



# UPSIZING CHILLIWACK'S SANITARY SEWERS

**PW Trenchless Provides  
City with Serious Bang for  
its Buck**

By Tonia Jurbin

**A** recently completed pipe bursting in Chilliwack, British Columbia, stands as a strong example of how trenchless technologies, delivered by an experienced and competent project team, can deliver tremendous value through technical excellence.

Chilliwack is a scenic, affordable rural community roughly 100 km east of Vancouver with a population of about 107,000, including several first nations communities within the City boundaries. It was incorporated in 1873 and is the third oldest municipality in British Columbia.

In the neighbourhood of Sardis, just east of Luckakuck Creek, an impressive upsizing of a 300-mm internal diameter PVC sanitary sewer to 500-mm external diameter HDPE was completed using pipe bursting techniques. Normally pipe bursting will increase a pipe by one or two sizes. This project gave the City some serious upsizing bang for its buck.

## Strategic Planning

In 2021, city leaders retained Urban Systems to prepare a Sanitary Strategic Plan. Urban Systems metered manholes in the area to better understand capacity issues. These studies revealed that while the existing sanitary system had no operational issues, it was under capacity for several reasons.

Water levels in this area can and do rise drastically and the risk of surcharge must be planned for and managed, especially in a growing community that will increase the loading on the system. The existing pipes also collect sanitary from several upstream first nation groups that will benefit as their communities also continue to grow.

While there were proposals to complete the work using traditional open-cut methods, trenchless technologies were preferred for several reasons.

## Deciding on Trenchless

The large excavations needed to do this work using open-cut methods would have introduced a high risk of settlement to the nearby

buildings, the closest being about 5 m away. There is a 750-mm concrete storm sewer parallel to, and about 1.5 m away from, the main that would have needed support if excavated.

By using trenchless methods there was far less impact on neighbouring buildings, the nearby residents, and many trees at the upstream or east end of the project were saved. Settlement gages were installed to monitor settlement near the buildings.

While all the work was carried out on City property, there is an arrangement between the city and the Couqualeetza and Stó:lō first nations to use some of their land for laydown and access. The current access to the pedestrian pathway has been left unhindered.

The scope of this project was to upsize about 350 m of pipe through pipe bursting using three pulls. At the west extent of the project near the creek there was an open cut section of about 60 m of 600-mm PVC pipe to meet the existing 600-mm trunk sewer.

The work included upgrades to three existing manholes and installing three new manholes. PW Trenchless also installed an in-house designed bypass in two phases for the main line installation as part of the contract.

All of this in an environment with a high-water table, even for August, with deep excavations of up to 4 m making trenchless technologies a very attractive option.

The City retained the Wedler Engineering & Sandpiper Contracting design-build team for this upgrade, who in turn sole sourced the trenchless elements of the work to PW Trenchless.

## Upsizing Commences

Without monitoring water levels, the normal assumption is that the lowest flows occur during late summer, which is when the work was



carried out. The work started at the upstream or end of the project – the area that is furthest away from the Luckakuck Creek. In doing so the team had the best chance of encountering a lower water table as the project progressed.

The first exit pit is located at the top or the east end of the job. About 100 m west or downstream of the first manhole, a second double entry manhole was built to accommodate pulls in two directions; Pull 1 going from the double entry manhole east to or upstream for 100 m to the first exit pit, and, Pull 2 going from the double entry manhole about 120 m west or downstream to a double exit pit. The manhole in the double entry pit was also the existing collector for an adjacent building with about 50 units. Pull three was pulled from an existing manhole 90 m west or downstream and pulled east to the double exit pit.

The double exit pit located roughly halfway

along the length of the project was the most challenging in terms of water management. There was a considerable volume of water running into the excavation carrying a lot of sand and collapsing the sides of the excavation. This was expected and dealt with using good shoring techniques, an experienced crew and an appropriately sized pump.

Once the last pull, from the existing manhole at the west end of the project (near the creek) was completed, the remaining alignment was open cut to the creek. During this phase an existing section of pipe in a backyard easement was eliminated when the sanitary was slightly realigned.

### **Project Outcome**

The upsizing increased the cross-sectional area by approximately 180 per cent but did not cause any observed heaving or displacement

at the surface. The material being displaced during the pull simply compressed and densified around the new pipe.

The Grundburst 2400G is an impressive piece of equipment that can pull up to 260 tonnes which is just a little more pulling power than a typical locomotive. It can pull pipe from 0.5 m to 1.2 m. One pulling rod alone weighs about 210 kg, the machine itself weighs about 4.1 tonnes and has a 4-cylinder diesel engine.

It is so big the minimum required pit dimensions are 10.7 m x 3 m x 0.5 m below the pipeline. However, with the double entry and exit pits on this project the excavation dimensions were much longer, about 23 m long and up to 4 m deep.

The occupants of the nearby buildings were very appreciative of the careful work to pre-

serve the integrity of their property.

The choice to utilize pipe bursting over traditional open cut excavation enabled the City and its partners to achieve a major increase in system capacity, while minimizing disruption to nearby residents, protecting the nearby residential buildings and preserving valuable green space.

Furthermore, the collaboration between the City of Chilliwack, Wedler Engineering, Sandpiper Contracting and PW Trenchless demonstrates how careful planning, skilled execution, and innovative methods can overcome challenging conditions such as high-water tables and sensitive surroundings.

**Tonia Jurbin, P. Eng.** (retired) is a geotechnical engineer and freelance writer in Greater Vancouver



**UniJet**  
INDUSTRIAL PIPE SERVICES

**SPECIALIZING IN LARGE DIAMETER PIPE CLEANING**

12" VACUUM TRUCKS WITH 6800 CFM BLOWERS THAT CAN DECANT LIQUID ON THE FLY AT OVER 1600 GPM  
CAPABLE OF CLEANING ANY DIAMETER PIPE WITH OVER 850m BETWEEN ACCESS POINTS  
DEEP TUNNEL CLEANING ANY OF DIAMETER LINE AT DEPTHS OF OVER 150ft  
DOUBLE 1-1/4" FLUSHERS WHICH RUN 2900psi PUMPS AT 236 GPM

UNIT 121: DOUBLE 1-1/4" FLUSHER  
UNIT 117: 12" VACUUM TRUCK

50 OMANDS CREEK BLVD  
WINNIPEG, MANITOBA  
(204) 633 - 4879