused on developing, evaluating, and selecting alternatives for further analysis. Approaches looked at include storage, on-site treatment, conveyance and treatment, and peak flow reduction (demand management). A workshop was held in May to discuss the range of approaches with tribes and state and local agencies. A public open house was held in October, and a community meeting was held in November.

In December, the following three alternatives were identified for further refinement and evaluation in 2010:

- **Upper Fauntleroy SW (Underground Storage)**. The elements of this alternative are a buried, large diameter storage pipe in the right-of-way, a diversion structure constructed under Director Street, and odor control and electrical facilities.
- **Former Fauntleroy School Site (Underground Storage)**. The elements of this alternative are an underground storage tank, a diversion structure constructed under Director Street, and odor control and electrical facilities.
- **Upper Basin, east of 35th Avenue SW (Greem Stormwater Infrastructure)**. The elements of this alternative are roadside raingardens located on multiple blocks to capture street runoff before it reaches the sewer system. No operating facilities are required as part of this alternative.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Basins/Barton.aspx

Milestone Schedule



Schedule Adjustments

There were no major changes to the schedule in 2009.

Cost Summary

Expenses	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	-32,117	27,551	1,036	0	6,559,532	6,754,429
Construction Contracts	-2,679	0	0	0	6,399,271	6,709,756
Owner Furnished Equipment	-29,437	0	0	0	0	29,437
Outside Agency Construction		0	0	0	9	9
Other Capital Charges		27,551	1,036	0	160,252	15,226
NON-CONSTRUCTION	526,756	751,272	298,964	1,416,850	3,187,358	3,075,188
Engineering	167,750	563,337	142,184	441,265	1,695,421	1,336,769
Planning & Management Svcs.	80,762	0	0	133,572	3,851	52,814
Permitting & Other Agency Support	912	0	0	2,168	117,441	120,434
Right-of-Way	1,295	0	0	319,665	1,940	320,339
Misc. Services & Materials	16,147	0	0	30,624	6,016	14,477
Staff Labor	259,890	187,935	156,780	489,556	1,362,689	1,230,355
PROJECT RESERVE		0	0	0	2,750,169	2,750,206
Project Reserve		0	0	0	2,750,169	2,750,206
Total (incl Credits & Revenues)	494,639	778,823	300,000	1,416,850	12,497,059	12,579,822
Total Credits & Revenues						
Total (w/out Credits & Revenues)	494,639	778,823	300,000	1,416,850	12,497,059	12,579,823

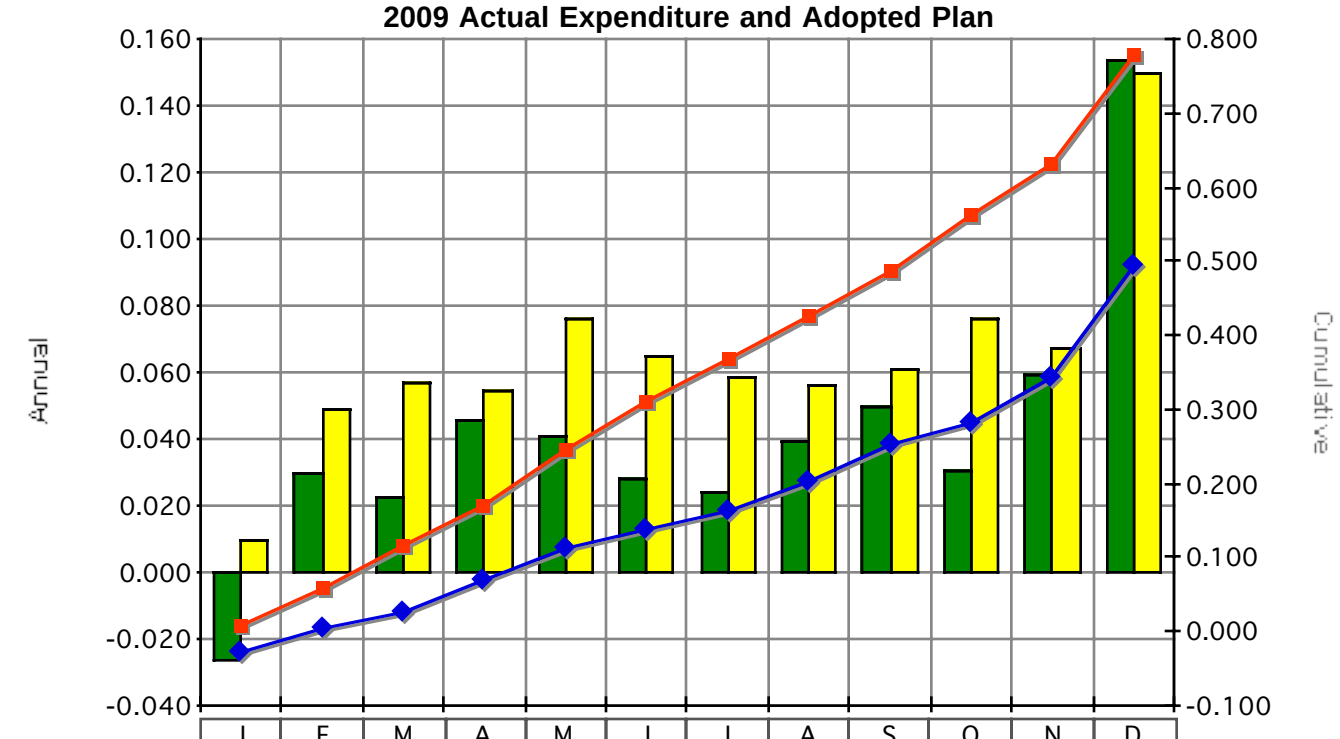
Cost/Budget Adjustments

The lifetime budget reflects the 1998 planning-level cost estimate that was developed as part of the RWSP, adjusted for inflation. Baseline estimates for the CSO Puget Sound Beach projects will be developed at the end of predesign.

Contract Status

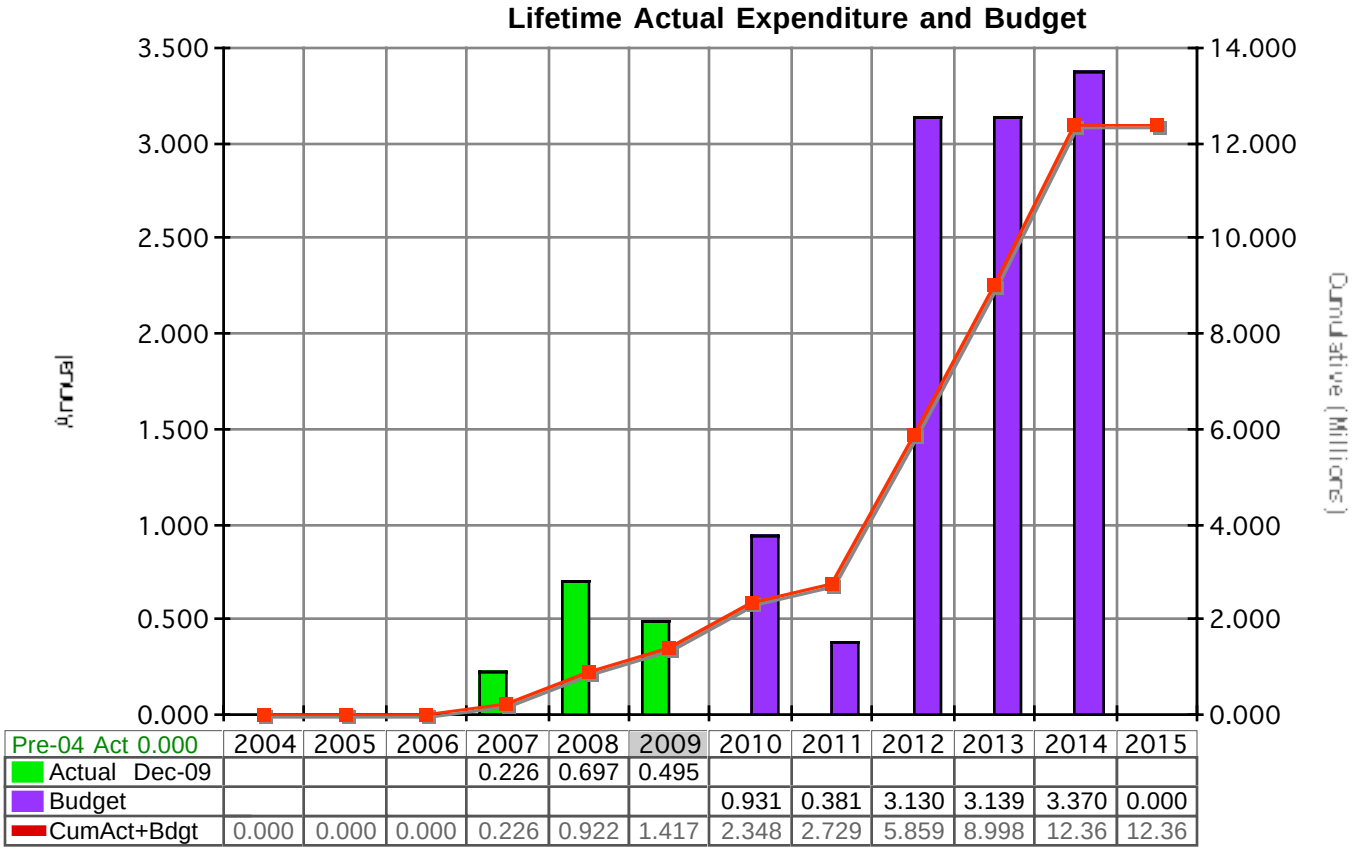
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Barton, Murray, Magnolia, & North Beach Combined Sewer E00022E06	$4,468,869	$0	$4,468,869	$1,545,006	35%	3	$6,013,874	$1,769,136	32	29%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.027	0.029	0.023	0.045	0.041	0.028	0.024	0.039	0.049	0.031	0.059	0.153
Adopted Plan	0.009	0.049	0.057	0.055	0.076	0.065	0.058	0.056	0.061	0.076	0.067	0.150
Cum. Plan	0.009	0.058	0.115	0.170	0.246	0.311	0.369	0.425	0.486	0.629	0.629	0.779
Cum. Act	-0.027	0.003	0.025	0.071	0.111	0.139	0.163	0.202	0.252	0.282	0.341	0.495

Lifetime Cash Flow



Pre-04 Act 0.000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Actual Dec-09				0.226	0.697	0.495						
Budget							0.931	0.381	3.130	3.139	3.370	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.226	0.922	1.417	2.348	2.729	5.859	8.998	12.36	12.36

RWSP Project Report
DECEMBER 2009

423368 Sediment Management Plan

Project Phase: 4 Implementation

Project Description

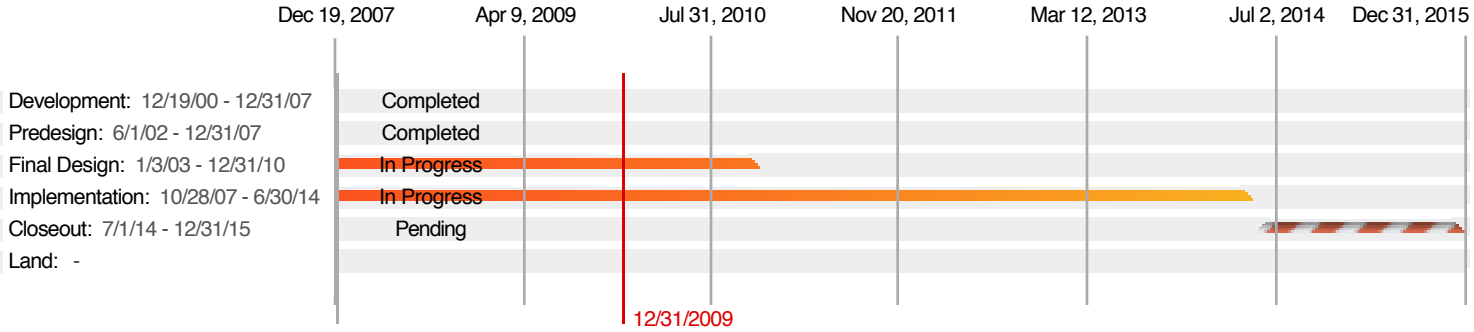
This project implements King County's Sediment Management Plan (SMP), which addresses sediment contamination cleanups required under the federal Comprehensive Environmental Response, Compensation, and Liability Act and state Model Toxic Control Act regulations. The SMP objectives are to repair potential environmental damage in a timely, efficient, and economical process; to prevent harm to public health; and to limit future liability.

Project-related activities in 2009 include the following:

- In coordination with the Port of Seattle, dredging and cleanup of Terminal 30 near the Lander CSO were completed in February.
- Work to prepare a near-field modeling report was ongoing. The purpose of the near-field model is to better predict deposition of contaminants around CSO outfalls and identify which CSOs are likely to have contaminated sediments. Findings from implementing the model will inform cleanup decisions and potential for recontamination.
- Conducted sampling of sediments in pipes to fill data gaps for East Waterway Superfund project.
- Collected additional data for the food web model that is being used to track the fate and transport of polychlorinated biphenyls (PCBs) in Puget Sound biota.
- Received determination from the U.S. Environmental Protection Agency (EPA) that no further cleanup action is needed for the Chelan CSO. Cleanup efforts were scheduled to begin in 2014.
- Continued working on studies and source control efforts related to East Waterway Superfund.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wastewater/SedimentManagement.aspx

Milestone Schedule



Schedule Adjustments

There were no major schedule changes.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	0	796,149	772,755	3,288,582	32,413,197	33,639,451
Construction Contracts	0	796,149	772,755	3,283,170	32,389,981	33,616,234
Owner Furnished Equipment	0	0	0	5,412	5,412	5,412
Other Capital Charges		0	0	0	17,805	17,805
NON-CONSTRUCTION	2,620,044	1,906,999	1,392,722	10,960,000	13,562,026	15,372,624
Engineering	7,232	1,068,218	465,480	2,308,430	4,473,512	4,123,759
Planning & Management Svcs.	548,550	0	0	1,182,100	473,187	633,550
Permitting & Other Agency Support	12	11,845	10,025	96,790	225,034	269,084
Right-of-Way	0	0	0	2,500	2,500	2,500
Misc. Services & Materials	1,204,284	29,776	30,107	2,989,330	1,828,028	1,997,937
Staff Labor	859,967	797,160	887,110	4,380,851	6,559,764	8,345,794
CREDITS AND REVENUES	-435,309	0	0	-2,189,247	-267,166	-1,753,938
Credits and Revenues	-435,309	0	0	-2,189,247	-267,166	-1,753,938
Total (incl Credits & Revenues)	2,184,735	2,703,148	2,165,477	12,059,335	45,708,057	47,258,137
Total Credits & Revenues	-435,309	0	0	-2,189,247	-267,166	-1,753,938
Total (w/out Credits & Revenues)	2,620,044	2,703,148	2,165,477	14,248,582	45,975,223	49,012,075

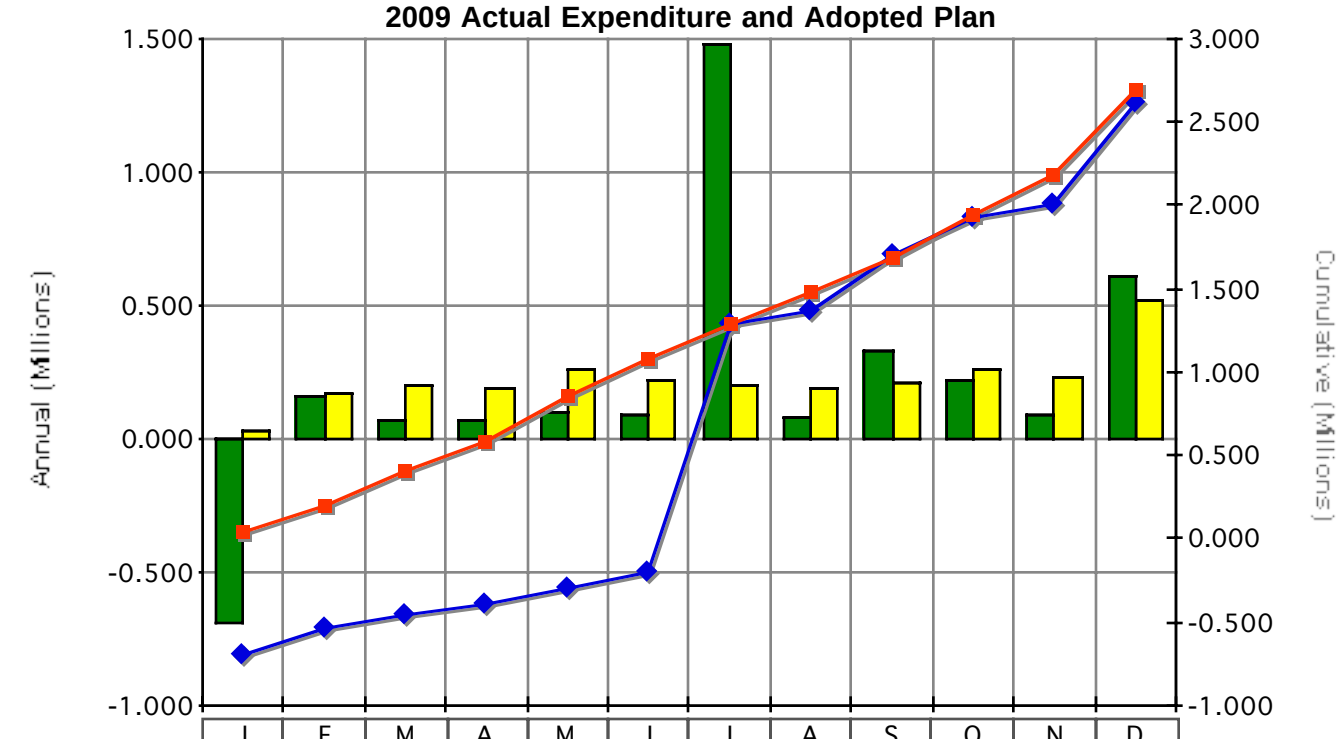
Cost/Budget Adjustments

There were no major changes to the project's lifetime budget. Allocation of costs has been adjusted to reflect previous project/program levels of efforts.

Contract Status

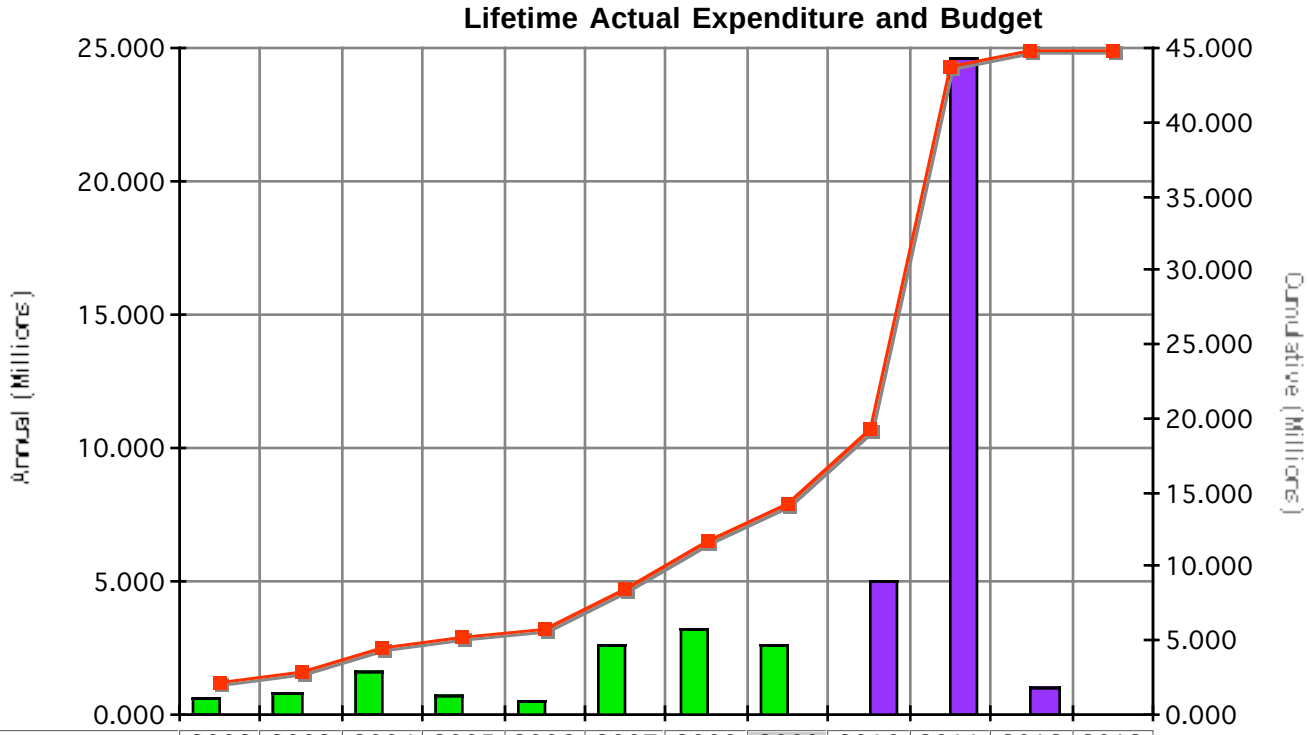
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid
Denny Remediation C00190C07	$3,276,234	$0	$3,276,234	$234,200	7%	1	$3,510,434	$3,013,699	3	86%
Sediment Management P23009P	$526,052	$704,947	$1,230,999	$0	0%	4	$1,230,999	$721,234	76	59%

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.689	0.161	0.068	0.075	0.096	0.092	1.483	0.083	0.329	0.224	0.093	0.605
Adopted Plan	0.032	0.170	0.197	0.189	0.265	0.224	0.203	0.195	0.211	0.265	0.232	0.519
Cum. Plan	0.032	0.203	0.400	0.589	0.854	1.079	1.281	1.476	1.687	2.184	2.184	2.703
Cum. Act	-0.689	-0.528	-0.460	-0.385	-0.289	-0.197	1.285	1.369	1.698	1.922	2.015	2.620

Lifetime Cash Flow



Pre-02 Act 1.544	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Actual Dec-09	0.643	0.771	1.577	0.689	0.524	2.642	3.239	2.620				
Budget									4.964	24.58	0.957	0.000
CumAct+Bdgt	2.186	2.957	4.535	5.224	5.748	8.390	11.62	14.24	19.21	43.79	44.75	44.75

RWSP Project Report
DECEMBER 2009

423589 Lower Duwamish Waterway Superfund

Project Phase: 1 Development

Project Description

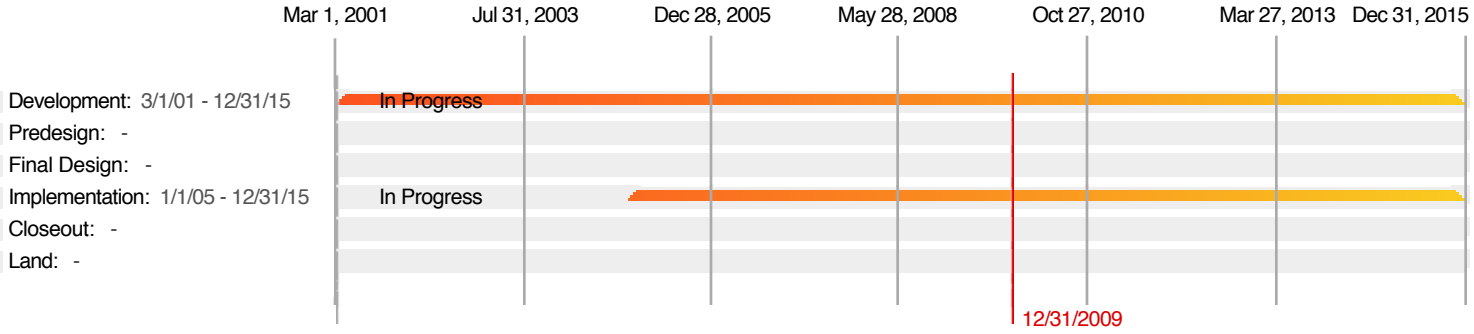
This project implements the County's shared responsibilities under a signed Administrative Order on Consent to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the Lower Duwamish Waterway Superfund Site. King County is partnering with the City of Seattle, the Port of Seattle, and the Boeing Company under a consent agreement with EPA and Washington State Department of Ecology (Ecology) to prepare the RI/FS. The project includes source control along the waterway and pays for EPA and Ecology's oversight costs.

Project activities and accomplishments in 2009 include the following:

- The draft remedial investigation, which defines the extent and inherent risks of contamination, was completed and is under review by EPA.
- The first draft of the feasibility study was released. The study evaluated 11 potential cleanup alternatives. Approximately 380 comments were received on the first draft. A second draft is scheduled to be released in October 2010.
- Participated in a coalition of community groups and government agencies that sponsor and promote the annual Duwamish Alive! community and habitat restoration events.

Visit the project website for more information:
http://www.kingcounty.gov/environment/wastewater/DuwamishWaterway.aspx

Milestone Schedule



Schedule Adjustments

The schedule for the Lower Duwamish Waterway Superfund project has been extended to match the EPA-adopted Order for Post Record of Decision negotiations that will take place in the 2013-2014 timeframe.

Cost Summary

	2009 Actual Expenditure and Plan			Lifetime Actual Expenditure and Budget		
Expenses	IBIS YTD Dec-09	Adopted Plan	Updated Plan	IBIS LTD Dec-09	Lifetime Budget	Updated Budget
CONSTRUCTION	0	0	0	138	138	138
Construction Contracts	0	0	0	138	138	138
NON-CONSTRUCTION	1,060,548	768,849	1,247,859	8,289,159	7,290,976	11,546,336
Engineering	-459,819	384,865	892,863	174,570	1,153,989	3,150,980
Planning & Management Svcs.	692,195	0	0	2,211,884	885,474	1,519,689
Permitting & Other Agency Support	0	0	0	386	386	386
Misc. Services & Materials	40,571	10,300	4,286	2,566,352	2,513,438	2,558,620
Staff Labor	787,600	373,684	350,710	3,335,967	2,737,689	4,316,661
CREDITS AND REVENUES	-817,185	0	0	-3,000,944	-1,997,146	-2,183,760
Credits and Revenues	-817,185	0	0	-3,000,944	-1,997,146	-2,183,760
Total (incl Credits & Revenues)	243,363	768,849	1,247,859	5,288,353	5,293,968	9,362,714
Total Credits & Revenues	-817,185	0	0	-3,000,944	-1,997,146	-2,183,760
Total (w/out Credits & Revenues)	1,060,548	768,849	1,247,859	8,289,297	7,291,114	11,546,474

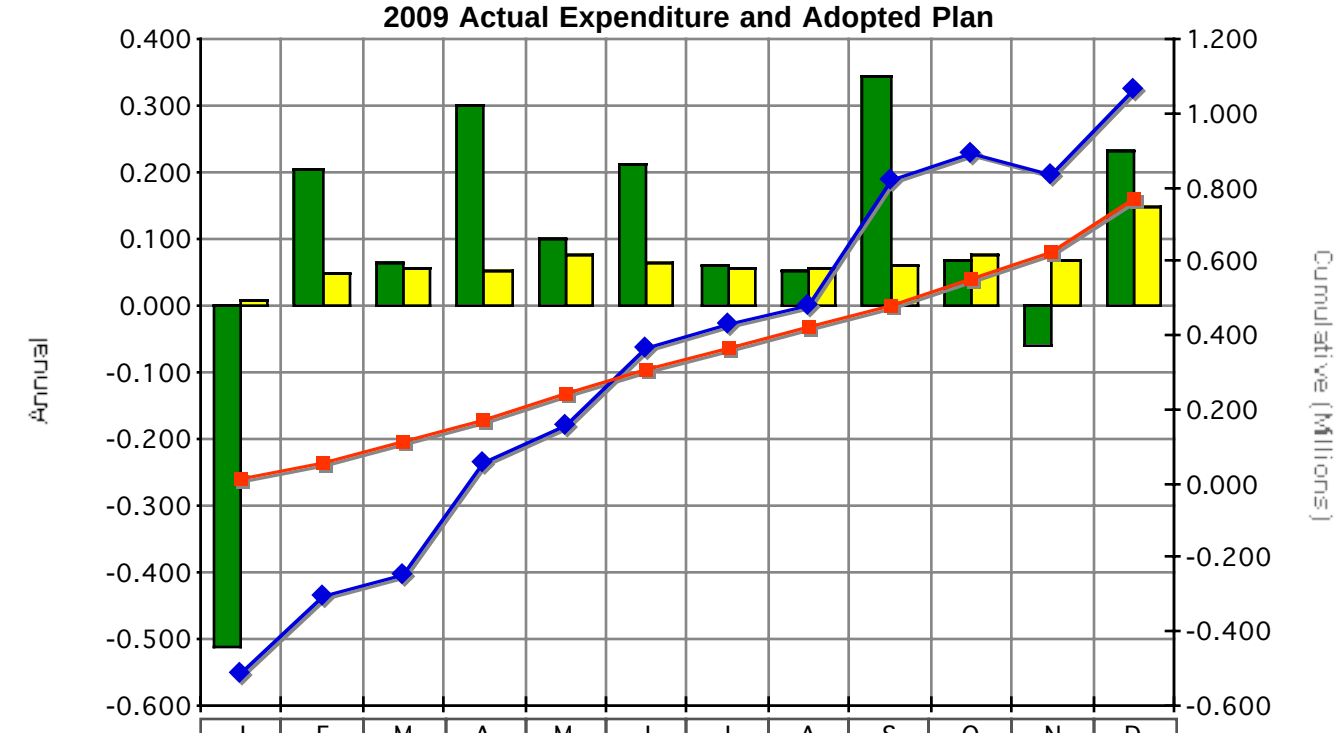
Cost/Budget Adjustments

The lifetime budget was adjusted to match the extended schedule and the significant additional work that was required of the agencies to complete the RI/FS.

Contract Status

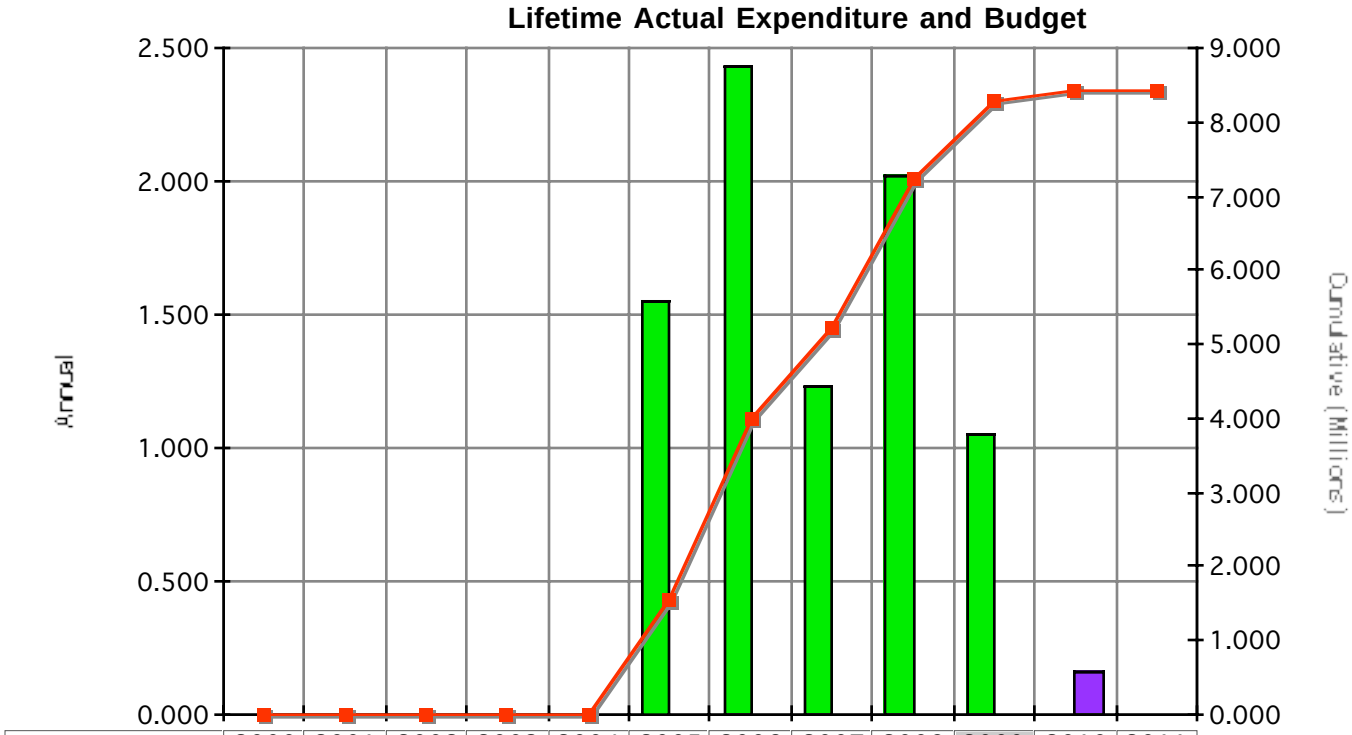
Contract	Original Contract Amount	Phased Amends	Base Contract Amount	Change Amends or COs	Change Percentage	Nbr of Amends/CO's to Date	Current Contract Amount	Amount Paid	Thru Pmt No.	% Paid

Annual Cash Flow



	J	F	M	A	M	J	J	A	S	O	N	D
Actual	-0.513	0.206	0.063	0.301	0.101	0.211	0.060	0.051	0.342	0.070	-0.061	0.231
Adopted Plan	0.009	0.048	0.056	0.054	0.075	0.064	0.058	0.055	0.060	0.075	0.066	0.148
Cum. Plan	0.009	0.058	0.114	0.168	0.243	0.307	0.364	0.420	0.480	0.621	0.621	0.769
Cum. Act	-0.513	-0.308	-0.245	0.056	0.157	0.367	0.428	0.479	0.821	0.891	0.830	1.061

Lifetime Cash Flow



Pre-2000 Act 0.000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Actual Dec-09						1.549	2.429	1.230	2.021	1.050		
Budget											0.162	0.000
CumAct+Bdgt	0.000	0.000	0.000	0.000	0.000	1.549	3.978	5.208	7.229	8.279	8.441	8.441

Chapter 4

RWSP Cost Estimates

RWSP reporting policies call for including in RWSP annual reports an update of the RWSP cost estimates through the year 2030. The cost estimates presented in this chapter include estimates for projects in various stages of development including planning, predesign, final design, and construction. Costs of completed RWSP projects are also included.

This chapter presents the following:

- Discussion of the accuracy of cost estimates
- A table that compares 2009 and 2008 cost estimates
- Explanation of the entries in the cost comparison table
- Presentation of cost estimates organized by four categories: (1) completed RWSP projects; (2) Brightwater cost trend update; (3) RWSP projects in design or construction; and (4) RWSP projects planned for the future
- Information on the Wastewater Treatment Division's (WTD) Productivity Initiative Pilot Program

4.1 Accuracy of Cost Estimates

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 significantly 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. Costs for projects in planning can have a rough order-of-magnitude estimate in the range of -50 to +100 percent.[1,2] By the time a project enters the construction phase, estimates typically narrow to a range of -10 to +15 percent of the final cost.

King County assumes a standard increase of 3 percent per year in projecting costs for its wastewater projects to account for price increases in project components such as materials, labor, equipment, supplies, and contractor markups. This rate is used because it closely approximates the actual rate of inflation over a long period of time.

[1] Project Management Institute's *A Guide to the Project Management Body of Knowledge*, third edition, 2004.
[2] Order-of-magnitude estimates are estimates without detailed engineering data; they are often referred to as "ball park" estimates.

4.2 Table Comparing 2009 and 2008 RWSP Cost Estimates

Table 4-1 summarizes the 2009 RWSP cost estimates and compares them to the 2008 cost estimates. The 2009 estimate for implementing the projects and programs associated with the RWSP through 2030 is approximately $3.44 billion in 2009 dollars, an increase of about $35 million, or 1.06 percent, from the 2008 RWSP cost estimate of $3.41 billion in 2009 dollars. Nearly one-fourth of the total 2009 RWSP cost estimate represents planning-level costs.

A challenge to providing a meaningful comparison of costs is that the RWSP is an ongoing plan that includes expenditures incurred in the past plus expenditures planned for the future. In presenting the comparison shown in Table 4-1, expenditures that have occurred through 2009 are included at their original value and future expenditures, planned for 2010 to 2030, are adjusted for inflation to a base year of 2009.

An explanation of the columns and categories (including cost changes in each category) follows the table.

Table 4-1. Comparison of 2009 and 2008 RWSP Cost Estimates (1999–2030)

RWSP Element	2008 RWSP Estimates (2008$ x 1M)	2008 RWSP Estimates (2009$ x 1M)	2009 RWSP Estimates (2009$ x 1M)	Cost Change (2009$ x 1M)
Total RWSP	**$3,351**	**$3,408**	**$3,443**	**$35**
Total Brightwater Treatment System[a]	**$1,764**	**$1,786**	**$1,799**	**$13**
Brightwater Treatment Plant	$647	$657	$662	$5
Brightwater Conveyance	$867	$878	$886	$7
Land and Right-of-Way	$103	$103	$104	$1
Mitigation	$147	$148	$148	--
Total Treatment & Odor Control Improvements	**$185**	**$189**	**$190**	**$1**
Phase I &II Odor Control at South Plant (completed)	$8	$8	$8	--
West Point Odor Control (completed)	$1	$1	$1	--
West Point Digestion Improvements	$10	$11	$11	--
King Street Regulator Odor Control (completed)	$6	$6	$7	$1
South Plant Expansion	$113	$116	$116	--
Vashon Treatment Plant Upgrade (completed)	$22	$22	$23	$1
Carnation Treatment Plant (completed)	$22	$22	$21	($1)
Chinook Wetlands Enhancement (completed)	$3	$3	$3	--
Total Conveyance System Improvements (CSI)	**$821**	**$837**	**$856**	**$19**
Completed CSI projects, acquisitions, and planning	$172	$172	$249	$77
CSI projects in design or construction	$210	$213	$213	--
Planned CSI projects, acquisitions, and planning	$439	$452	$394	($58)
Total Infiltration/Inflow (I/I) Reduction[b]	**$42**	**$42**	**$42**	**--**
Total Combined Sewer Overflow (CSO) Control	**$471**	**$484**	**$488**	**$4**
CSO Control Projects[c]	$412	$425	$425	--
CSO Planning and Updates	$10	$10	$11	$1
Sediment Management/Lower Duwamish Superfund	$48	$49	$52	$2
Total Reclaimed Water	**$42**	**$43**	**$41**	**($1)**
Technology Demonstration (completed)	$1	$1	$1	--
Future Water Reuse (Existing Reclaimed Water Program)	$6	$6	$5	($1)
Water Reuse Satellite Facility (canceled)	$5	$5	$5	--
Reclaimed Water Backbone	$26	$26	$26	--
RWSP Water/Wastewater Conservation (completed)	$1	$1	$1	--
Reclaimed Water Comprehensive Plan	$3	$3	$3	--
Water Quality Protection (completed)	**$16**	**$16**	**$16**	**--**
Habitat Conservation Plan (HCP)/ Programmatic Biological Assessment	**$8**	**$8**	**$8**	**--**
RWSP Planning and Reporting	**$2**	**$3**	**$3**	**--**

Notes: All costs in 2009 column are as of December 31, 2009; projects shown are not exhaustive, but are listed to illustrate changes. Totals may not add because of rounding to the nearest million. Expenditures that have occurred through 2009 are included at their original value.

[a] The Brightwater cost estimates are shown in constant dollars to be consistent with other components of total RWSP costs. Section 4.3.2 of this chapter discusses presenting Brightwater costs in nominal dollars, consistent with the Brightwater Cost Update: Current Conditions and Trends, January 2010.

[b] Design and construction costs for the initial I/I reduction projects are funded by the CSI program in accordance with the recommended program approved by the King County Council in 2006; therefore, costs associated with these projects are not shown in this line item.

[c] The 2008 and 2009 cost estimates for the CSO control projects are the 1998 planning-level estimates adjusted for inflation. Updated estimates for the CSO Puget Sound Beach projects are anticipated at the end of predesign. Cost estimates for the remainder of the CSO control projects are expected to be updated as part of the 2012 CSO Control program review.

4.2.1 Explanation of RWSP Cost-Estimate Comparison Table

Table 4-1 includes four columns:

- **2008 RWSP Cost Estimates (2008$ x 1M) column.** This column shows the 2008 RWSP cost estimates that were developed based on project details as of December 31, 2008, and that were presented in 2008 dollars in the RWSP 2008 Annual Report. The 2008 cost estimates include costs expended through 2008 at their original value and costs anticipated for 2009 through 2030 adjusted for 3 percent inflation to a base year of 2008.
- **2008 RWSP Cost Estimates (2009$ x 1M) column.** This column shows the 2008 RWSP cost estimates adjusted to 2009 dollars to create a common base for comparison with current estimates. Adjustments for inflation are based on the assumption of a standard increase of 3 percent per year. Expenditures that occurred through 2008 are included at their original value and not adjusted for inflation.
- **2009 RWSP Cost Estimates (2009$ x 1M) column.** This column shows the 2009 cost estimates in 2009 dollars that were developed based on project details as of December 31, 2009. Future expenditures—costs anticipated for 2010 through 2030—have been adjusted for 3 percent inflation to a base year of 2009. Expenditures that occurred through 2009 are included at their original value.
- **Cost Change (2009$ x 1M) column.** This column shows the changes in cost estimates from the 2008 estimates to the 2009 estimates in 2009 dollars.

The following sections provide more information on each category presented in Table 4-1.

Brightwater Treatment System

Brightwater costs planned for 2009 through 2012 have been adjusted to 2009 dollars to be consistent with the other RWSP costs. This is a different approach than the one used in the cost trend reports that are published annually.

The Brightwater 2009 cost estimate indicates an increase in costs of 0.73 percent or $13 million from the 2008 estimate.

The Brightwater January 2010 cost trend update, which presents the Brightwater costs in nominal dollars (includes inflation), expresses the Brightwater cost trend in a range and indicates an increase in costs of 0.9 percent ($16.1 million) to an increase in costs of 3.2 percent ($57.1 million) from the January 2009 cost trend update. The Brightwater cost trend update is discussed later in this chapter (section 4.3.2).

Treatment and Odor Control Improvements

Costs for treatment and odor control improvements include treatment plant improvements and specific odor control improvements that result from implementing RWSP policies. The 2009 cost

estimate for these projects is $190 million, an increase of about $1 million from the 2008 cost estimate. The projects in this category are as follows:

- **Odor Control at South Treatment (Phases I and II) and West Point Treatment Plants.** The cost estimates reflect the total expenditures for these projects.
- **West Point Digestion Improvements.** There were no cost changes for this project.
- **King Street Regulator Odor Control Project.** The cost estimate for this project increased by approximately $800,000. Construction was delayed and costs increased due to site conditions and underground utility conflicts. These factors also resulted in the need for additional construction management, project management, and project control services. This project was complete in 2009; no additional expenditures are anticipated for this project.
- **South Treatment Plant Expansion.** This project is planned for 2029. The cost estimate for this project reflects the 1998 RWSP planning-cost estimate adjusted for inflation.
- **Vashon Treatment Plant Upgrade.** The total project cost increased by approximately $1 million. The increase is attributed to costs associated with settling a construction claim and additional closeout activities, such as utility relocation and fencing improvements. No additional expenditures are anticipated for this project.
- **Carnation Treatment Plant.** The total project cost decreased by approximately $1 million. The decrease is attributed to (1) Chinook Wetlands Enhancement project costs (approximately $470,000) that were inadvertently charged to the Carnation Treatment Plant project, and (2) approximately $730,000 of the appropriated funds for the Carnation plant project was not needed. No additional expenditures are anticipated for this project.
- **Chinook Wetlands Enhancement.** This project's cost increased by approximately $470,000—these costs had been applied to the Carnation Treatment Plant project. The total cost for the Chinook Wetlands Enhancement project is $3.4 million. Because costs are rounded to the nearest million in Table 4-1, the table shows no change in the project's costs from the 2008 estimate. No additional expenditures are anticipated for this project.

Conveyance System Improvements

The 2009 cost estimate for RWSP conveyance system improvements (CSI) is $856 million, an increase of approximately $19 million from the 2008 cost estimate. Almost one-half of the total CSI costs represent planning-level cost estimates.

A portion of the increase (approximately $5 million) is attributed to the startup of the Decennial Flow Monitoring project. This is a new project, resulting from King County Council approval of Ordinance 16033 in March 2008, which made amendments to the RWSP conveyance policies. The amended RWSP conveyance policies call for WTD to conduct systemwide flow monitoring every 10 years to correspond with the population census. More information on the Decennial Flow Monitoring project is provided in Chapter 3.

The remainder of the increase is due to changes from the 2008 cost estimates for the following projects:

- **Sunset/Heathfield Pump Station Replacement and Forcemain**. This project entered the project development phase in 2009. The planning-level cost estimate increased by approximately $6 million. The increase is attributed to an adjustment in project contingency costs. The project's baseline budget and schedule are expected to be established in 2011. More information on this project is provided in Chapter 3.
- **Bellevue Influent Trunk.** This project entered the project development phase in 2009. The planning-level cost estimate for this project increased by approximately $1.2 million. The increase is attributed to an increase in forecasted construction costs to include funds for lining or rehabilitation of the existing Bellevue Influent Trunk and adding project contingency funds, which were inadvertently left out of the lifetime budget forecast. The baseline budget and schedule are expected to be established in 2010. More information on this project is provided in Chapter 3.
- **Kent-Auburn Conveyance Improvements.** This project's cost estimate increased by approximately $3 million. The increase reflects inflation associated with delaying construction of the project to 2012. More information on this project is provided in Chapter 3.
- **North Creek Pipeline.** The lifetime cost estimate for this project increased by approximately $2 million. The increase takes into account the actual bids on the contract as compared to the engineer's estimate. This project's scope, schedule, and budget will be revised in 2010. More information on this project is provided in Chapter 3.
- **Juanita Bay Pump Station Replacement.** This project was substantially complete in December 2008, and the pump station began operating in January 2009. Approximately $2.6 million has been added to the overall project's costs to support work to resolve construction claims and related closeout activities.

Infiltration/Inflow Reduction Program

There were no changes in the cost estimates for the Infiltration/Inflow (I/I) Reduction Program.

In accordance with the recommended I/I control program that was approved by the King County Council in May 2006, design and construction costs for the initial I/I reduction projects are funded by the Conveyance System Improvement Program and are not included as part of I/I program costs. The purpose of the recommended I/I control program is to invest in I/I reduction in lieu of investing in larger conveyance system improvements when it is cost-effective to do so.

Chapter 3 provides more information on the initial I/I reduction projects.

Combined Sewer Overflow Control Program

The 2009 total Combined Sewer Overflow (CSO) Control Program cost estimate is $488 million, which is an increase of approximately $4 million from the program's total cost estimate in 2008.

The CSO Control Program total cost estimate includes costs associated with CSO control projects, CSO planning and updates, the Sediment Management Program, and the Lower Duwamish Waterway Superfund projects.

- The cost estimates associated with CSO control projects represent the 1998 RWSP planning-level cost estimates of the 21 planned CSO control projects adjusted for inflation to 2009 dollars. Updated cost estimates for the CSO Puget Sound Beach projects (Chapter 3) will be available when predesign is completed. Planning-level cost estimates for the remainder of the CSO control projects are expected to be updated as part of the 2012 CSO program review.
- The cost estimates associated with CSO planning and updates increased by approximately $1.4 million. The increase is attributed to several factors including (1) the CSO program review consultant estimates came in much higher than the planning-level estimate, (2) additional work and new reports required by the renewed National Pollutant Discharge Elimination System permit for the West Point Treatment Plant, (3) modeling and staff needs to respond to inquiries from the City of Seattle and exploration of joint projects with the City, (4) increased work to implement studies in response to the U.S. Environmental Protection Agency Request for Information and Order by Consent order, and (5) a delay in the hydraulic modeling work.
- The cost estimates for the Sediment Management/Lower Duwamish Superfund category increased by approximately $2 million. The increase is attributed to adjusting the lifetime budget to match the extended schedule and the significant additional work that is being required of the agencies to complete the Remedial Investigation/Feasibility Study. More information on these projects is provided in Chapter 3.

Chapter 2 provides more information on the CSO Control Program.

Reclaimed Water

The reclaimed water cost estimates decreased by approximately $1.3 million from the 2008 cost estimates. The decrease is attributed to a reduction in the capital program budget for the existing reclaimed water program. There were no other cost changes in the reclaimed water categories referenced in Table 4-1.

Chapter 2 provides more information on the Reclaimed Water Program.

Water Quality Protection

This program provided scientific information on water quality and hydrologic conditions in both the Lake Washington and Green River watersheds and was complete as of December 2006. The amount shown in Table 4-1 reflects the total expenditures for this program.

Habitat Conservation Plan/Programmatic Biological Assessment

There were no changes from the 2008 cost estimate for this project.

RWSP Planning and Reporting

There were no changes from the 2008 cost estimate for this program.

4.3 Alternative Ways to Show RWSP Cost Estimates

This section presents RWSP costs in a manner to provide an informative snapshot of the progress being made and costs associated with implementing the RWSP. The RWSP costs are broken down by the following categories:

- **Completed RWSP Projects.** This category consists of projects for which all activity has been completed.
- **Brightwater Cost Trend Update.** This category consists of the trend estimate that is developed on an annual basis for the Brightwater project.
- **RWSP Projects in Design or Construction.** This category consists of all RWSP projects that are in the current capital improvement plan (CIP) budget for WTD.
- **Projects Planned for the Future.** This category consists of projects that have not yet begun.

Presenting costs this way provides a means to track incurred, current, and future costs separately as projects move through the categories. Because some categories present costs in nominal dollars and others in base-year or constant dollars, the sum of these categories will not yield a meaningful total cost comparison as is done with the estimates in Table 4-1.

An explanation and a summary table of each category follow.

4.3.1 Completed RWSP Projects

Completed RWSP projects refer to projects or programs that have been completed and for which no future expenditures are anticipated. Table 4-2 summarizes the expenditures associated with completed projects and compares expenditures as of December 31, 2009, to those as of December 31, 2008.

Table 4-2. Completed RWSP Projects (million dollars)

	Expenditures as of Dec. 31, 2008	Expenditures as of Dec. 31, 2009	Change from 2008
Total completed projects	**$291**	**$375**	**$84**
Total completed Conveyance System Improvement projects, acquisitions, planning	**$172**	**249**	**$77**
Total completed Treatment and Odor Control projects	**$56**	**$63**	**$7**
West Point Odor Control	$1	$1	--
South Plant Odor Control	$8	$8	--
Vashon Treatment Plant Upgrade	$22	$23	$1
Carnation Treatment Plant	$22	$21	($1)
Chinook Wetlands Enhancement	$3	$3	--
King Street Regulator Odor Control	--	$7	$7
Total completed Reclaimed Water projects	**$7**	**$7**	**--**
Technology Demonstration	$1	$1	--
Water Reuse Satellite Facility	$5	$5	--
RWSP/WW Conservation	$1	$1	--
Total completed I/I Pilot Study projects and program	**$40**	**$40**	**--**
Total completed Water Quality Protection	**$16**	**$16**	**--**

Note: Expenditures are shown at their original value. Totals may not add because of rounding to the nearest million.

The 2009 expenditures for completed projects are $84 million more than the expenditures as of December 31, 2008. This change reflects the completion of three projects: Hidden Lake Pump Station Replacement and Sewer Improvement, Juanita Bay Pump Station Replacement, and King Street Regulator Odor Control.[3,4]

4.3.2 Brightwater Cost Trend Update

King County has prepared nine cost estimates for the Brightwater project, each at key points in the project's lifecycle. Each estimate is summarized as follows.

- The first estimate was a conceptual estimate developed in 2001 as part of the Brightwater siting analysis.
- The second and third estimates were released in 2002 and 2003 as part of the draft and final environmental impact statements. These two estimates were based on the current Brightwater system configuration and included preliminary design information for the treatment plant and conveyance system.
- The fourth estimate was presented in October 2004 at the completion of 30 percent design. This estimate was subsequently adopted by the King County Council as the project's baseline budget.

[3] Although no additional expenditures are anticipated for these projects, close-out activities will occur through 2010 for some of these projects, and adjustments to the lifetime costs are possible.

[4] Although the Hidden Lake and Juanita pump station projects were substantially complete in 2008, their costs were shown in the "design or construction" category in the RWSP cost estimate chapter of the RWSP 2008 Annual Report.

- The fifth estimate, prepared in December 2005, reflected the completion of 60 percent design for the treatment plant and 100 percent design for much of the conveyance system.
- The sixth cost estimate, prepared in January 2007, described the project's transition from design to construction, a change that also necessitated a shift from constant (base year) dollars to nominal (inflated) dollars as a significant portion of the project's construction costs were established by contracts that included inflation.
- The seventh cost estimate, issued January 2008, reflected the project's near complete transition to construction, with over 98 percent of the construction contracts awarded, as well as actual costs incurred through 2007.
- The eighth estimate, January 2009, updated the costs on the basis of actual progress for each of the contracts and highlighted potential risk issues, particularly for tunneling and the Washington State sales tax exemption.
- The ninth and current cost estimate (based on actual costs through December 2009 and forecasts costs through completion) is the subject of this section.

January 2010 Cost Estimate

Table 4-3 shows the current lifetime cost estimates for the Brightwater project expressed as a range. The low estimate reflects the assumption that King County will receive a tax exemption from the Washington State Department of Revenue related to the production and sale of reclaimed water and biosolids at the treatment plant. The high estimate in this range reflects the possibility that the county will not receive any exemption. Table 4-3 also shows that the high range of the January 2009 estimate falls within the range of lifetime costs estimated by R.W. Beck, the Brightwater project's independent Oversight Monitoring Consultant.

As of January 2010, the current lifetime cost estimate for the Brightwater project ranges between $1.816 and $1.857 billion. This represents an overall increase of $16.1 million, or about 0.9 percent, to an increase of $57.1 million, or about 3.2 percent, as compared to the estimate presented in the January 2009 cost update (see Table 4-3).

Table 4-3. Comparison of January 2008 and January 2009 Brightwater Cost Estimates (million dollars with inflation)

Brightwater Component	January 2009		January 2010		Dollar Change		Percent Change		November 2009 OMC[a] Estimate	
	Low	High	Low	High	Low	High	Low	High	Low	High
Treatment Plant	$878.6	$889.6	$884.2	$893.5	$5.6	$14.9	0.6%	1.7%	$929–	$967
Conveyance	$921.2	$954.6	$931.6	$963.3	$10.5	$42.2	1.1%	4.6%	$892–	$907
Total	**$1,799.8**	**$1,844.3**	**$1815.8**	**$1856.8**	**$16.1**	**$57.1**	**0.9%**	**3.2%**	**$1,821–**	**$1,874**

[a]OMC = Oversight Monitoring Consultant

The majority of the cost increase for the treatment plant is related to change orders to both the Liquids and Solids contracts and the forecast delay in treatment plant startup from conveyance system contract delays. The majority of the cost increase for the conveyance system is due to change orders and claims and an increase in construction management and engineering services

costs. More details are provided in the Brightwater Cost Update: Current Conditions and Trends, January 2010.[5]

4.3.3 RWSP Projects in Design or Construction

Table 4-4 shows the cost estimates of projects in design or construction as of December 31, 2009, and as of December 31, 2008. These projects were included as part of the 2010 and 2009 King County adopted budgets, respectively. The cost estimates are shown in inflated dollars. Some costs have been spent; some are allocated to out-years. For the 2008 estimate, the expenditures that occurred through 2008 are included at their original value; for the 2009 estimates, the expenditures through 2009 are included at their original value.

The cost estimates for projects in design or construction in 2009 is $355 million, an increase of $9 million from the 2008 estimate of $346 million. This change is the net result of completion of the Hidden Lake Pump Station and Sewer Improvement, Juanita Bay Pump Station Replacement, and King Street Regulator Station projects and increases in costs of some of the projects in design and construction. The lifetime costs of the completed projects are included in Table 4-2.

[5] The Brightwater Cost Update: Current Conditions and Trends, January 2010 is available at http://www.kingcounty.gov/environment/wtd/Construction/North/Brightwater/Description/~/media/environment/wtd/Construction/Brightwater/current/BW_2010_0099_Cost_trend_report.ashx.

Table 4-4. RWSP Projects in Design or Construction (million dollars, inflated)

	2008 Cost Estimates[a]	2009 Cost Estimates[b]	Cost Change
Total Costs for RWSP Projects in Design/Construction	**$346**	**$355**	**$9**
Total Conveyance Projects	**$220**	**228**	**$8**
Hidden Lake Pump Station Replacement and Sewer Improvement[c]	$38	--	($38)
Bellevue Pump Station	$34	$34	--
Juanita Bay Pump Station Replacement[c]	$38	--	($38)
Kent/Auburn Conveyance Improvements[d]	$51	$51	--
Black Diamond Storage	$13	$14	$1
North Creek Pipeline Project	$45	$48	$3
Bellevue Influent Trunk Parallel	--	$4	$4
Sunset/Heathfield Pump Station Replacement and Force Main Replacement	--	$71	$71
Decennial Flow Monitoring	--	$5	$5
Total Treatment and Odor Control	**$17**	**$11**	**($6)**
King Street Regulator Odor Control[c]	$6	--	($6)
West Point Digestion Improvements	$11	$11	--
Total I/I[e]	**$2**	**$2**	**--**
Total CSO Control Program[f]	**$61**	**$69**	**$8**
Sediment Management/Lower Duwamish Superfund	$51	$57	$6
CSO Planning and Updates	$10	$12	$2
Habitat Conservation Plan (HCP)/Programmatic Biological Assessment	**$8**	**$8**	**--**
Reclaimed Water	**$36**	**$34**	**($1)**
Brightwater Reclaimed Water Backbone	$27	$27	--
Future Water Reuse	$6	$5	($1)
Reclaimed Water Comprehensive Plan	$3	$3	--
RWSP Planning and Reporting	**$3**	**$3**	**--**

Note: Totals may not add because of rounding to the nearest million.

[a] Project costs in this column reflect costs reported in the 2009–2014 WTD CIP budget submittal (October 2008).

[b] Project costs in this column reflect costs reported in the 2010–2015 WTD CIP budget submittal (September 2009).

[c] Total expenditures for 2009 are reflected in Table 4-2, Completed RWSP Projects.

[d] This project has been separated into two projects; the cost estimate reflects the anticipated costs for both projects.

[e] These costs reflect projected costs related to flow monitoring for the initial I/I reduction projects; ongoing modeling, cost-benefit analysis, planning, and reporting; public education; and regional I/I clearinghouse and other program related costs. The expenditures associated with the I/I pilot programs are reflected in Table 4-2, Completed RWSP Projects.

[f] Although the Puget Sound Beach CSO control projects were included in the 2009–2014 and 2010-2015 WTD CIP budget submittal, they are not reflected in this table. Updated cost estimates for these projects will occur at the completion of predesign. Because their costs reflect planning-level costs, these project costs are included in Table 4-5, RWSP Projects Planned for the Future.

4.3.4 RWSP Projects Planned for the Future

Table 4-5 shows planning-level cost estimates for projects planned in the future for 2008 and 2009. The costs in Table 4-5 are presented in constant dollars.

Table 4-5. RWSP Projects Planned for the Future

	2008 Cost Estimate (2008$ x 1M)	2008 Cost Estimate (2009$ x 1M)	2009 Cost Estimate (2009$ x 1M)	Cost Change (2009$ x 1M)
Total Planned Projects	**$964**	**$993**	**$935**	**($58)**
Planned Conveyance Projects[a,b]	$439	$452	$394	($58)
Planned CSO Control Projects[c]	$412	$425	$425	--
Planned South Plant Expansion[d]	$113	$116	$116	--

[a] Conveyance project costs reflect the planning-level cost estimates that were developed as part of the 2007 Conveyance System Improvement Program Update and adjusted for inflation, using the 3 percent per year assumption, to 2009 dollars.
[b] In 2009, three conveyance projects that were included in planned projects in 2008 entered the project development/predesign phase: Decennial Flow Monitoring, Sunset/Heathfield Pump Station Replacements, and Bellevue Influent Trunk. The 2009 cost estimates for these projects are shown in Table 4-4.
[c] CSO control project cost estimates for the planned CSO control projects reflect the 1998 planning-level estimates adjusted for inflation, using the 3 percent per year assumption, to 2009 dollars.
[d] South Plant expansion cost estimates reflect the 1998 planning-level estimate adjusted for inflation, using the 3 percent per year assumption, to 2009 dollars.

4.4 Productivity Initiative Pilot Program

RWSP Financial Policy-3 directs the King County Executive to maintain an ongoing program of reviewing business practices and potential cost-effective technologies and strategies for savings and efficiencies. To meet this policy guidance, the WTD Productivity Initiative Pilot Program was developed to identify and implement ways to increase efficiency. This 10-year incentive program applies certain private-sector business practices, including the establishment of an incentive-based cash payment to employees in the wastewater program, to reduce operating costs, increase productivity, and continue a high level of service and environmental protection for WTD's customers. The Productivity Initiative Pilot Program was approved by the King County Council for WTD's operating program in 2001.

The Productivity Initiative Pilot Program identifies specific levels of service, cost reductions and efficiencies over the period 2001–2010 that are anticipated to result in an estimated $75.9 million savings for ratepayers, while increasing levels of service to these same customers. Savings are achieved by undertaking an intensive review of current business practices, identifying and implementing cost-saving practices, working to increase employee involvement in business decisions, and ensuring that the wastewater program receives the best possible services from its partner agencies inside and outside the agency. Since the program was launched, it has expanded to include three pilot programs in the capital program: Major Capital Projects Pilot, Small In-House Capital Construction Projects Pilot, and Asset Management Pilot.

Positive productivity results were generated in 2009, the ninth year of the pilot program. The results mark the seventh time in the past nine years of the 10-year pilot program that employees

achieved an established productivity target for the operating program and earned a financial incentive for their work. Since 2001, a savings of $72.6 million for ratepayers has been achieved.

More information on WTD's Productivity Initiative, including the Productivity Initiative 2009 Annual Report, is available at http://www.kingcounty.gov/environment/wtd/About/Finances/PI.aspx.

Appendices

Appendix A. The Health of Our Waters, Water Quality Monitoring Results for 2009

Appendix B. Sanitary Sewer Overflows and Permit Deviations in 2009

Appendix C. 2009 Summary of Odor Complaints

Appendix A
The Health of Our Waters,
Water Quality Monitoring Results
for 2009

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Acronyms and Abbreviations

B-IBI	Benthic Index of Biotic Integrity
BMP	best management practices
CSO	combined sewer overflow
DO	dissolved oxygen
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
HPA	hydraulic permit approval
NPDES	National Pollutant Discharge Elimination System
ORP	oxygen reduction potential
PAR	photosynthetically active radiation
PBDE	polybrominated diphenyl ethers
SAP	sampling and analysis plan
TOC	total organic carbon
TSS	total suspended solids
WQI	water quality index
WRIA	Water Resource Inventory Area

Summary of 2009 Water and Sediment Monitoring

To protect public health and its significant investment in water quality improvements, King County regularly monitors wastewater treatment plant effluent, marine water, fresh water, and sediments (Table A-1at the end of this summary). The biological, chemical, and physical parameters used to assess a water body's health under Washington State Water Quality Standards are fecal coliform bacteria, dissolved oxygen, temperature, pH, nutrients, turbidity, and a variety of chemical compounds. King County uses other indicators in addition to these parameters.

With the exception of Quartermaster Harbor near Vashon Island, the quality of marine waters in King County is fair to good. The quality of freshwater and sediment ranged from good to poor, based on the locations monitored and the parameters measured. The water quality index for stream locations monitored in 2009 indicates that many of the locations sampled had moderate to poor water quality.

Some water quality indicators…

Fecal coliform bacteria. The presence of fecal indicator bacteria indicates that the water has been contaminated with the fecal material of humans, birds, or other warm-blooded animals. One type of fecal indicator bacteria, fecal coliforms, may enter the aquatic environment from domestic animals, wildlife, stormwater runoff, wastewater discharges, and failing septic systems. Although these bacteria are usually not harmful, they often occur with other less easily measured disease-causing bacteria and their presence indicates the potential for pathogens to be present and to pose a risk to human health.

Dissolved oxygen. Aquatic plants and animals require a certain amount of dissolved oxygen (DO) for respiration and basic metabolic processes. Waters that contain high amounts of DO are generally considered healthy ecosystems. DO concentrations are most important during the summer season when oxygen-depleting processes are at their peak.

Temperature. Temperature influences many of the chemical components of the water, including DO concentration. Temperature also exerts a direct influence on the biological activity and growth and, therefore, the survival of aquatic organisms. Temperature levels in waters that bear salmonids (cool water fish) are also very important.

Treatment Plant Effluent

King County regularly samples wastewater effluent from its four secondary wastewater treatment plants—West Point, South, Vashon, and Carnation plants—and analyzes these samples at process laboratories at the plants and at its environmental laboratory in Seattle. Three plants discharge their effluent into Puget Sound through deep outfalls. In March 2009, the Carnation plant starting discharging to a nearby wetland. Discharges continue to be in compliance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permit for each plant, and so are in compliance with the Washington State Water Pollution Control Law, the Federal Water Pollution Control Act, and the Federal Clean Water Act.

Marine Water and Sediment

King County's Puget Sound Marine Monitoring Program routinely collects and analyzes marine water samples at the following locations: (1) near county treatment plant and combined sewer overflow (CSO) outfalls to assess potential effects to Puget Sound water quality from wastewater discharges; (2) at ambient locations in the Sound to better understand regional water quality and

to provide data needed to identify trends that may indicate impacts from long-term cumulative pollution; and (3) at Puget Sound beaches, including beaches near outfalls.[1] Sediment samples near outfalls and at ambient locations in Elliott Bay and the Central Basin of Puget Sound are also collected for this program.

Offshore and Nearshore Marine Water

Fifteen stations in the offshore and nearshore marine water column were monitored monthly in 2009. Thirteen of the fifteen stations were monitored for nutrients, fecal indicator bacteria, dissolved oxygen (DO), temperature, salinity, chlorophyll, water clarity, turbidity, total suspended solids, pH, and photosynthetically active radiation (PAR).[2] Two of the stations were monitored for all these parameters except for light transmission, water clarity, and PAR. In addition, *in situ* water quality monitoring systems at three locations (along the Seattle waterfront, Dockton Park in Quartermaster Harbor near Vashon–Maury Island, and outer Quartermaster Harbor) collect temperature, salinity, DO, turbidity, chlorophyll, and pH data every 15 minutes. The mooring in outer Quartermaster Harbor also collects nitrate data at 15-minute intervals. These *in situ* systems augment and aid in interpreting the monthly data collected at the other offshore sites and in assessing daily variability.

One measure of water quality in Puget Sound is evaluated by two fecal coliform bacteria standards—the geometric mean and the peak. All offshore and nearshore marine monitoring locations—both ambient and outfall locations—met these fecal coliform bacteria standards in 2009, including a station in Elliott Bay that exceeded the peak standard in 2008.

The overall quality of offshore marine waters is evaluated through the water quality index (WQI). The WQI incorporates results from four separate parameters: DO, density stratification, ammonia, and dissolved inorganic nitrogen (DIN). In 2009, an index score was calculated for 14 of the offshore and nearshore stations. A score was not calculated for the station located in the East Duwamish Waterway because of considerable freshwater influence from the Duwamish River. Findings indicate that the water quality was at a low level of concern at 10 of the 14 stations, at a moderate level of concern at 2 stations, and a high level of concern at 2 stations. With the exception of 2007, all stations were at a low level of concern in the five years previous to 2009 (Figure A-1). The stations at a moderate or high level of concern in 2009 are described below:

- One station in Elliott Bay is at a moderate level of concern. The station showed low DO levels and consecutive months of low DIN. It has been at a high or moderate level of concern for 5 of the past 10 years. This station tends to have more density stratification in the summer and fall than other sites because of the freshwater influence of the Duwamish River. The stratification impedes water column mixing, causing lower DO levels at the deepest depths and depletion of DIN at the surface from phytoplankton uptake.

- The station near Point Jefferson on the Kitsap Peninsula also was assigned a moderate level of concern. The station showed consecutive months of low DIN and strong-

[1] Ambient monitoring measures surrounding (background) conditions.
[2] Photosynthetically active radiation is the portion of the electromagnetic spectrum associated with photosynthesis. Its measure is important in evaluating the effect of light on plant growth.

intermittent density. Before 2009, it was at a moderate level of concern only once in the past 10 years. The reasons for the changes in DIN and density are being investigated.

- Both stations in Quartermaster Harbor were at a high level of concern in 2009 because of five consecutive months of low DIN. One of the stations also had low DO levels. These stations have been at a high level of concern two of the three years monitored (at a low level of concern in 2008). The *in situ* mooring in Quartermaster Harbor at Dockton also showed low levels of DO and DIN. The physical characteristics of the harbor, a shallow embayment with poor tidal flushing, make it susceptible to water quality problems. Since monitoring began in 2006, findings have consistently shown low DO during late summer and fall because of large phytoplankton blooms. These findings have prompted a multi-agency four-year study to investigate the low DO and the role nitrogen has, if any, in causing water quality problems in the harbor (see the "Other Monitoring" section below).

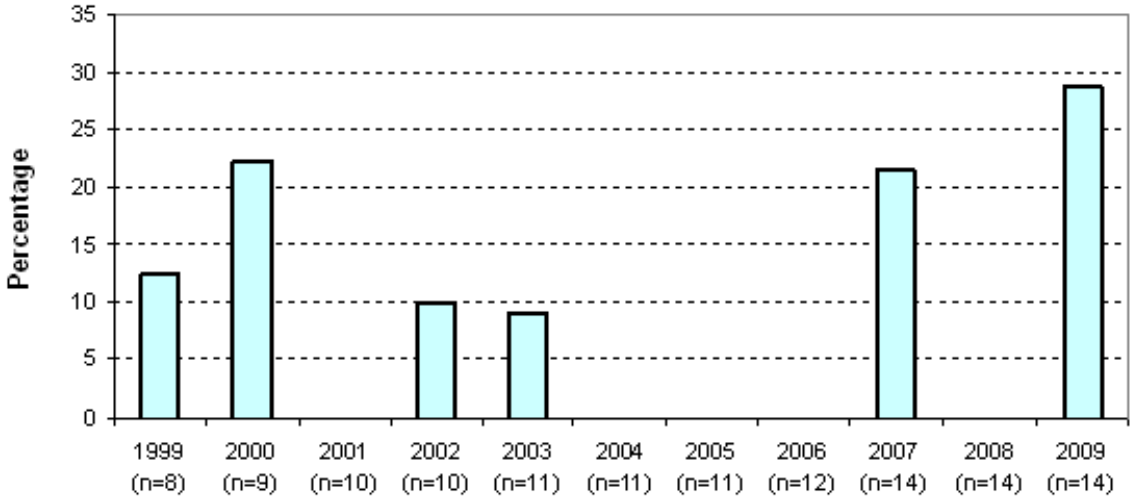

Figure A-1. Percentage of Offshore and Nearshore Marine Water Sampling Sites with a Water Quality Index Rating of Moderate or High Concern (1999–2009)

Marine Beach Water

Twenty-five beach stations were monitored in 2009 for fecal indicator bacteria, nutrients, temperature, and salinity. Fifteen of these stations met all fecal coliform bacteria standards, compared with fourteen in 2008; eight stations did not meet at least one standard, compared with five in 2008; and two stations did not meet any of the standards, compared with six in 2008. The two stations that did not meet any of the standards—in Fauntleroy Cove and at Redondo Beach—are near freshwater sources. Freshwater can enter the marine environment via streams, CSO and stormwater outfalls, and treatment plant outfalls.

Piper's Creek was also monitored for fecal coliform bacteria and nutrients because of its effect on water quality where it outflows on the beach at Carkeek Park.

Marine Sediments

Sediments at ambient locations in Elliott Bay are sampled every two years and in the Central Basin of Puget Sound every five years. The samples are analyzed for metals, organics, and physical parameters. All stations were sampled in 2007. The sampling found that sediment quality in these areas is generally good, with some isolated impacts from human activity.

The Elliott Bay sediment stations were sampled in 2009. Five of the eight stations met all Washington State Sediment Management Standards chemical criteria for sediment quality. Three of the stations, all located near industrialized shorelines, exhibited minor sediment quality impacts, as evidenced by exceedances of either one or two chemical criteria at each station.

Lake Water and Sediment

This section describes three monitoring programs for major lakes in King County: open-water (mid-lake and nearshore), swimming beach, and sediment monitoring.

Mid-Lake and Nearshore Water

The Major Lakes Monitoring Program sampled nine open-water stations in Lakes Washington, Sammamish, and Union (including the Lake Washington Ship Canal) in 2009.[3] Open-water stations were sampled biweekly in March through October and monthly during the other part of the year for temperature, DO, pH, conductivity, clarity (Secchi transparency), and nutrients. Fecal coliform bacteria was sampled at the three Lake Union stations to detect existing and potential problems with the county conveyance system. A focused assessment of stormwater loading at designated stations in Lake Union and south Lake Washington will be conducted in the future if funds are available.

Summer phosphorus concentrations were converted to a trophic state index to assess overall water quality in Lakes Washington, Sammamish, and Union (Figure A-2). The 1994–2009 results for Lakes Sammamish and Washington show that phosphorus concentrations fluctuate between the low and moderate thresholds from year to year, indicating that the water quality varies from good to moderate with low potential for nuisance algal blooms (algae feeds on phosphorus). With the exception of 2007, Lake Union typically shows phosphorus concentrations in the moderate water quality range. High phosphorus levels in 2007 placed Lake Union in the poor water quality range. High phosphorus concentrations in urbanized areas can result from poorly designed drainage systems, inadequate maintenance of sewer infrastructure, and home and business landscaping practices.

[3] The program had been sampling 25 open-water (mid-lake) and nearshore sites from the early 1970s through 2008. In 2009, this program was reduced because of budget cuts. Only nine open-water stations were sampled, and the only lake monitored for fecal colifrom bacteria was Lake Union..

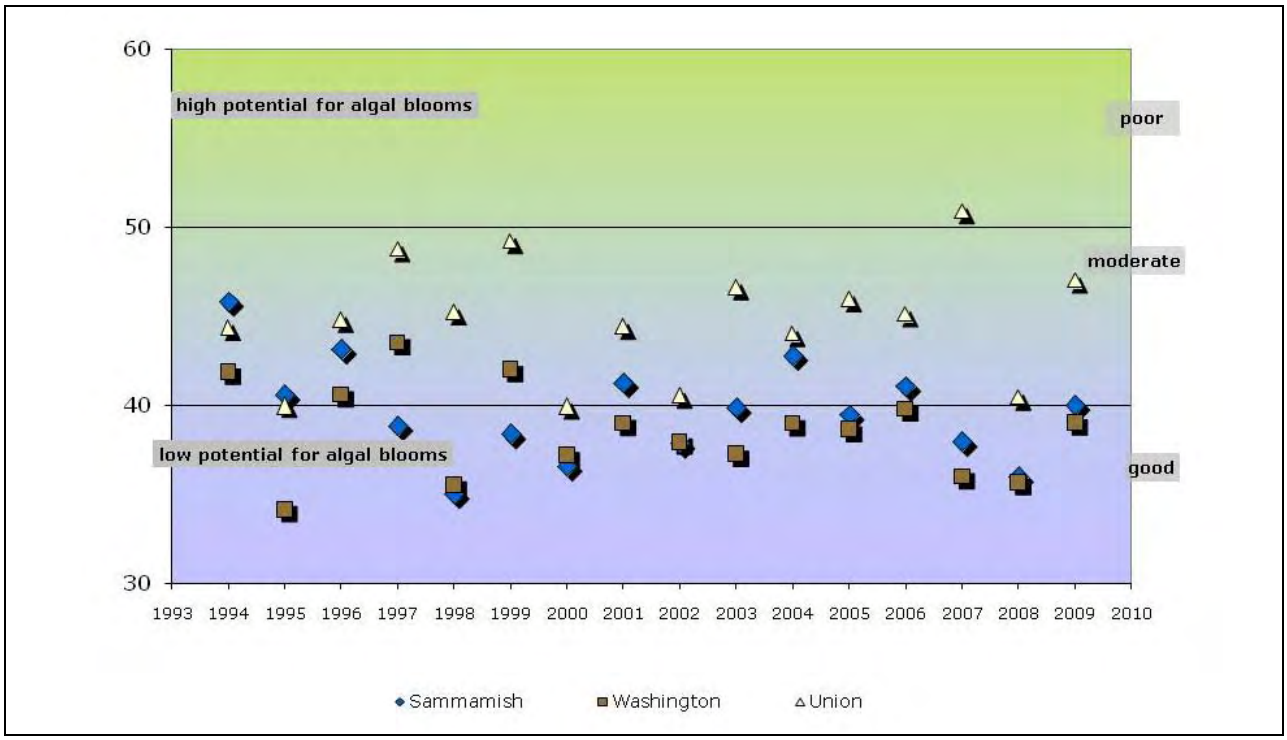

Figure A-2. Overall Water Quality of Lakes Washington, Sammamish, and Union as Measured by the Trophic State Index (1994–2009)

Lake Swimming Beach Water

King County wants to maintain the safety of lakes for all beneficial uses. The Swimming Beach Monitoring Program has been sampling 17 beaches on Lake Sammamish, Lake Washington, and Green Lake for fecal coliform bacteria every summer since 1996. The county began monitoring for algal toxins in 2003.

Results of fecal coliform bacteria monitoring in 2009 and in previous years show that three streams that drain into or nearby swimming beaches have high concentrations of fecal coliform bacteria (Thornton, Juanita, Idlywood, and Johns Creeks). Matthews, Juanita, and Gene Coulon swimming beaches on Lake Washington and Idlywood swimming beach on Lake Sammamish are at risk for fecal bacteria contamination because of their proximity to these creeks. Bacteria levels were low in Green Lake for the seventh year in a row (all samples met the standard). Lake Sammamish levels have remained consistently low, with slight variability from year to year. High bacteria levels in 2009 resulted in a one-week closure of Juanita Beach. Elevated bacteria counts were attributed to a large population of geese observed in the area during the same period. The Magnuson off-leash area near Lake Washington also showed high bacteria levels, apparently from short-lived incidents related to poor pet management that did not result in closures.

King County, the City of Kirkland, and the Washington State Department of Ecology (Ecology) did intensive bacteria monitoring in the Juanita Creek basin in 2008. Results of the effort were published in 2009 and will soon be posted on the King County Stream and River Monitoring

Program's website. Implementation of action items in targeted areas will begin in 2010 as joint efforts with Public Health – Seattle & King County, City of Kirkland, and Northshore Utility District.

Certain species of freshwater cyanobacteria (formerly called blue-green algae, although they are not true algae) are known to make toxins that are potentially harmful to mammals. Smaller bodied animals drinking directly from affected water bodies are particularly at risk, and pet deaths directly related to contact and ingestion of algae blooms have been reported in Washington State. In 2009, all 17 swimming beaches were monitored for two toxin groups of cyanobacteria: microcystin (a liver toxin) and anatoxin-a (a neurotoxin). Microcystin levels were below the state guidance level and anatoxin-a was not detected at any of the beaches. Samples other than the routine project samples were collected if a potential toxic algal bloom was reported to state or county staff. In 2009, Lakes Hicks, Steel, Bellevue, and Lorene were sampled for microcystin, some multiple times, because of persistent toxicity.

Lake Sediments

The Major Lakes Sediment Monitoring Program started a 10-year program in 2007 to monitor sediment quality in Lakes Washington, Sammamish, and Union. Sediments at five stations are monitored in deep areas of Lakes Washington, Sammamish, and Union each year for trends. In addition, about 15 one-time samples are taken each year throughout the 10-year program at various stations to investigate sediment quality in swimming beaches, nearshore habitat, and areas with known contamination. Samples are analyzed for metals, organics, and physical parameters.

In 2007, samples were collected from Lake Sammamish. The results indicate that 10 out of 18 stations showed chemical concentrations high enough to suggest likely adverse effects to aquatic organisms. In 2008 and 2009, samples were collected from Lake Washington. The results from 2008 indicate that 4 out of 17 stations showed chemical concentrations high enough to suggest likely adverse effects to aquatic organisms. Samples from 2009 are still being analyzed.

Stream and River Water and Sediment

This section describes King County monitoring of water, sediments, and benthic macroinvertebrates in county streams and rivers.

Stream and River Water

In 2009, because of budget cuts, the number of sites sampled by the Stream and River Monitoring Program was reduced to 25 sites on three rivers and eighteen streams from the 63 sites on three rivers and twenty-eight streams sampled in previous years. The program targets major rivers and streams that will best characterize potential sources of pollutant loading to a major water body.

Overall water quality of rivers and streams in King County, as measured by the WQI for rivers and streams, varies between and within streams. In 2009, Ecology modified the WQI for rivers and streams to reflect revised state water quality rules for the protection of native fish and aquatic resources and to more directly reflect conditions in Puget Sound lowland streams. For

purposes of year-to-year comparison, results for the 2007–2008 water year (October 1 through September 30) were recalculated using the new Puget Sound lowland WQI (Figure A-3). The 2008–2009 WQI scores indicated that 84 percent of the 25 sampling sites (compared with 72 percent of 63 sites sampled in 2007–2008) were of moderate or high water quality concern (poor to moderate water quality) and that 16 percent were rated of low concern (good water quality). Four sites were rated of high concern:

- Judd and Fisher Creeks on Vashon Island were affected by high fecal coliform bacteria, nitrogen, and phosphorus levels. Judd Creek also had high total suspended solids. Both creeks were rated as moderate concern in 2007–2008.
- Springbrook Creek in Water Resource Inventory Area 9 (WRIA 9) was affected by high fecal coliform bacteria, low DO, and high phosphorus levels.[4] This creek also was rated as high concern in 2007–2008.
- Thornton Creek in WRIA 8 was affected by high fecal coliform bacteria, high phosphorus, and low DO levels. This creek also was rated as high concern in 2007–2008.

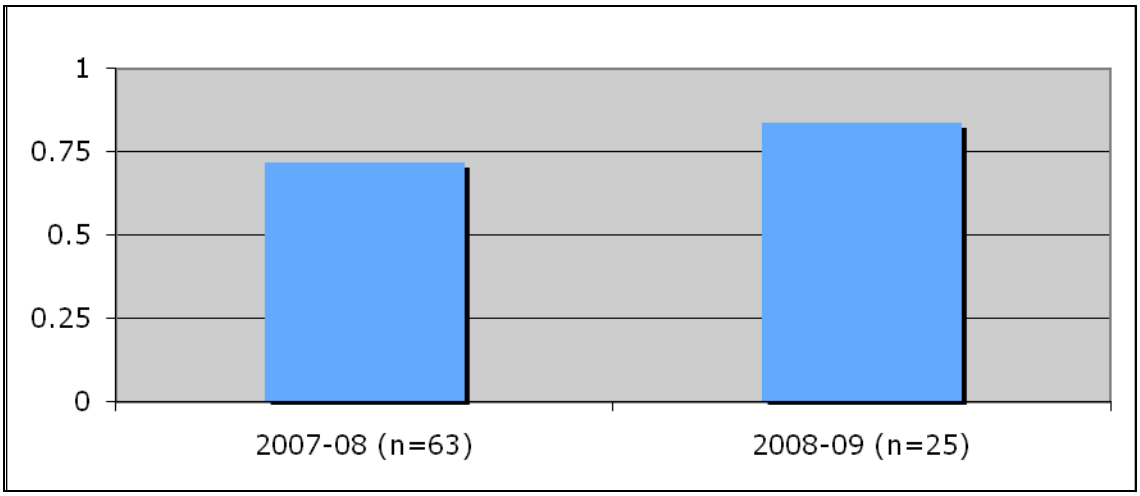

Figure A-3. Percentage of King County Streams with Moderate or High Concern Rating Using the Water Quality Index (2007–2008 and 2008–2009)

Continuous (15-minute) streamflow and water temperature data were collected at a number of stream locations throughout King County in 2009. Flow data have been collected at 20 stations in WRIAs 8 and 9 (7 of these stations are maintained by the U.S. Geological Survey) for long enough to allow for assessment of trends:

- In general, streams in the existing urban growth area have become "flashier," meaning that peak streamflow rises and falls more rapidly and peak flows are higher than would

[4] The two major watersheds—called Water Resource Inventory Areas (WRIAs)—in King County are the Lake Washington/Cedar/Sammamish watershed (WRIA 8) and the Green/Duwamish and Central Puget Sound watershed (WRIA 9).

typically occur under forested conditions. These conditions lead to flash flooding, channel erosion, and disturbed habitat. Juanita and Kelsey Creeks show the most significant increases in flashiness over time, which is likely the result of the rapid urbanization prior to regulations aimed at mitigating the impacts of development on streamflow. For more information, see http://kcintertest/dnrp/measures/indicators/ae-water-quantity.aspx#Flows.

- Summer low flows in a number of streams appear to have declined from historical levels, with the largest relative declines noted in North Fork Issaquah and Des Moines Creeks. The declines are likely due to a combination of reduced rainfall infiltration resulting from urban development and net water consumption or export from the basins. Lower summer flows could have a negative effect on fish and other stream-dwelling organisms.
- An analysis conducted in 2009 of continuous temperature data collected at locations throughout the Puget Lowland of King County suggests that approximately 80 percent of the streams sampled have recorded a 7-day maximum temperature greater than the state "core salmonid habitat" standard of 16 ^{o}C and that 60 percent exceeded the 17.5 ^{o}C standard for the protection of salmonid spawning, rearing, and migration.

Stream and River Sediments

The Streams Sediment Monitoring Program monitors sediment in small wadeable streams in WRIAs 8 and 9. Samples are collected at one location in 10 index creeks each year and analyzed for trends. In addition, one-time samples are collected every creek-mile in approximately three stream basins each year. All 30 streams in the program will be monitored within 10 years. Samples are analyzed for metals, organics, and physical parameters. So far, 123 sites in eighteen streams have been sampled. Results suggest that there are likely adverse effects to aquatic organisms from chemicals at 44 of these sites.

Stream and River Benthic Macroinvertebrates

King County collects samples of stream benthic macroinvertebrates (bottom-dwelling water bugs) annually from approximately 150 randomly selected locations in 15 subbasins in WRIAs 8 and 9. The purpose of the monitoring is to characterize existing conditions and general stream health, compare biological conditions of subbasins, and identify trends over time. A scorecard system—the Benthic Index of Biotic Integrity (B-IBI)—is used to rank the health of the streams. The scores are based on the type and number of stream bugs present. A detailed assessment of the data is under way. The data can be accessed at http://pugetsoundstreambenthos.org (Monitoring Project: King County – DNRP, Ambient Monitoring).

Other Monitoring

In addition to ongoing water and sediment quality monitoring, the county conducts special intensive investigations. Examples include the following:

- Studies are under way to support decision-making, siting, and construction of wastewater capital projects. For example, the wetland that receives Class A reclaimed water from the new Carnation Treatment Plant was monitored before plant startup to establish a baseline and is being monitored after discharge to the wetland began in 2009 to identify any trends

in water and sediment quality. Pre-construction monitoring was also done to establish a baseline in the vicinity of the Brightwater outfall. Additional monitoring will be done to update the baseline just prior to outfall operation.

- In 2009, King County began work on the Quartermaster Harbor Nitrogen Management Study. The study, prompted by low DO levels and other indicators of degraded water quality, will extend through 2012. Sources of nitrogen are being identified and quantified, and nitrogen impacts on DO in Quartermaster Harbor will be modeled. The study is expected to result in recommendations for policy changes in the 2012 King County Comprehensive Plan update for nitrogen management on Vashon-Maury Island and other rural areas. Initial estimates were made in 2009 of nutrient loading from the atmosphere, tributary streams, nearshore septic systems, submarine groundwater, and harbor sediments.[5]
- King County is participating in studies, some of them under the federal Superfund program, of sediments contaminated from historical discharges from CSO and stormwater outfalls.

Availability of Monitoring Data on the Web

In 2009, King County's regional data management program continued to maintain and upgrade the methods used to store and disseminate monitoring data so that the public can directly download data from the Web. Monitoring program websites are as follows:

- The Puget Sound Marine Monitoring Program page provides tables and graphs of measurements of Puget Sound water quality collected from the surface to the bottom (http://green.kingcounty.gov/marine/). It also provides information on all aspects of King County's routine marine monitoring programs. In 2009, a redesigned *in situ* data page was added for the moorings in Elliott Bay and Quartermaster Harbor (http://green.kingcounty.gov/marine-buoy/).
- The Swimming Beach Monitoring Program page provides tables, graphs, and maps of monitoring results as they become available each week and provides the most current information on beach closures (http://green.kingcounty.gov/swimbeach/).
- Tables and graphs of monitoring results are posted as they become available each month on the Major Lakes Monitoring Program page (http://green.kingcounty.gov/lakes/) and the Stream and River Monitoring Program page (http://green.kingcounty.gov/WLR/Waterres/StreamsData/). Data can be downloaded from each site.
- The Benthic Invertebrate Monitoring Program page provides information about the county's stream benthic invertebrate monitoring program, including the B-IBI scorecards for specific streams (http://www.kingcounty.gov/environment/data-and-trends/monitoring-data/stream-bugs.aspx and http://pugetsoundstreambenthos.org:80/Default.aspx).

[5] See http://your.kingcounty.gov/dnrp/library/2010/kcr2119.pdf for a report of the data sources, methods, and results of this effort.

- The public can download rainfall, streamflow, water quality, and other hydrologic data collected at King County gauge sites form the Hydrologic Information Center page (http://green.kingcounty.gov/wlr/waterres/hydrology/). The page also offers a summary of the year's precipitation and provides access to presentations made by county hydrology staff.
- The Lakes Stewardship Program page allows for download of data and provides access to graphs and maps of the lakes and the monitoring data resulting from volunteer monitoring efforts at more than 50 lakes in western King County (http://your.kingcounty.gov/dnrp/wlr/water-resources/small-lakes/data/default.aspx).
- The KingStat Aquatic Environment Index includes information and ratings on water quality, aquatic biota, shorelines, water quantity, and sediment quality. The information is updated each year (http://your.kingcounty.gov/dnrp/measures/indicators/aquatic-enviro.aspx).

Table A-1. Summary of King County Water Quality Monitoring Programs

Program	Media and Locations	Parameters	Methods	Sampling Frequency	Program Purpose	Duration
Ongoing Monitoring						
Marine monitoring	Water and sediment in areas of Puget Sound near and away from King County treatment plant and CSO outfalls Water and shellfish (butter clams) at Puget Sound beaches	Water: temperature, salinity, clarity, DO, TSS, turbidity, nutrients, pH, chlorophyll, PAR, and bacteria Ambient sediment: metals, organics, and physical properties Beach water: temperature, salinity, nutrients, and bacteria Shellfish: lipids, metals, and PBDEs	Water samples collected at multiple depths, ranging from 1 to 200 m Sediment: VanVeen grab sampler for subtidal sediments; sediment corer for intertidal sediments[a] Shellfish: shovel	Water: monthly; every 15 minutes at 3 sites Sediment: every 2 years (Elliott Bay), every 5 years (Puget Sound) Shellfish: semi-annually	To assess potential effects to water quality from point and nonpoint pollution sources and to compare quality to county wastewater sources	Ongoing
Marine NPDES sediment monitoring	Sediments in Puget Sound near treatment plant outfalls	Grain size, solids, sulfides, ammonia-nitrogen, oil & grease, TOC, metals, organic compounds, and (at South and West Point plants) benthic infauna	Sediment samples in a grid pattern as defined in the SAP approved by Ecology	Sediment samples at outfalls once per permit cycle (about every 5 years)	NPDES permit requirement	Ongoing

BMP = best management practices; CSO = combined sewer overflow; DNR = Washington State Department of Natural Resources; DO = dissolved oxygen; Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; HPA = Hydraulic Permit Approval; m = meter; NPDES = National Pollutant Discharge Elimination System; ORP = oxygen reduction potential; PAR = photosynthetically active radiation; PBDEs = polybrominated diphenyl ethers; SAP = sampling and analysis plan; TOC = total organic carbon; TSS = total suspended solids.

[a] Intertidal zone is the area that is exposed to the air at low tide and submerged at high tide; subtidal zone is the area below the intertidal zone that is always covered by water.

[b] Petite ponar is a type of grab sampler that can easily be carried by one person in the field and can be deployed without the use of a winch or crane recommended for larger samplers.

Table A-1. Summary of King County Water Quality Monitoring Programs

Program	Media and Locations	Parameters	Methods	Sampling Frequency	Program Purpose	Duration
Major lakes monitoring	Water and sediment in Lakes Washington, Sammamish, and Union at ambient locations	Water: temperature, DO, pH, conductivity, clarity, nutrients, and fecal coliform (Lake Union only) Sediment: metals, organics, and physical properties	Water samples collected at incremental depths depending on the site Sediment: surface, petite ponar[b]	Water samples: biweekly from March through October; monthly during the rest of the year Sediment: yearly	To document status and trends of lakes	Ongoing
Swimming beach monitoring	Lake Washington, Lake Sammamish, and Green Lake	Bacteria; microcystin and anatoxin (algal toxins)	Water samples at swimming beaches	Weekly, in the summer from Memorial Day through end of September	To evaluate human health risks and necessity for beach closures	Ongoing
Small lakes monitoring	Volunteers monitor 44 small lakes in King County	Precipitation, lake level, temperature, Secchi depth, phosphorus, nitrogen, chlorophyl-a, phytoplankton	Single-point and vertical profiles	Rainfall & lake level: daily Temperature & Secchi depth: weekly Other parameters: every 2 weeks April to October	To characterize and identify trends in water quality	Ongoing

BMP = best management practices; CSO = combined sewer overflow; DNR = Washington State Department of Natural Resources; DO = dissolved oxygen; Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; HPA = Hydraulic Permit Approval; m = meter; NPDES = National Pollutant Discharge Elimination System; ORP = oxygen reduction potential; PAR = photosynthetically active radiation; PBDEs = polybrominated diphenyl ethers; SAP = sampling and analysis plan; TOC = total organic carbon; TSS = total suspended solids.

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Table A-1. Summary of King County Water Quality Monitoring Programs

Program	Media and Locations	Parameters	Methods	Sampling Frequency	Program Purpose	Duration
Rivers and streams monitoring	Water quality samples from rivers and streams of both watersheds; emphasis on wadeable streams that could be a source of pollution Stream sediment samples for trend analysis at 10 creeks, plus spatial analysis of stations every creek mile in 3 basins Streamflow and temperature data from 35 stream locations	Baseflow and storm samples: TSS, pH, temperature, conductivity, DO, nutrients, bacteria Storm samples: trace metals and specifed organics Sediment: metals, organics, and physical parameters	Various methods for collecting water samples Sediment: surface sediments, core tube, petite ponar Streamflow and temperature: continuous data recorders; direct measurements 6–12 times per year	Monthly sampling under baseflow conditions; 3–4 times per year under storm conditions Sediment: yearly	To identify impacts from the wastewater conveyance system and surface water runoff; to document the status and long-term trends of targeted streams and rivers	Ongoing
Benthic macroinvertebrate monitoring	Wadeable stream subbasins	Size and distribution of aquatic macroinvertebrate populations	Samples collected with a Surber stream bottom sampler	Annually	To establish a baseline for identifying long-term trends	Ongoing
Precipitation monitoring	Rainfall measured at 70 locations in King and Snohomish Counties, and at 2 meteorologic stations	Rainfall, air temperature, wind pressure, calculated transpiration/evaporarion	Continuous data recorders		To analyze infiltration to wastewater conveyance system and to model stormwater	Ongoing

BMP = best management practices; CSO = combined sewer overflow; DNR = Washington State Department of Natural Resources; DO = dissolved oxygen; Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; HPA = Hydraulic Permit Approval; m = meter; NPDES = National Pollutant Discharge Elimination System; ORP = oxygen reduction potential; PAR = photosynthetically active radiation; PBDEs = polybrominated diphenyl ethers; SAP = sampling and analysis plan; TOC = total organic carbon; TSS = total suspended solids.

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Table A-1. Summary of King County Water Quality Monitoring Programs

Program	Media and Locations	Parameters	Methods	Sampling Frequency	Program Purpose	Duration
Special Studies						
Brightwater Outfall Studies	Water, sediment, eelgrass, and intertidal biota for the Brightwater outfall site	Water: temperature, salinity, clarity, DO, nutrients, suspended solids, light transmission, chlorophyll, PAR, and bacteria Sediment: chemistry and benthic taxonomy Eelgrass and intertidal biota: distribution and relative abundance	Water column samples collected at multiple depths, from 1 to 175 m Surface sediments collected by grab sampling Eelgrass survey: side-scan sonar, underwater video, SCUBA divers Intertidal biota survey: transect/quadrat method	Water: monthly Sediment: 4 times per year Eelgrass: 7 sampling events over the course of the study Intertidal biota: annually for 5 years	To meet HPA and DNR outfall lease requirements and to compare outfall pre-construction to post-construction data	Through 2014
Brightwater Construction NPDES Stormwater Monitoring	Stormwater and surface water	Stormwater quality	Various	Intensive	To meet NPDES Construction Stormwater permit	Through 2010
Elliott West/Denny Way CSO sediment monitoring	Sediment near the new Denny Way Regulator and Elliott West CSO Treatment Facility outfalls and in sediment cleanup areas associated with the old Denny Way CSO discharge site	Benthic communities, sediment chemistry	Sediment samples per approved SAP	Variable	To meet U.S. Army Corps of Engineers permit requirements and an Ecology cleanup order	Through 2021

BMP = best management practices; CSO = combined sewer overflow; DNR = Washington State Department of Natural Resources; DO = dissolved oxygen; Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; HPA = Hydraulic Permit Approval; m = meter; NPDES = National Pollutant Discharge Elimination System; ORP = oxygen reduction potential; PAR = photosynthetically active radiation; PBDEs = polybrominated diphenyl ethers; SAP = sampling and analysis plan; TOC = total organic carbon; TSS = total suspended solids.

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Table A-1. Summary of King County Water Quality Monitoring Programs

Program	Media and Locations	Parameters	Methods	Sampling Frequency	Program Purpose	Duration
Duwamish/Diagonal post-remediation sediment monitoring	Sediment near the Seattle Diagonal storm drain (includes city and county CSO outfalls) and the county's Duwamish CSO outfall	Sediment chemistry, turbidity, cap surveys	Sediment samples per approved SAP	Annual	Under an EPA/Ecology Consent Order	Through 2013
Wetland monitoring for Carnation Treatment Plant	Water quality in discharge wetland, existing tributaries, and outflow Sediment quality in wetland pond	Water: metals, organics, nutrients, bacteria Sediment: metals, organics, and physical parameters	Water column Surface sediments	Variable	Determine conditions before and after treatment plant discharge	2006–2010
Quartermaster Harbor Nitrogen Management Study	Groundwater quality Streamwater quality Streamflow and temperature (done as part of another project) Marine water quality (see ambient marine monitoring above)	Groundwater: alkalinity, nutrients, TSS, bacteria, DO, pH, specific conductance, temperature, turbidity, ORP Streamwater: same as groundwater, except for addition of mircrobiology and deletion of TSS and ORP	Groundwater: monitoring wells with dedicated sampling equipment Streamwater: various sampling methods	Groundwater: Annually Streams: Monthly Streamflow: continuously at 5 sites; every 2 years at 22 sites	Recommend policy changes for nitrogen management in the King County Comprehensive Plan	2009–2012

BMP = best management practices; CSO = combined sewer overflow; DNR = Washington State Department of Natural Resources; DO = dissolved oxygen; Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; HPA = Hydraulic Permit Approval; m = meter; NPDES = National Pollutant Discharge Elimination System; ORP = oxygen reduction potential; PAR = photosynthetically active radiation; PBDEs = polybrominated diphenyl ethers; SAP = sampling and analysis plan; TOC = total organic carbon; TSS = total suspended solids.

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Appendix B

Sanitary Sewer Overflows and Permit Deviations in 2009

Table A-1 provides information on sanitary sewer overflows in 2009, and Table A-2 provides information on permit deviations in 2009.

Table B-1. Sanitary Sewer Overflows in 2009

Date	Location	Estimated Volume (gallons)	Duration	Discharge Type	Receiving Water	Reason for Overflow
Jan. 30	North Creek Force Main	14,000	30 minutes	Untreated wastewater	On the roadway and to a drainage swale that leads to the Sammamish Slough	An air jumper structure ruptured. The spill was quickly contained, and the pipe was repaired.
Feb. 11	Lake Hills Interceptor	1,000	5 minutes	Untreated wastewater	On the street and into a manhole	A surge of flow overwhelmed a bypass pump during line work. The spill was quickly contained, and the area was cleaned up.
June 12	Interurban Force Main	720	3 days	Untreated wastewater	On the ground	A valve in the vacuum relief system on one of the parallel force mains was leaking. The line was cleaned with no success; then the valve was replaced.
July 17	North Interceptor	13,000	Up to 7 days	Untreated wastewater	On the ground, into a storm drain, and into Lake Washington Ship Canal	A private side sewer connected to the interceptor was inadvertently plugged during King County maintenance work. The connection was reestablished.
July 20	Interurban Force Main	50–500	Unknown	Untreated wastewater	On the ground	A vacuum relief valve in the other parallel force main (see June 12) was leaking. Flow was switched to the other force main.
Aug. 20	Interurban Force Main	500	Unknown	Untreated wastewater	On the ground	Occurred while waiting for parts to arrive to repair the problem that caused the July 20 leak.
Sept. 30	West Point Treatment Plant	Unknown	Unknown	Untreated wastewater	Puget Sound	During testing, a small leak was discovered in the emergency outfall gate stop logs. The leak was quickly repaired.
Oct. 11	Bellevue Pump Station	36,000	1 hour	Untreated wastewater	Meydenbauer Creek	A high wet well alarm appeared to have shut off pumps in the temporary pumping operation during upgrade and expansion of the Bellevue Pump Station. Of the three pumps, one was out of service to remove rags. Another lost automatic control, which prevented the third pump from running.
Oct. 14	Murray Avenue Pump Station	36,000	36 minutes	Untreated wastewater	Puget Sound	Caused by a power outage in the area. A mobile generator provided temporary power and stopped the overflow.

Date	Location	Estimated Volume (gallons)	Duration	Discharge Type	Receiving Water	Reason for Overflow
Oct. 21	Interurban Force Main	Up to 12,000	Up to 6 days	Untreated wastewater	On the ground in a vegetated area	Vacuum relief valves were leaking (see Aug. 20). The valves were later replaced.
Dec. 10	Carnation Treatment Plant	350	15–20 minutes	Waste-activated sludge	On the ground at the fenceline	Overflow was from the vent on the vacuum sump. The sump could not be shut off because of check valve damage from cold temperatures. The spill was allowed to freeze. It was then removed and the area was disinfected with chlorine granules.
Dec. 15	West Point Treatment Plant	8.7 million	3 hours	Untreated wastewater	Puget Sound	Gate malfunction and operator error. The emergency bypass gate immediately opened after routine preparation for anticipated high flow volume. Normal measures to close the gate were not taken in a timely manner.

Table B-2. Permit Deviations in 2009

Date	Location	Estimated Volume (gallons)	Duration	Discharge Type	Receiving Water	Reason for Permit Deviation
Dec. 29 (2008)–Jan. 6	Beulah Park Cove	0–32,242	Unknown	Treated wastewater; no disinfection	Drip field in the facility	Disinfection failure occurred sometime during an 8-day period while the facility was on automatic operation. On Jan. 6, it was found that the ultraviolet bulbs were not working, possibly the result of a power failure on Jan. 4. Bulbs/ballasts were replaced and sampling was done.
Jan. 28	West Point Treatment Plant	100,000	5 minutes	Partially treated wastewater mixed with fully treated effluent	Puget Sound	Operator error. An incorrect setpoint for the primary tanks caused the effluent weir gates to drop, a downstream surge to occur, and the level at the flow diversion structure to rise .The CSO gates opened.
Feb. 11	West Point Treatment Plant	20,000	3 minutes	Partially treated wastewater mixed with fully treated effluent	Puget Sound	Operator error. An incorrect setpoint for the primary tanks caused the effluent weir gates to drop, a downstream surge to occur, and the level at the flow diversion structure to rise .The CSO gates opened.
May 13	West Point Treatment Plant	150,000	5 minutes	Partially treated wastewater mixed with fully treated effluent	Puget Sound	A pump in the Influent Pump Station shut down when restarted after maintenance, causing high levels upstream and triggering the CSO gates to open.
July 26	Beulah Park Cove	500	1.5 hours	Treated wastewater; no disinfection	On the ground and possibly into a storm drain; did not appear to reach surface water	A treatment train overflowed. The cause could not be determined. A pipe was added to connect overflow pipes to prevent leakage to the ground.

Date	Location	Estimated Volume (gallons)	Duration	Discharge Type	Receiving Water	Reason for Permit Deviation
Aug. 14	West Point Treatment Plant	10,000	2 minutes	Partially treated wastewater mixed with fully treated effluent	Puget Sound	Operator error. Incorrect setpoints during maintenance caused the primary effluent weir gate to drop, a downstream surge to occur, and the CSO gates to open.
Oct. 16	West Point Treatment Plant	800,000	8 minutes	Partially treated wastewater mixed with fully treated effluent		A power supply failure to the programmable logic controller for the Influent Pump Station caused the pump to shut down, resulting in a high wet well condition and triggering the CSO gates to open and flow to bypass secondary treatment.

Appendix C

2009 Summary of Odor Complaints

The Wastewater Treatment Division (WTD) received and investigated 60 odor complaints in 2009. Of these complaints, 44 were determined to be attributable to WTD wastewater facilities.

Detailed information for each complaint is included in the table below. The table lists the complaints by the following areas:

- **West Point Treatment Plant Area.** This area is adjacent to the West Point Treatment Plant. There was one complaint in 2009; this complaint was attributed to the plant.
- **West Service Offsite Area.** This area encompasses the pump stations, regulator stations, and pipelines that deliver wastewater to the West Point plant. These facilities are generally located north and east of the plant. The area received 19 complaints in 2009; 14 were attributed to WTD facilities.
- **South Treatment Plant Area.** This area is adjacent to South Treatment Plant. There were four complaints in 2009; two were attributed to WTD facilities.
- **South/East Service Offsite Area/Alki Service Area.** This area encompasses the pump stations, regulator stations, and pipelines that deliver wastewater to South plant, which are generally located south and east of the plant. The service area also includes the facilities in the Alki service area. The area received 34 complaints in 2009; 25 were attributed to WTD facilities.
- **Vashon Treatment Plant Area.** This area encompasses the facilities that are part of the Vashon Treatment Plant System. The area received two complaints in 2009; both were attributed to WTD facilities.
- **Carnation Treatment Plant Area.** This area encompasses the facilities that are part of the Carnation Treatment Plant system. The area received no complaints in 2009.

In general, WTD staff notifies complainants about the findings of the investigation into their complaints. Some complainants inform staff they do not want to be notified and others do not provide contact information.

Location	Date	Complaint	Investigation Findings/Resolution
West Point Treatment Plant Area			
West Point Treatment Plant	11/3/09	Complainant reported "rotten egg" odors while walking on the beach adjacent to the West Point plant.	High gas pressure associated with testing on the flame arrester and digester blower resulted in odors. The odors ceased when the work was completed, and the pressure returned to normal.
West Service Offsite Area			
142 NW Canal Street, Seattle	4/10/09	Complainant sensed odors inside and outside stated address.	Facilities inspection staff investigated and confirmed the side sewer of this address is connected to the county's sewer main, but odors may be coming from internal plumbing problems. Similar complaints in 2008 resulted in sealing nearby manholes. However, the plugs had been removed when a meter to monitor hydrogen sulfide (H_2S) was installed in the manhole. See note below on June 2009 investigation.
142 NW Canal Street, Seattle	4/14/09	Complainant (same as 4/10/09) said there was a musty/pungent odor coming inside the house from the laundry room.	As a precaution, WTD staff plugged manhole N-23-01. See note below on June 2009 investigation.
142 NW Canal Street, Seattle	4/28/09	Complainant (same as 4/10/09) said manure/sewage odors are entering the house.	See note below on June 2009 investigation.
142 NW Canal Street, Seattle	5/1/09	Complainant (same as 4/10/09) reported strong sewer odors inside laundry room.	In June 2009, a thorough investigation determined that the house had internal plumbing problems. The odors sensed inside were not attributed to the county system. Complainant was notified about the results of investigation.
3905 NE Belvoir Place, Seattle/ Belvoir Pump Station	6/16/09	Complainant sensed moderate manure/rotten egg odors outside near his address. Complainant thought the odors came from the Belvoir Pump Station.	The operator investigated the pump station and sensed sporadic odors. The wet well was pumped down and hosed, and the wet well exhaust fan was cleaned.
3904 NE Belvoir Place, Seattle/ Belvoir Pump Station	6/18/09	Complainant sensed sewage odors for one week when bicycling past the Belvoir Pump Station.	Similar to complaint on 6/16/09, the operator sensed sporadic odors coming from the wet well exhaust stack. The exhaust fan was examined.

Location	Date	Complaint	Investigation Findings/Resolution
701 Galer Street, Seattle/Dexter Pump Station	6/26/09	Complainant sensed "human feces" odor. Complainant thought the odors were coming from the nearby lift station.	Upon investigation, the operator sensed odors inside the gate room, but no odors outside of the facility. No further action was taken.
6423 NE 175th, Kenmore (Kenmore Pump Station)	7/10/09	Complainant sensed strong sewage odors outside near his address. Complainant thought the odors came from the Kenmore Pump Station.	Upon investigation, no odors were sensed. The chemical injection pumps were adjusted to increase the Bioxide flow to prevent further odors.
5703 33rd Avenue NE, Seattle	7/18/09	Complainant sensed very strong "garbage-like" odors outside near his address. Complainant thinks they are coming from across the street.	Area of odors is part of the Seattle Public Utilities (SPU) service area. WTD staff notified SPU. Designated as a non-county complaint.
3637 Thorndyke Avenue West, Seattle	7/28/09	Complainant sensed strong sewer odors inside office at building address.	The Wheeler Street mobile odor control unit was off due to settling/short-circuiting of the carbon beds. Began maintenance for the mobile odor control unit.
3637 Thorndyke Avenue West, Seattle	7/30/09	Complainant sensed strong sewer odors inside office at building address.	Maintenance work was more extensive than anticipated, so there was a delay in getting the unit back in service. The mobile odor control unit was placed back into service this afternoon.
6423 NE 175th, Kenmore/Kenmore Pump Station	8/13/09	Complainant (same as 7/10/09) sensed moderate "rotten egg" odors inside.	Upon investigation, it was found that the chemical pump for the Bioxide feed had failed. The chemical pump was repaired.
15724 Beach Drive NE, Lake Forest Park/Log Boom Regulator	8/17/09	Complainant sensed strong "sewer" odors inside his residence up through the vent lines.	Fan for carbon unit near residence was off, but operating passively. The source of the odor was from flushing out the south storage line at the Log Boom Regulator. Staff modified operating procedures to prevent slug discharges to the lake line. (A slug discharge refers to any discharge of a non-routine, episodic nature.)
4584 NE 89th Street, Seattle/ North Portal	8/20/09	Complainant sensed strong "sewer" odors inside his residence.	During the investigation, high H_2S measurements were detected outside the North Portal doors. Further investigation revealed that the temporary flow storage program in place at time of complaint might have caused odors.

Location	Date	Complaint	Investigation Findings/Resolution
18533 26th Avenue NE, Lake Forest Park/ McAleer Odor Control Unit	9/1/09	Complainant sensed strong "rotten egg/manure" odors inside residence. Complainant believes the odors are coming from the McAleer Odor Control Unit.	In the initial investigation, the operator sensed a faint odor from the unit, although it was operating normally. A follow-up investigation detected pressure coming out of the odor control-vault manhole cover and resulted in a work request to check the exhaust duct. A broken fan belt was discovered and repaired.
17500 Midvale Avenue North, Shoreline/Boeing Creek Park	9/14/09	Complainant sensed intermittent "baby diaper like" odors the past month both inside and outside his residence. Complainant believed the odors came from the odor control facility in the park.	No odors were detected at the Boeing Creek Storage Structure at the time of investigation. An H_2S reading was taken and it was 0 parts per billion (ppb).
Belvoir Pump Station	9/16/09	Complainant sensed strong "rotten egg" odors outside which he thought came from the Belvoir Pump Station.	Upon investigation, no odors were sensed within the vicinity of the pump station and the odor control system was operating normally. No further action taken.
4241 21st Avenue West, Seattle	9/17/09	Complainant sensed "rotten egg" odors outside and entering into her office building. Complainant sensed these odors starting August 26 to present.	Even though no odors were present upon investigation, a nearby manhole was plugged. Further investigation revealed sewer odors and staff identified two backflow preventers on the property that could be stuck open. The property owner was notified.
4241 21st Avenue West, Seattle	10/8/09	Complainant has sensed strong sewer odors inside and outside business property for a long time.	The nearest King County facility is the West Point plant. There is a manhole 50 feet from the business. Very little odor was sensed upon investigation, with the source unknown. No corrective action taken at this time. Since the source of the odor was unknown, the complaint was designated as non-county.
South Treatment Plant Area			
6241 S. 129th, Seattle/South Treatment Plant	5/26/09	Complainant sensed strong "rotten egg and sewage" odors near her apartment complex.	All of the plant's odor control systems were in operation. Operators sensed a very strong odor from the plant and noticed floating sludge from clarifiers. The tanks were hosed down and calcium hypochlorite was added to the empty clarifiers.

Location	Date	Complaint	Investigation Findings/Resolution
5827 South 144th Street, Tukwila	8/18/09	Complainant sensed strong odors outside residence and thinks the source of odors is the South plant.	All odor control units at the plant were operating normally. The nearest King County facility to the residence is the Interurban Pump Station. The pump station's odor control unit was in service. Upon investigation, no odors were sensed around the residence and no H_2S was measured from local manholes. Designated as a non-county complaint.
5827 South 144th Street, Tukwila	11/2/09	Complainant sensed strong "slightly sweet sewage" odors at the Allentown Community Center. Complainant thought the odors came from South plant.	Upon investigation, the operators did not sense any odors around the plant. All of the odor control units were in operation. The location of the complaint was over two miles from South plant. No further action taken at this time. Since the odor source could not be verified, it was designated as a non-county complaint.
South Treatment Plant	12/28/09	Complainant sensed sewage odors inside vehicle while driving south of the plant on I-405.	An operational check of the facility revealed some odor from the primary and secondary clarifier areas but no odors around the southern plant boundary. All odor control units and fans were operating normally. The septage and biofilter units were checked the day after and very little odor was sensed at these two odor control units. No further action was taken at this time.
South/East Service Offsite Area			
Willows Road and 124th NE, Redmond	2/5/09	Complainant sensed strong odors at an office complex just west of the York Pump Station.	At the time of the complaint, the North Creek Pump Station was coming back into service after being down for a week. A high H_2S concentration from the initial flow in the force main could have temporarily broken through the odor control vessels at the force main discharge or pump station. Staff checked the carbon scrubbers at the North Creek Force Main and found that the carbon media still had adsorption capacity. Staff also checked the odor control unit; the sulfide levels from the exhaust were minimal with no odors.

Location	Date	Complaint	Investigation Findings/Resolution
York Pump Station	2/16/09	Complainant sensed strong manure or compost-like odors from 2/11 to 2/16 throughout the day.	On investigation, staff sensed diesel fuel and slight sewage odors at the pump station. The York and North Creek Force Main Discharge odor control units were operating at the time of the complaint. Staff took measurements from the exhausts of the odor control units and minimal levels of H_2S were detected. No further action was taken at this time.
North Creek Force Main Discharge Structure	2/23/09	Personnel from a nearby nursery sensed strong "rotten egg" odors from the North Creek Force Main Discharge Structure.	During the initial investigation, the operator sensed no odors; both odor control units were in operation. A follow-up inspection revealed sewage odors and high H_2S concentrations (300 ppb) from the exhaust of the odor control unit. The carbon was changed.
Murray Avenue Pump Station	2/23/09	Complainant first detected "rotten egg" odors near Lowman Beach and thought the odor was coming from the Murray Avenue Pump Station.	Upon investigation, a slight odor was sensed from a drain west of the station and near a few of the wet well hatches. Minimal H_2S concentrations were detected from readings taken at the hatches and odor control unit exhaust. The wet well fan filter was changed. Because the filter can become clogged with grease, it is now scheduled to be changed out on a weekly basis.
Murray Avenue Pump Station	3/15/09	Complainant detected "rotten egg" odor near the pump station.	Upon investigation, slight sewage and H_2S odors were sensed at the top of the station. The wet well exhaust fan was operating at the time, but not performing optimally. A sample of the carbon in the scrubber was collected. The sample confirmed that there was plenty of H_2S adsorption capacity remaining. The wet well fan filter was changed and the fan belt was replaced.
Fauntleroy Ferry Dock	3/18/09	Washington State Ferries employee sensed "gasoline-like" odors in the ticket booth near the Barton Pump Station.	The operator sensed a hint of gasoline odor during the investigation. The wet well was checked with a gas monitor; nothing was detected. According to Industrial Waste staff, there were no commercial discharges in the area. No further action was taken at this time.

Location	Date	Complaint	Investigation Findings/Resolution
3038 241st Avenue SE, Sammamish	5/16/09	Complainant sensed sewage odors in her backyard. Complainant thought the odors were coming from a septic tank.	Since no King County wastewater facilities are nearby, staff gave complainant the phone number to the Sammamish Sewer and Water District. Designated as a non-county complaint.
29725 224th Avenue SE, Black Diamond	5/16/09	Complainant sensed strong "manure/compost" odors outside and thought the odors were coming from a manhole.	Operators sensed sewage odors on the NE side of address. Manholes 84, 85, and 86 (along the Black Diamond conveyance line) were sealed and caulked. Bioxide dosing was started at the Black Diamond Pump Station shortly thereafter.
Fauntleroy Ferry Dock	5/31/09	Ferry employee sensed a "moldy, manure/compost" odor inside the ticket booth.	Upon investigation, the odors were no longer present. The Purafil carbon in the odor control unit at the Barton Street Pump Station was changed in April. Warm weather may have led to algae growth/seaweed odor on the beach. Designated as a non-county complaint.
140th Avenue NE and Bel-Red Road, Bellevue	6/1/09	Complainant sensed moderate sewage odors outside. Complainant thought the odors were coming from a new sewer line.	The nearest King County facilities were manholes RO3-19, RO3-20. No odors were sensed upon investigation but a contractor working at the address stated they have sensed sewage odors for over a month. Manhole R03-19 was sealed.
Wilburton Inlet Siphon Odor Control unit near Medina Discharge	6/5/09	A Puget Sound Energy representative called the South plant about strong "manure/compost" odors by the mobile odor control unit near the Medina Force Main Discharge structure.	Upon investigation, the operator sensed a musty odor around the odor control unit. The South plant staff monitored the mobile unit for odors. There were low sulfide readings from the unit. No further action was taken.
7135 Beach Drive SW, Seattle	6/8/09	Complainant sensed moderate sewage odors near her house, just south of the Murray Pump Station.	Operator sensed slight odors from the manhole in front of her house as well as at the inlet to the Murray Pump Station wet well. The manhole was resealed and the wet well fan filter at the Murray Pump Station was changed.
5827 South 144th Street, Tukwila	7/1/09	Complainant sensed very strong "manure/outhouse" odors outside. Complainant thought they came from the Interurban Pump Station.	The complainant later informed the South plant that Baker Commodities had broken a line and that was the source of the odor. Designated as a non-county complaint.

Location	Date	Complaint	Investigation Findings/Resolution
Fauntleroy Ferry Ticket Booth	7/5/09	Call received from the Washington State Ferries regarding very strong sewage odors from the Barton Pump Station.	Upon investigation, the operator noticed that the odor was coming from the beach (low tide). The station's odor control unit was operating and as a precaution, the dry well was hosed. There was no access to the wet well as a car was parked on top of the hatch. Since low tide odors are prevalent this time of the year, the complaint was designated as non-county.
7135 Beach Drive SW, Seattle	8/3/09	Complainant sensed strong sewage odors outside from manholes located along Beach Drive SW, just south of Murray Pump Station.	Upon investigation, the operator did not detect any odors and found the Murray Pump Station odor control unit was in service. As a precaution, the operator changed the wet well filter, and the manhole on front of the complainant's home was sealed.
7117 Beach Drive SW, Seattle	8/4/09	Initial complaint received at West Point plant and forwarded to South plant. Complainant sensed very strong sewage odors outside for the past few days and thinks the odors are coming from a manhole near residence.	Upon investigation, the respondents noticed a faint sewage odor from the manhole. The manhole was sealed and caulked.
SE 5th Street and 118th Avenue SE, Bellevue/Wilburton Siphon Inlet Mobile Odor Unit	8/7/09	Complainant sensed very strong "rotten egg" odors at residence for the past two weeks.	Upon investigation, it was found that the mobile odor unit for the Wilburton Siphon Inlet Structure was not operating. The operator took necessary steps to make the unit operational.
Yarrow Bay Pump Station	8/10/09	Complainant sensed strong "manure/compost" odors at the beginning of August but did not know whom to contact to complain about the odors.	The operator sensed strong rotten egg odors from the wet well and Pepcon scrubbing tower room exhaust fan. Necessary repairs were made to the scrubbing tower and recycle pump.
Fauntleroy Ferry Dock	8/14/09	Complainant sensed strong "rotten egg" odors and thought they came from the Barton Pump Station.	The operator sensed very slight odors around the station. Earlier odors were determined to be caused by seaweed, as there was a very low tide that morning. Designated as a non-county complaint.
11804 SE 5th Street, Bellevue/ Wilburton Siphon Inlet Structure	8/18/09	Complainant sensed strong "rotten egg" odors inside and outside residence.	Upon investigation, the operator sensed musty odors in various areas within the vicinity of the complaint location. The mobile odor control unit was operating. The carbon was changed.

Location	Date	Complaint	Investigation Findings/Resolution
Fauntleroy Ferry Dock	9/3/09	Complainant sensed strong "seaweed" odors at the Fauntleroy Ferry dock.	The operator detected strong seaweed odors. The odor control unit at the Barton Pump Station was operating normally at the time of the complaint. The complaint was designated as non-county.
Medina Force Main Discharge Structure/Odor Control Units	9/4/09	Complainant sensed strong "nasty rotten egg" odors near the top section of the Chrysler-Jeep Car dealership.	Upon investigation, the operator sensed strong "carbon" odors from the exhaust of the mobile odor control unit. Maintenance was scheduled.
Medina Force Main Discharge Structure/Odor Control Units	9/8/09	Complainant sensed very strong sewage odors during the evening hours at the Chrysler-Jeep Car dealership.	The operator sensed strong sewage/carbon odors from unit upon investigation. Staff changed out the carbon in both odor control units at the Medina discharge structure.
SE 5th Street and 118th Avenue SE, Bellevue/Wilburton Siphon Inlet Structure	9/11/09	Complainant sensed very strong odors outside residence, which is located across the street from the Wilburton Siphon Inlet Structure.	Slight sewage odors were sensed around the structure and high H_2S levels were recorded from a nearby manhole and around the edges of the structure. The mobile odor control unit at the Medina discharge structure was operating at the time of the complaint. Additional caulking was placed around the manhole and the siphon inlet structure. Staff changed out the carbon in the mobile and skid mounted odor control units.
Fauntleroy Ferry Dock	9/13/09	Complainant sensed strong "seaweed" odors from the Fauntleroy Ferry dock ticket booth.	At the time of the complaint, there was a low tide and odors seemed worse than normal. The investigation confirmed the seaweed odors were a result of the low tide. Designated as a non-county complaint.
11833 93rd Avenue NE, Kirkland/Juanita Bay area	9/14/09	Complainant sensed moderate "manure/compost and sewage" odors near dock at the Juanita Bay Beach park.	The operator confirmed that the odors were a result of decaying aquatic vegetation. Designated as a non-county complaint.
Medina Force Main Discharge Structure/Odor Control Units	9/16/09	Complainant sensed very strong "sewage" odors inside and outside of building. Complainant thought the odors were coming from a manhole near the railroad tracks behind the building, where the Medina Force Main discharge is located.	At the time of the complaint, the carbon was being changed in the mobile and skid-mounted units. The units were re-started after changing the carbon.
SE 5th Street and 118th Avenue SE, Bellevue/Wilburton Siphon Inlet Structure	10/13/09	Complainant sensed very strong odors outside her residence, which is located across the street from the Wilburton Siphon Inlet Structure.	No odors were sensed by the operator at the time of investigation. The mobile odor unit that treats foul air from the siphon inlet had kicked out due to a power bump. The mobile odor unit was restarted.

Location	Date	Complaint	Investigation Findings/Resolution
JB Nursery/York Pump Station, North Creek Force Main Discharge	10/22/09	Complainant said employees sensed very strong "rotten egg" odors at their landscaping nursery, located adjacent to the York Pump Station and North Creek Force Main Discharge odor control units.	Operator sensed carbon odor along the south side of the York Pump Station. Both odor control facilities were in operation. A follow-up investigation performed the day after detected minimal H_2S readings from the odor control unit exhausts of both facilities. Maintenance was scheduled.
JB Nursery/York Pump Station, North Creek Force Main Discharge	10/27/09	Complainant (same as 10/22/09) said employees and customers sensed very strong "rotten egg" odors at their landscaping nursery.	Operator noticed sewage odors west of the North Creek Force Main Discharge and carbon odor along the south side of the York Pump Station. Staff changed out the carbon for the North Creek Force Main Discharge units.
116th Avenue and 120th Street E., Kirkland/York Force Main Discharge	11/11/09	Employee at Subaru car dealership sensed strong "rotten egg" odors.	Upon investigation, the operator noticed brief whiffs of odor around the structure. Manager of dealership said they notice very brief whiffs of odor, but do not call them in since no one seems inconvenienced by them. The carbon at this unit was last changed out in September and is still new. No further action was taken at this time.
JB Nursery/York Pump Station, North Creek Force Main Discharge	11/11/09	Complainant (same as 10/22/09) said employees and customers sensed "sewage" odors at their landscaping nursery.	Upon investigation, operator noticed some carbon odors near the North Creek Force Main Discharge odor control units. The carbon in the North Creek Force Main Discharge had been changed out recently. No further action was taken at this time.
South Mercer Pump Station	11/13/09	Complainant noticed odors for the past few weeks before calling the plant.	Upon investigation, the operator sensed some odors at the top of the station. The carbon in the unit was changed out and additional carbon added.
12112 SE 31st Street, Bellevue	12/30/09	Complainant sensed moderate "rotten egg" odors outside apartment complex.	No odors were detected at the complex upon investigation; however, strong odors were sensed from the mobile odor control unit at the Sweyolocken Discharge, which is located directly west across I-405. H_2S readings taken from the exhaust confirmed that the mobile unit could have been the source of the complaint (approximately 1 part per million). Carbon was added to the chambers.

Location	Date	Complaint	Investigation Findings/Resolution
Vashon Treatment Plant Area			
Beulah Cove Treatment Trains	7/20/09	Complainant sensed odors at his residence for over a week but did not call, as he wanted to make sure the odor was not beach decay.	The operator thinks that the combination of seaweed/low tides and the treatment trains are causing the odors. The operator secured the lids to the vaults and changed the carbon socks for each vault. The passive carbon units at the Cove were changed out in August.
Vashon Pump Station Bunker Trail (BT)-1	7/30/09	Complainant sensed strong "manure/rotten egg" odors at an espresso stand, located across the street from the Vashon Pump Station BT-1. She walked over to the facility to verify that the odor was coming from the pump station and not the beach.	Upon investigation, the operator sensed a whiff of odors. The wet well was pumped down and hypochlorite granules were sprinkled into and on the sides of the wet well. The passive carbon units at BT-1 were changed.