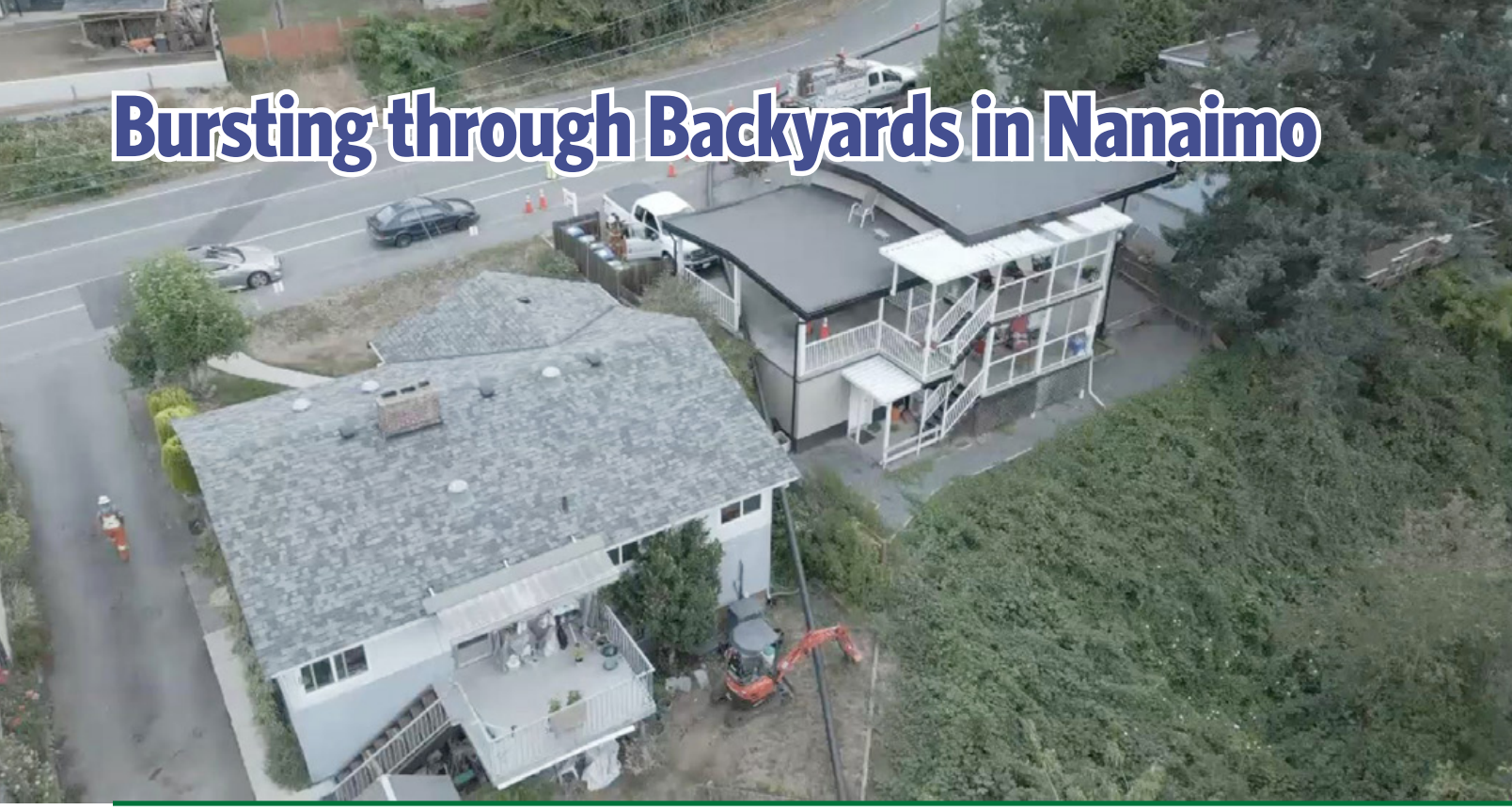
Bursting through Backyards in Nanaimo



By: Tonia Jurbin, P.Eng. (retired)

The Regional District of Nanaimo includes Parksville, Qualicum and Lantzville with a population of about 170,000, the City of Nanaimo itself has about 100,000 people. For a municipality of this size, it's punching well above its weight with respect to the City's pipe rehabilitation program that routinely uses many of the trenchless technologies that are available.

There are people within the engineering department in Nanaimo with strong backgrounds, interest and experience in using trenchless rehabilitation techniques.

> *"There is a culture of innovation that spreads throughout our organization."*
>
> - Bill Sims, General Manager of Engineering & Public Works, City of Nanaimo

In 1999, Bill Sims, now the General Manager of Engineering & Public Works, was a strong advocate for the use of trenchless methods to replace and upsize an existing 14-inch AC pipe, which was originally installed in 1975. Located in a riparian area,

Every house service connection had to be accessed

Challenges included steepness of the work areas

> *At the time it was the largest pipe bursting project in the world and made international news!*

and at considerable depth, an upsize to a 26-inch pipe was required. Their consultants were advising to build additional pump stations but Sims was adamant that they find a way to rehabilitate the existing plant.

Once he learned about pipe bursting there was no going back, and the City set up a contract for a 400m pipe project. This was successful, so the project went ahead, and at the time it was the largest pipe bursting project in the world. Between May and October 1999, the City successfully upsized 4km of pipe, by several pipe sizes. This made international news and earned many awards including the prestigious NASTT No Dig Project of the Year, and the even more prestigious ISTT Award for Project of the Year.

No bypass was required for this project

Small footprint of pipe bursting rigs helped navigate around the backyard clutter

Nanaimo does not shy away from new technology, Sims explains, "The City of Nanaimo is open to responsible and reasonable risk taking. There is a culture of innovation that spreads throughout our organization from sewer rehab to AI." Truly well ahead of their time, in the 1980s the City was developing their own means of splitting water services to replace in place, it's called pipe bursting today. In the 1990s and early 2000s they were already using spray on epoxy linings and cast in place curing on a number of projects.

Like most asset management programs, infrastructure planning sets the priorities for what work must be carried out. In Nanaimo, there is enough collective experience and confidence to quickly decide whether trenchless methods are the best way to proceed at any given site.

Two straight runs of equal length affected 12 properties

All work was done within the backyard easements

They have set targets for their trenchless projects of about 3 weeks, compared with the 2 ½ month target to complete open cut projects. Additionally, the City understands that for the right projects, comparative cost savings of up to 40 percent may be realized.

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UPSIZING PIPE

The project under discussion here involves the replacement of a 150mm sanitary concrete pipe, originally built in 1959. The condition of the existing pipe had deteriorated considerably, with spalling of the pipe wall in the invert.Replacement with a 200mm HDPE pipe, using pipe bursting methods, was therefore proposed. The HDPE provides a tight, closed system with a lower potential for failure over time when compared with the aging concrete pipes. Ironically, one of the reasons for upsizing the pipe to 200mm was not so much to increase capacity as the fact that the inspection camera had got stuck in the 150mm pipe so, there is an expectation that by using one size larger there will be less likelihood of cameras getting stuck in

Upsizing a pipe by one size during pipe bursting does not add significant cost

> *Nanaimo completed 4kms of upsizing pipe, earning many awards including NASTT No Dig Project of the Year, and the prestigious ISTT Award for Project of the Year.*

the future. This is a common issue for cities with lots of 6-inch or smaller mains in their networks. Perhaps, as camera technologies advance, these issues may be alleviated, but in many areas the preference is to increase the diameter of these smaller pipes. Upsizing a pipe by one size during pipe bursting does not add significant cost to this kind of work.

When the project along Bush Street & Vancouver Ave was tendered, there were only two bids from trenchless contractors, PW Trenchless of Surrey BC was low bid, in fact $300K lower than the local contractor on a $500K contract.

The total length for the Bush Street project was 220m, to be carried out in 2 pulls from a more or less central existing manhole, snuggly tucked away in the far edge of a very steep backyard. The challenges on this site were the steepness of the work areas, and a highly congested work zone with multiple obstacles and clutter, making access, equipment operation and staging, a real challenge. Imagine a backyard with fences, greenhouses, sheds, gardens, planters, trees and garages, and the odd swing set. Now multiply that by 12 and imagine threading your way through that with supplies, equipment, hoses, baskets and crew.

There were two straight runs of almost equal length from the central existing manhole. The first run - eastwards to an existing 3m deep manhole and affecting five properties, and the second run - westwards to a much shallower 1.4m deep new manhole, affecting seven properties.

At the central existing manhole, a machine had to be walked down from driveway to the backyard and down to expose the house service connections in preparation for the pipe bursting.

Every house service connection had to be accessed. The contractor started accessing individual properties from the east and west extent through the fences to reach the middle where the machine had to be walked down. A variety of earthmoving equipment was used to access tight work spaces with steep slopes. No bypass was needed for this project. The water was shut off for 8 hour intervals while the pipe was pulled into place and the electrofusion 'WYE' connections were completed.

In this case all the work was carried out within the backyard easements. The City was responsible for all the site restoration including restoring the fences, applying topsoil and seeding. The City mentioned that, given the access challenges for this length of pipe, the contractor was creative in how they set up the staging and laydown. Sims concludes, "PW's experience and deep, tireless commitment to furthering the industry is what makes this story a nonevent."

So, what's the real story here? This project had no drama, no big surprises, no unhappy property owners and the winning bid was $300K lower than the local bid. The fact that this technology is still widely unfamiliar or viewed by some as highly risky, that is what is remarkable. In the 1990s HDD was the riskiest thing anyone ever heard of. It was a huge deal to be installing a conduit by HDD under the Fraser River, or completing an intersect method HDD bore which meets halfway across the St. Lawrence river; now it's routine.

> *Remarkable that this technology is still widely unfamiliar or viewed by some as highly risky.*

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