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Tofino is using a polyurethane foam grout product and pumping system made by Prime Resins to seal cracks and holes in pipes.

Tofino attacks leaking sewer manholes with Prime Resins foam grout

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Development pressure in the District of Tofino, British Columbia is building.

As plans move forward with an Aboriginal housing development of 160 homes which will need to tap into the district's infrastructure, the community of about 1,800 will likely be required to build a sewage treatment plant under provincial regulations in the coming years.

Prior to that, Tofino needs to repair leaking sewer manholes that are experiencing water infiltration.

"Typically, we're finding that the concrete barrels underneath the manholes have been poorly constructed in the past," says Don MacKinnon, public works superintendent with the District of Tofino.

"We're on a force main system, because we have a lot of undulating topography. The system is pressurized and operated using sewer lift station pumps, so any extra water we have to transport through the system costs us more in electrical bills.

"When it comes time to design a sewage treatment plant, we also want to design it to a size that reflects the actual needs of the community, not a volume of water inflated by rain and groundwater infiltration."

The district chose a polyurethane foam grout product and pumping system made by Prime Resins to seal cracks and holes in pipes.

"The product has been around for many years, but not for this application," says MacKinnon. "I've been a geotechnical engineer for 30 years and I've seen it used in subway systems, hydro-electric dams and other tunneling projects. The price of the product has gone down and the cost of infiltration has gone up, so it seems this is the right time for this product. We're going full steam ahead to aggressively resolve infiltration and inflow problems."

The foam is already being used in Burnaby, New Westminster, Powell River, and the District of Ucluelet, according to Glenn Votkin of Martech, Canadian distributor of the product.

"Here, we're using a two-pronged approach," he says. "We're using a hydrophilic product that chases the water into the cracks and provides a bond to wet concrete but is still flexible enough to allow the concrete to expand and contract.

"The second product is a hydrophobic liquid polyurethane injection resin designed to seal leaks and fill voids behind concrete and masonry structures. Once it fills those voids with rigid foam, it can stabilize the surrounding soil and the roadway above the voids."

In February, the District of Tofino and the District of Ucluelet sponsored a two-day product demonstration and tutorial for public works staff and area contractors to familiarize them with the product in real-life applications.



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Work crews discuss the day's plan before setting out to repair leaking pipes.

Among the candidates, a manhole leaking at a rate of about 90 litres per minute, repaired successfully using the hydrophilic product.

The product is applied behind pipe leaks by drilling a small hole into the pipe surface, then using a spray pump to apply the repair compound to the area outside the pipe. The hydrophilic material is carried through the leak by infiltrating water and acts as a sealant for the drill hole.

Initial tests show that the product can stop the manhole leaks, although in some cases repeat applications are necessary to progressively reduce infiltration during rainy weather.

"We're trying to develop a strategy to treat the worst leaks first," says MacKinnon. "If we have a period of extremely wet weather, we can see if the previous grouting has been effective. Newly-constructed manholes won't provide the same challenges as the older ones, which will probably need regular maintenance for the rest of our lives. Over time, district staff will be able to track the cost-effectiveness of our repair dollars."

The hydrophobic soil-stabilizing product has also been tested in the district, but tracking its performance is a little more difficult.

"It could be effective," says MacKinnon. "But it's harder to substantiate the overall performance of a product that aims to save us from digging to make repairs — unless we dig."