King County

BALLARD SIPHON
Replacement Project

Department of Natural Resources and Parks • **Wastewater Treatment Division**

Project Overview WINTER 2007

Project Description

A team of King County specialists and supporting consultants is well into a process of figuring out how best to restore a pair of old wooden sewer pipes nested deep in the sediment of Salmon Bay. The active sewer pipeline between the end of 20th Avenue NW in Ballard and the former Marco Shipyard on the Magnolia side is called the Ballard Siphon.

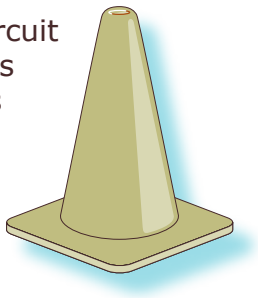
What propels wastewater through the siphons and across the bay is the difference between the higher water elevation in the pipes on the north side of the canal and the lower elevation on the south side.

The current design process will be followed by construction to rehabilitate the existing wooden sewer pipes and install an additional pipeline with larger capacity. This flier will be followed by others, and is one means by which property owners, business operators and other interested people will be kept informed of design progress.

History of the Pipeline

The City of Seattle laid the 36-inch diameter sewer pipes seventy-two years ago, and they're still in service, conveying up to 60 million gallons a day of wastewater across the bay, on its way to the Westpoint Treatment Plant. The pipeline was not unusual when it was laid in 1935, constructed of wooden staves like an old-fashioned barrel, and held together by metal compression bands.

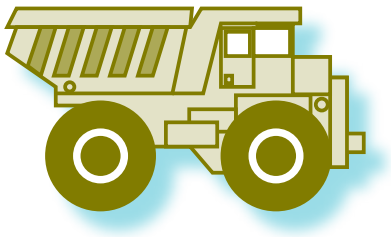
Tests about a year ago showed deformation and signs of fatigue in the lines, and King County launched an effort to determine how to replace them as quickly as possible, with the least likelihood of a structural failure. The team came to full strength in January, and now is boring soil samples, surveying, doing sonar readings, running closed-circuit television cameras through the pipes – gaining specific data to come up with the best replacement design.



Design Options

In the year since the problem was discovered, early analysis ruled out some possible replacement options – for example, simply laying new siphons on the bottom next to the existing ones. That method could involve a lengthy permitting process, affect tribal fishing rights, require working around salmon migration periods, and stir up sediments during construction.

The design team also looked at a horizontal directional drilling method to install replacement pipes beneath the floor of the Ship Canal. This tunneling method would avoid construction within the waterway and decrease permitting and sediment issues. But, serious engineering complications included greater space constraints, greater impact on the neighborhood and hydraulic limitations.



The current design focuses on slip-lining new plastic pipes inside the existing siphon barrels and constructing a deep shaft tunnel some 40 feet beneath the bottom of the canal, with new below-grade connection structures at both ends of the tunnel. Design and construction of the Ballard Siphon Replacement Project won't be easy. Space is tightly limited by underground utilities, railroad tracks and businesses on both sides of Salmon Bay.

At the same time that various engineering options are being created and analyzed, a separate team of County employees and consultants is working out emergency procedures, tasks and designs for immediate actions in case the existing pipeline should fail before the replacement is ready for service. The County's Environmental Lab has begun regular monitoring to detect any changed conditions that could indicate if a sewage discharge is occurring.

Creating Resources from Wastewater

Construction Schedule

The Ballard Siphon Replacement Project is scheduled for completion by December 2008, about 36 months from start to finish.

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