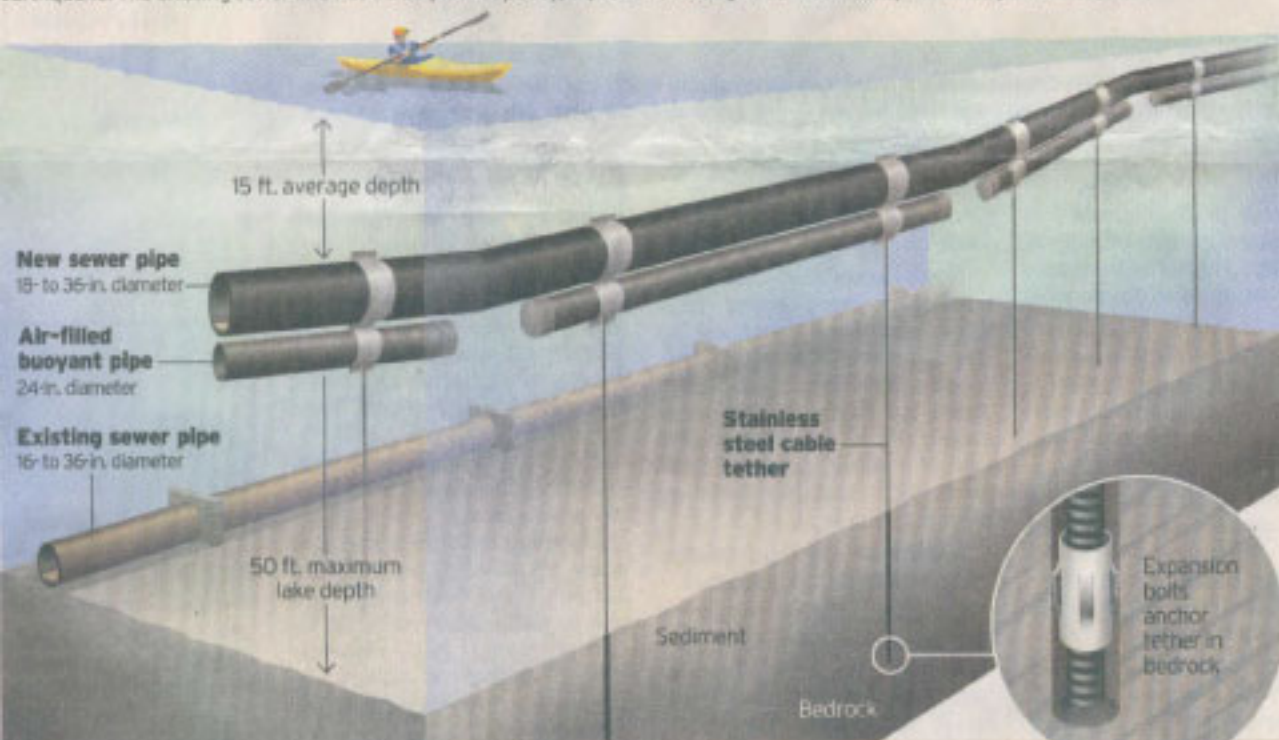


# It's not Big Pipe – it's Buoyant Pipe

## Lake Oswego's floating sewer pipe

The proposed \$100 million in-lake sewer system would float below the surface of Oswego Lake, supported by buoyant pipes and tethered to the bottom by cables. The pipe would be more durable, have increased capacity and could withstand a moderate earthquake. The existing sewer line has inadequate capacity, is prone to leakage and would likely fail during an earthquake.



Lake Oswego has to get the sewer – its costliest project ever – and flowing by

By **DANA TIMS** and **YUXING ZHENG**  
THE OREGONIAN

LAKE OSWEGO — The area around Oswego Lake, one of the largest privately owned bodies of water in the country, offers some of the state's priciest real estate.

Housing markets may be booming elsewhere, but it's still not easy for buyers to snap up older, dollar lakefront homes and knock them down to build something grander.

Now the lake is about to make a distinction — one that city officials may or may not choose to have: the world's only buoyant gravity sewer line.

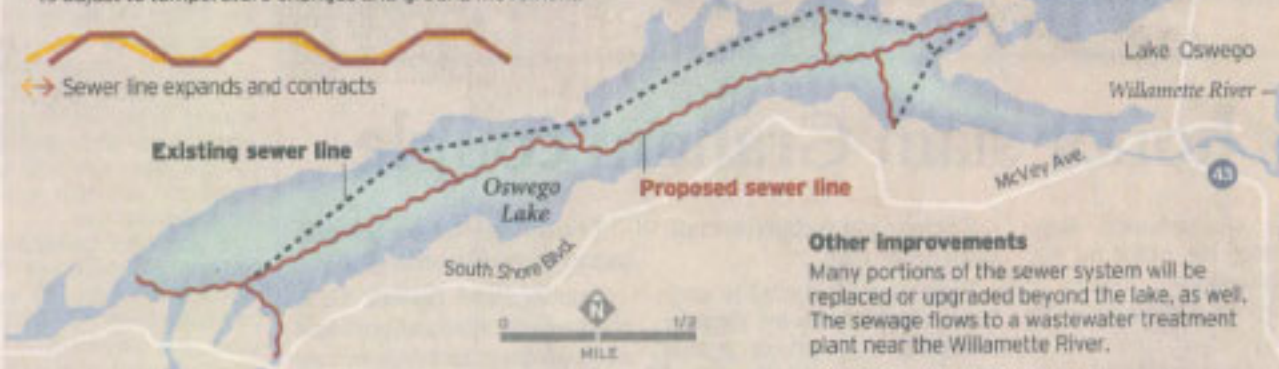
"There are many applications of buoyant pipe in marine environments all over the world," says Joel Komarek, Lake Oswego city engineer overseeing the \$100 million project. "But this is the first one where grade is critical to operation of the system."

Engineering marvels of the past called Oswego Lake interlakes aside, nudging the most expensive capital project in Lake Oswego history closer to fruition has been anything but easy.

Please see **PIPE**, Page 43

### New sewer lines serpentine design

Pipe sections are joined together in a way that allows them to expand and contract — somewhat like a spring — to adjust to temperature changes and ground movement.



### Other improvements

Many portions of the sewer system will be replaced or upgraded beyond the lake, as well. The sewage flows to a wastewater treatment plant near the Willamette River.

Source: City of Lake Oswego

ERIC BAKER/THE OREGONIAN

"There are many applications of buoyant pipe in marine environments all over the world. But this is the first one where grade is critical to operation of the system."

Joel Komarek, Lake Oswego city engineer



# Lake Oswego hurries to get the sewer line — its costliest capital project ever — up and flowing by 2009

By **DANA TIMS**  
and **YUXING ZHENG**  
THE OREGONIAN

**LAKE OSWEGO** — The area around Oswego Lake, one of the largest privately owned bodies of water in the country, offers some of the state's priciest real estate.

Housing markets may be sagging elsewhere, but it's still not uncommon for buyers to snap up older, million-dollar lakefront homes and promptly knock them down to build something spendor.

Now the lake is about to get a new distinction — one that city boosters may or may not choose to tout — as having the world's only buoyant gravity sewer line.

"There are many applications of buoyant pipe in marine environments all over the world," said Joel Komarek, Lake Oswego city engineer overseeing the \$100 million project. "But this is the first one where grade is critical to operation of the system."

Engineering marvels of the so-called Oswego Lake interceptor sewer aside, nudging the most expensive capital project in Lake Oswego's history closer to fruition has been anything but easy.

Please see **PIPE**, Page B5

# Pipe: Lakefront residents air their concerns

Continued from Page B1

Months of tense negotiations between the city and the Lake Oswego Corp., which must consent to the city's request for a construction-phase drawdown of the lake, still aren't wrapped up. A compromise, limiting any main-lake drawdown to a single winter, could be announced as early as next month.

Then there's the regulatory side.

The city has ponied up \$54,000 in fines for tens of thousands of gallons of raw-sewage overflows into the lake. The overflows, known in public works parlance as surcharges, are attributable to cracks and breaks in smaller sewer lines feeding an aging concrete and cast-iron interceptor built across the bottom of the lake in 1963.

Under a standing order from the state Department of Environmental Quality, the city has until 2012 to complete the project, thereby avoiding the sort of catastrophic break that could leave the lake and the city's downstream wastewater treatment plant swimming in effluent.

Finally, there's the financial burden, which is landing squarely on the backs of the city's 38,600 residents.

The net result could be a screeching halt to the city's long-held dreams of redeveloping its Foothills district — a large, mostly abandoned industrial area along the Willamette River

we've accomplished here, we didn't go looking for this one. It was pretty much handed to us."

## 2009 finish proposed

Given the prospect of dramatically rising construction costs and the threat of continued sewage surcharges, fines and a line-shearing earthquake, the city is scrambling to speed up its original completion timetable. Komarek, in his talks with Lake Oswego Corp. officials, now thinks the lake can be drawn down and work started next September, nine months earlier than original projections.

As envisioned, the refilling process would begin on or before April 1, 2009. The original 14-month drawdown proposed by the city — and just as vigorously opposed by the Lake Oswego Corp. — could be scrapped by completing work in the adjacent Oswego Lake Canal during dry periods starting that month.

If all goes according to plan, the entire project could be completed by the end of October 2009, shaving a year or more off the initial construction timetable and saving millions in the process.

Once the floodgates on the Oswego Lake dam are opened, lowering the surface level by 16 feet, work will commence on an engineering task never before attempted — a gravity-driven buoyant pipeline.

Led by Barnard Construction of Bozeman, Mont., which is expected to be named chief contractor in early December, crews will drive 460 individual ground anchors, at 22-foot intervals, about 10 feet down into the lake's bedrock.

Steel rods will be attached to the ground anchors and extend upward out of the lakebed sediment, which in some places is 100 feet deep. Stainless steel rope will then connect the rods to brackets on 10,000 feet of

buoyant, non-corrodible plastic pipe floating a maximum of 35 feet above the lakebed and an average of 15 feet below the surface.

An additional 2,000 feet of pipe, at either end of the floating pipe, will sit on more conventional ground piling.

The key to the system's success and its uniqueness, Komarek said, is maintaining the critical downhill orientation from the lake's west end toward the interceptor's eastern terminus. Grade-altering thermal expansion, caused by lake temperatures ranging from 40 to 75 degrees Fahrenheit, is addressed through use of built-in expansion loops.

"Early on, a lot of people were skeptical that this could work," City Councilor Donna Jordan said. "But once it's done, I think everyone will be more than satisfied."

## Residents relieved

For people living on the lake or having access to it through long-standing easements, the apparent compromise involving only one winter's drawdown comes as a huge relief. Many were upset by talk several years ago of an interceptor-related drawdown lasting as long as two years.

"We all realize this is something that needs to be done," said lakefront resident Elaine Howard, who regularly skims by various species of ducks, geese and birds during her early morning kayaking sojourns. "We're happy to help accommodate the city's needs but also feel that they should try to accommodate ours."

Dozens of concerned lakefront dwellers turned up at a City Council public meeting on the topic several months ago. Their concerns ranged from the need to protect the lake's fragile ecosystem during any interceptor work to talk that the city should

that is envisioned as a haven for new residents — or creating a new community center along the busy Kruse Way business corridor.

"This certainly shoves a lot of other things off the table," said John Turchi, a City Council member who has lived on the lake for the past six years and remembers walking across its frozen surface as a teenager. "But unlike many other projects

which are based on use and come tacked onto sewer bills, or general obligation bonds, which are paid through property taxes.

A 20-year revenue bond probably would call for annual 10-percent increases in sewer bills for the first five to 10 years, after which rates would remain relatively steady. The average homeowner would pay about \$444 per year more, according to recent city estimates.

Under a 20-year general obligation bond, the owner of a \$300,000 home would pay an additional \$474 annually.

Financing alternatives could include paying for the project with both types of bonds or first seeking voter approval for general obligation bonds and then issuing revenue bonds, instead.

The latter course, known as "double barrel bonding," could yield lower interest rates on revenue bonds because, due to prior voter approval of general obligation bonds, underwriters would consider them backed by the "full faith and credit of the city overall," said Stephan Lashbrook, Lake Oswego's community development director.

"It's all a very complicated topic and one we need to fit into a user-friendly format," he said. "What I know for sure is that it's going to be an interesting 2008 around here."

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