

# Lateral Sealing in Wisconsin Provides Opportunity for Innovation

## Lateral Work Successfully Completed 30 Ft Off the Main Line.

By Sharon M. Bueno

**T**he Village of Brown Deer, Wis., just wanted to address an ongoing problem in one of its residential subdivisions that has resulted in high inflow and infiltration at one of its interceptor sewers as far back as 1996. In correcting the problem, village officials did not want the work to take place on the private property of the residents.



The 38-ft long Logiball Packer

The solution they sought resulted in testing and chemically grouting to seal nearly two dozen laterals from a record 30 ft from the main line sewer in one operation — something both the project's contractor and manufacturer of the rehab equipment had never tried or even heard of before.

Logiball Inc., which is headquartered in Ste-Foy, Quebec, Canada, was brought into the project in June 2004 when it was asked by Larry Neitzul, director of Brown Deer's public works department, if it was possible to test and seal laterals 30 ft from the main line sewer. The request was a first for Logiball, which has been in business since the early 1980s.

"I told Larry [Neitzul] that we had never done anything like this before and didn't know anyone who had," said Marc Ancil, Logiball president. "The longest we had ever done in the field involved a 20-foot long lateral bladder. In this case, we would need to have a 38-foot long lateral bladder... This was a totally different animal."

Typically this type of work is done anywhere from 18 in. up to 10 ft from the main line which normally covers the main to lateral connection or the portion of the lateral below the groundwater table. In this case, everything was done from the mainline up to 30 ft from the lateral connection.

Before concentrating on testing and sealing the laterals, the most pressing problem was figuring out how to

clean the laterals first to ensure a smooth ride for the lateral packers that would follow to do the grouting.

"I told Larry [Neitzul] that we would have to make sure these lines were pre-CCTVed to make sure there are laterals up there," Ancil said. "And depending on what we find, we may need to correct that lateral before we attempt to seal it."

Logiball decided to build and try the 38-ft long lateral packer. All the operations were working aboveground (inversion and retraction of the 38-ft long lateral bladder). The equipment was tested in the shop before the project went out to bid, Ancil said.

To make this project work, Logiball had to head to the drawing board to create a tool that would be able to enter and clean the laterals first in order to give access to the lateral packers that were used to apply the chemical grout — all from the main line, some 30 feet up into the lateral. What Logiball came up with was the Lateral Launcher, a motor on a set of skids that rotates a guiding arm in which there is a cleaning hose. The equipment was tested in the shop before the project went out to bid, Ancil said.

What followed was a never-before done lateral cleaning, testing and sealing project.

### The Problem

The Village of Brown Deer is a suburb on the north side of Milwaukee and has a population of approximately 12,500, with the usual mix of commercial and residential dwellers. Starting in 1996, one of its residential subdivisions began experiencing high overflows of its sewers after heavy rains. Village officials tried to address the problem using chemical grout sealing at the main line and the manholes but they still saw a lot of water coming from the laterals, according to Neitzul.

In 2002, the Village entered into a joint project with the Milwaukee Metropolitan Sewage District to permanently solve the overflow problems — this time by sealing the laterals. In all, 55 laterals and some manholes were tested and sealed using a resin liner. In determining which laterals would be a part of the project, village officials opted to run a dye injection test into the ditch lines and near the foundations of 123 homes and recorded the amount of dyed water that came down from the lateral.

"That's how we established which homes we wanted to work on," Neitzul said. Groundwater monitoring wells were also placed along some of the lateral lines to check the groundwater flows afterward.

And everything went well with the pilot project — except for the weather in the months that followed. Whereas heavy rains brought the overflow problems to the public works department's attention, a return to such weather was also needed to determine if the



lateral liners had solved the problem.

"Basically after we got done with the project, we really didn't have any significant rainfall for about a year," Neitzul said. "So we didn't have much data" to go on in determining if the lateral seals had solved the I/I problems.

## Phase II

The second phase of Brown Deer's project is currently under way and is being done independently of Milwaukee Metropolitan Sewage District, which had provided the funding for the initial phase. The Village contracted with Great Lakes TV & Seal, Green Bay, Wis., through the bidding process to re-televiser the laterals that were done, as well as clean, test and seal 22 additional laterals in the same subdivision.

Great Lakes TV & Seal was no stranger to Brown Deer, having previously done manhole rehab and chemical grouting in past years. The contractor specializes in rehab work, such as cured-in-place pipe, chemical grouting, manhole rehab, lateral lining, as well as using robotic cutters to remove obstructions in pipelines.

The major difference in Phase II of the project was the stipulation that the entire scope of the work be done without infringing on the private property and rights of way (ROW) of the residents. The work would have to be done 30 ft from the main line sewer to the lateral.

Before the laterals could be tested for leaks and then sealed, a way needed to be developed on how to ensure that the lateral packers could be inverted and then removed without getting hung up. That meant the lines had to be televised to check for obstructions.

"We had to verify what the condition of the lateral was," said Jeff Healy, owner of Great Lakes TV & Seal. "We had to know if the pipe was in good condition. We had to know if there were roots or if there was some reason the grout packer wouldn't seal in there and if it would inflate. Was there any broken pipe? We had to make sure all of those things were checked."

Great Lakes TV & Seal utilized Aries CCTV equipment and its lateral evaluation TV system (LETS) camera to televise the laterals 45 ft from the main. The inspection revealed that the laterals, which were between 25 and 40 years old, had some visible leaks, which were the cause of the overflows. The condition of laterals otherwise showed that cleaning was necessary before any rehab work could begin.

"Most of them were in fairly good shape," said Healy. "We did find some leaking, which was expected. We also had the cleaning problems of grease, roots and other debris, such as mineral deposits."

That the laterals would require cleaning before rehab was not at all unexpected, Healy said, but "The question was how are we going to do it?"

That's where Logiball stepped in with its Lateral Launcher cleaning tool, which guides the 1/2-in. hose

and nozzle into the lateral connection from the main line sewer. Winched in tandem with the CCTV camera, the 0-90 vdc motor is used to rotate the guiding arm and nozzle into the lateral connection. When the pump from the cleaning truck is turned on, the back jets on the nozzle shoots the hose into the lateral for cleaning.

"You connect a pre-determined length of half-inch hose — in this particular case we had to go 45 feet - off the one-inch hose of the cleaner truck," said Anctil. "We put a half-inch nozzle with back jets on it. When you align this with the camera over the service connection and start to pump on the cleaning truck, this propels it up into the lateral and cleans everything along the way."

The cleaning of the laterals took approximately two days. Now Healy and his crew could begin sealing the laterals using Logiball's 38-ft lateral bladder with Avanti International's AV100 chemical grout. Testing and sealing laterals from this distance creates a series of unknowns. One that concerned Anctil was the speed at which the grout would be pumped before it would gel.

"You want the grouting material to go on the outside of the pipe to stop the leaks. In this case, we needed a gel time of anywhere from two to three minutes and we were pumping six gallons per minute," he said. "We knew the void area between the inflated bladder and the inside of the pipe but we didn't know how many gallons of grout it would take to actually seal this and fill up the voids on the outside of the pipe."

Some laterals took 20 gal while others took 75 gal, he said. An Aries truck with electric pumps was used to pump the grout.

Other questions that needed to be answered throughout the project included: How do you know when the lateral bladder has been fully inverted out of the mainline packer? Will the grout travel 30 ft from the packer ports before it gels? Will the lateral bladder get stuck on its way back? How long will it take to vacuum back the lateral bladder?

## Conclusion

"Everything has gone well," Neitzul said of the work. "The first couple of days, of course, were done slowly with only three or four laterals being done a day. As they went along, they started to get a good seven-plus laterals done a day with the system. Once they had the system down and really knew what they were doing and what to look and listen for, then things moved smoothly."

As for using this system of addressing laterals in the future, Neitzul said the village will wait until it can monitor the work. "If we see a definite improvement, we will then expand the program out to the remainder of the subdivisions, which is about 350 homes."

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