

[COMBINED SEWER OVERFLOW]

Collaborating for Control

Agencies invest in combined sewer overflow (CSO) efforts to protect environmental, human health

By Laura Wharton



Workers inspect King County's mile-long storage tunnel, completed in 2006.

One of the biggest challenges of operating a wastewater system in a rainy climate is controlling the high volumes of storm water that get into sewer pipes, taking up needed capacity and causing overflows that can degrade water quality and threaten public health.

Rainy Region

The King County, Wash., Wastewater Treatment Division, headquartered in Seattle, operates a regional wholesale sewer utility that conveys and treats wastewater for 1.4 million people served by 34 local sewer utilities—all in a region where it rains about 37 in. annually.

The county's biggest wastewater utility customer, the city of Seattle, operates a combined system in which storm water runoff from streets and sewage from homes and businesses flow, in older parts of the city, into the same pipe.

During the rainy season (October through May), high storm water volumes can push system capacity over the limit, resulting in CSOs at 38 relief points in the county system. These overflow points prevent damage to wastewater facilities and sewage backups in homes and businesses. CSOs are comprised of about 10 percent sewage and 90 percent storm water.

Over the past several decades, King County has made significant strides in controlling CSOs. Before a regional

treatment system came online in the 1960s, it is estimated that up to 30 billion gal per year of untreated storm water and sewage flowed into local waterways, primarily Puget Sound, Lake Washington and the Duwamish River. The first step in cleaning up the widespread water pollution was to build the initial phases of a sewage treatment system to capture and send the bulk of these flows to a plant for treatment.

In 1979, the county initiated its CSO program to address the excess storm water and sewage that was not making it to treatment plants during rainy weather. By 1988, King County effectively reduced CSO volumes to 2.4 billion gal per year.

Today, CSO volumes in King County systems are estimated at about 900 million gal per year. While this represents progress, CSO control remains a top priority, especially in light of broader policy initiatives such as Washington state's Puget Sound Partnership, established in 2007 by the state legislature and Gov. Christine Gregoire to clean up Puget Sound by 2020. The goals of the partnership underscore the importance of King County's upcoming investments in CSO control.

Phase One

The county will spend 2008 planning a major project to control CSOs at four Puget Sound beaches that serve as popular recreation areas. A public process will enable people to become involved in aspects of project planning, including evaluating and commenting on various technologies and alternatives.

Over the longer term, King County's clean water agency expects to begin construction on 20 additional projects to control all CSOs in its system by 2030. The goal is to have each CSO location overflow, on average, no more than once per year.

To date, King County has invested approximately \$360 million in CSO control projects, including \$233 million toward two projects completed in 2005 to improve water quality in Lake Washington and Puget Sound by building new CSO treatment facilities and wastewater storage tunnels.

Phase Two

The next phase of CSO control is expected to be much more expensive and complex. Conservative estimates put CSO control costs at about \$400 million, and with construction costs, inflation and increasingly stringent regulatory requirements, the program price tag will likely run higher. Additionally, many projects will need to be built in densely populated urban areas, presenting engineering and

mitigation challenges that could further drive up costs.

The county is looking at a variety of CSO control methods and technologies to keep costs contained while meeting regulatory requirements, preserving water quality and maintaining community quality of life, especially around Seattle's parks and beaches. Among the county's CSO options being considered are trunk line storage,



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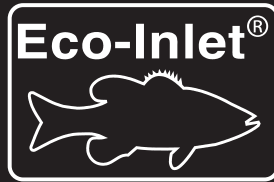
offline storage and the construction of CSO treatment facilities like the four treatment plants it currently operates.

King County is also doing pilot tests on new CSO technologies to make treatment more effective. One of the challenges of CSO treatment is that it is not practical to treat these flows with the advanced biological process used in most U.S. treatment plants, limiting options to the settling and disinfection common to primary treatment.

Staff will soon begin a pilot test on CSO flows using new technologies that may be more effective in removing some of the emerging storm water chemicals known to contaminate sediment around CSO outfalls (i.e., automotive waste, metal and pesticide residues). The county expects to learn more about the technologies' effectiveness by the time the pilot program is completed in 2009.

Of course, keeping storm water out of the system is also an important factor in controlling CSOs. King County is looking at opportunities to partner with the city of Seattle on demand management programs to eliminate or reduce runoff. The county's clean water agency is also interested in working with other agencies to encourage low-impact development, which can significantly reduce impervious surface coverage and storm water runoff volumes.

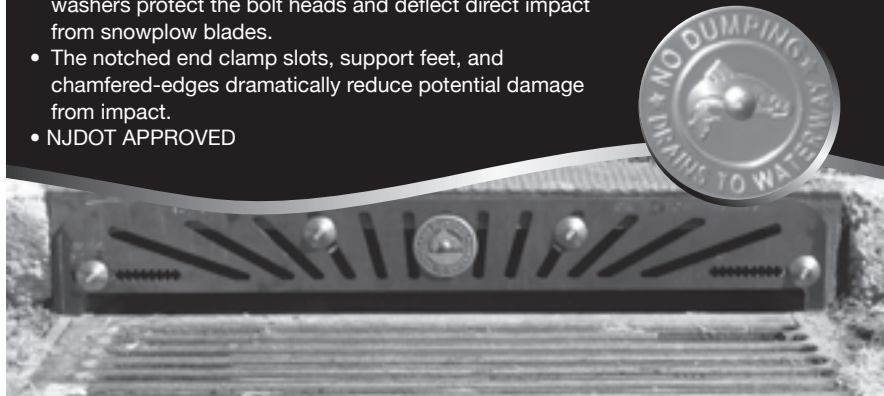
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Program Benefits

The primary benefit from the CSO control program remains the reduction in public health risk from pathogens found in sewage. The program will also, however, play a supporting role in keeping the toxic chemicals carried by storm water out of local waterways. This is key because the chemicals could otherwise degrade the environment for years to come.

King County's CSO control efforts will enable people enjoying local waterways to be more confident about the quality and safety of their recreational activities. In the long term, CSO control will help improve overall water quality, benefiting marine life and habitats in Lake Washington, Puget Sound and the Duwamish River.

By continuing its forward-thinking program to control all CSOs in its system, King County's clean water agency is fulfilling its larger mission to protect public health and the environment for yet another generation.

For more information on King County's Wastewater Treatment Division and its CSO program, visit <http://dnr.metrokc.gov/wtd>. **SWS**

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