

# YDiG?



BC's Magazine for Trenchless Construction

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### INSIDE:

- The Case for Surface Casing
- Abbotsford Interceptor Work
- Carbon Reduction in Canada
- Trenchless Events & More!

**2016**

Official Publication of the North American Society for  
Trenchless Technology • British Columbia Chapter

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# YDiG?



North American Society for Trenchless Technology - BC Chapter



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## President's Message

KIERAN  
FIELD



**I**t has been another great year for trenchless technologies in British Columbia, with many high-profile projects proving once again that trenchless construction is a cost-effective, low-impact, greener alternative to traditional open-cut installation techniques.

2015 saw our chapter of NASTT take a slightly different course of action in promoting trenchless technologies in British Columbia. In 2015 we focused much of our efforts on the Trenchless Technology Road Show, a joint effort of the Centre for Advancement of Trenchless Technologies (CATT), Benjamin Media Inc. and NASTT-BC.

This three-day Road Show took place in the Executive Airport Plaza Hotel & Conference Centre in Richmond, and consisted of one day of courses and two days of technical presentations. Of the courses, attendees chose between Trenchless Technologies 101, Assessment and Renovation of Culverts, and Advances in Water & Waste Water Infrastructure Asset Management. The technical presentations were broken into eight sessions over the two days. The sessions covered topics like

# Taking a Different Road

**"The Road Show was a huge success, with over 260 attendees and a sold-out exhibit hall"**

"Trenchless Saves \$\$\$\$," "Going Green," "Tunneling & Micro Tunneling" and "Emerging Technologies." We also took the opportunity to give special thanks to Ken Foster and Michael Alldritt for their contribution to the trenchless industry in British Columbia over the years.

The Road Show was a huge success, with over 260 attendees and a sold-out exhibit hall. So successful it was, we are already making plans to host the Road Show again in 2017. Two major items have already been decided upon. Our 2017 Trenchless Technology Road Show is going to be bigger, and it is going to be even better!

2015 was also the first year NASTT-BC awarded our Camosun College bursary to a

very deserving student. The \$1,000 contribution will become an annual event and go to a student demonstrating an interest in trenchless technologies.

Moving into 2016 the society's board retains its diversity with members of the contracting, supplier, consulting engineering, and municipal and regional government communities still at the helm (the latter accounting for over 20 percent of the board).

Kicking off our seminars this year will be two Pipe Bursting Best Practices courses in June. One will be held in Vernon and the other in Victoria (early bird registration ends on May 13!). We are also hoping to host a multi-day course on microtunneling and pilot tubing later in 2016. I should remind everyone that our seminars are registered with the Environmental Operators Certification Program (EOCP) Society so attendees are entitled to Continuing Education Units (CEUs) for attending our seminars.

If you have not considered getting involved in NASTT-BC, please consider doing so now. We are always looking for individuals to join the board of directors, but even a smaller commitment can make a big difference. Members who become active in the society learn and benefit from the exchange of ideas with others in their industry. More information can be found on page 8.



# Stronger than Ever

DR. KIMBERLIE STAHELI  
NASTT CHAIR

**G**reetings, B.C. Chapter members! NASTT is having a great year, and I'm excited for the future during my term as Chair of the Board of Directors and beyond. As you may be aware, NASTT's 2016 No-Dig Show in Dallas was a huge success as we experienced a sold-out exhibit hall and had excellent attendance.

NASTT would never be where we are today without the dedication and support of our volunteers and regional chapters. In addition to NASTT's No-Dig Show, NASTT provides many trenchless training courses. NASTT is focused on trenchless education, and the highly experienced instructors are dedicated to trenchless education, providing their expertise strictly

on a volunteer basis. They donate personal time to travel around North America to provide high-quality training on a host of trenchless technologies.

The B.C. Chapter has some exciting upcoming Pipe Bursting Courses being held June 14 in Vernon and June 16 in Victoria. These one-day classes will be taught by expert volunteer instructors Dr. Alan Atalah of Bowling Green State University and Dr. David Bennett of Bennett Trenchless Engineers. These courses are great for those seeking basic knowledge of pipe bursting as well as veterans seeking details on the latest pipe bursting techniques. The course includes topics such as the types, methods and application of pipe bursting, planning and preliminary design of a pipe bursting job, design and construction considerations, and troubleshooting and problem solving. For more information on

these courses, visit [nastt.org/calendar](http://nastt.org/calendar).

During strategic planning efforts, the Board of Directors identified goals of engaging larger groups of trenchless professionals to participate in the many volunteer opportunities provided by NASTT. These opportunities prove to be very satisfying and rewarding. NASTT has a wide variety of ways to participate that allow involvement at any level. If you are interested in more information, please visit our website at [nastt.org/volunteer](http://nastt.org/volunteer). There you can view our committees and learn more about these great ways to stay involved with the trenchless community. Please consider becoming a volunteer – we would love to have you.

NASTT has a very promising future, and the B.C. Chapter is stronger than ever. Thank you again for your continued support and dedication to NASTT and the trenchless technology industry.



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# Y-Join NASTT BC?

THE BRITISH COLUMBIA CHAPTER OF THE NORTH AMERICAN SOCIETY  
FOR TRENCHLESS TECHNOLOGY (NASTT)

## NASTT BRITISH COLUMBIA CHAPTER: Leaders in Innovation

Formed in 1997 as part of the original NASTT Northwest Chapter, the BC Chapter was established separately in 2005. It exists to promote the use of trenchless technology in B.C. through education and standards. NASTT-BC has worked hard over the years to have trenchless standards adopted throughout the Province. In 2008, work began by the Chapter to develop a tool for accurately determining the reduced carbon footprint that various trenchless technologies offer - the Carbon Calculator! Use this program to estimate the tons of carbon emissions that were eliminated by the trenchless construction method that you have chosen for your project. Watch for the posting of the latest version of this useful tool to enhance sustainability in British Columbia.

- In the MMCD's new Platinum book, CIPP and Pipe Bursting are included, with remaining trenchless methods to follow.
- NASTT-BC held one seminar in 2015 on trenchless rehabilitation of laterals and one three-day Trenchless Road Show. NASTT-BC will be hosting the Trenchless Road Show again in 2017.
- NASTT-BC has worked to be a leader in promoting the use of trenchless as a low cost /low carbon method of construction.
- Since 2005, the chapter has published their annual magazine Y-DIG?
- The chapter and Y-DIG? Magazine is a great way for consultants to promote their successes, for cities to learn about the projects, methods, lessons and experiences of other cities, and for all 3 partners (owners, consultants and contractors) to share information.

## WHAT IS NASTT?

Founded in 1990, NASTT is a not-for-profit educational and technical society. As the North American component of the ISTT (International Society for Trenchless Technology), NASTT is dedicated to promoting the benefits of trenchless technology through education, training and research. NASTT is the definitive resource for trenchless professionals like you, who are concerned with underground systems and the applications of trenchless technology.

### Trenchless Technology

By using trenchless technology methods, you are reducing the impact of underground construction on your community. The benefits of trenchless technology are priceless:

- Minimizes surface disruption & trenching
- Reduces public inconvenience
- Cost-effective methods
- Less traffic congestion
- Widely utilized & accepted
- And this all adds up to - REDUCING CARBON FOOTPRINT BY UP TO 90%!

### Membership

If you're interested or concerned in underground systems and the application of trenchless technology, then NASTT membership is right for you.

NASTT connects you to the people and businesses involved in the trenchless industry.

NASTT is your link to thousands of trenchless professionals and leaders working in regional, national and international levels. Membership is open to individuals, agencies and companies involved with providing gas, water, sewage, communications and electrical services.

### Your Regional Chapter - NASTT-BC

A major contribution the NASTT-BC Chapter has made to the global trenchless effort is the promotion of trenchless technology as a low carbon option.

For more recent information on Trenchless Construction in British Columbia and BC Chapter activities, go to **[www.nastt-bc.org](http://www.nastt-bc.org)**.

## JOIN NASTT and NASTT-BC TODAY!

*To become a member of NASTT-BC, contact Monica Perry at [mwperry@telus.net](mailto:mwperry@telus.net)*



# Events & Training Opportunities

May 1-3

## BCWWA Annual Conference

Whistler Conference Centre  
Whistler, British Columbia  
Information: [bcwwa.org](http://bcwwa.org)

May 18-19

## Trenchless Technology Road Show 2016

Scotiabank Convention Centre  
Niagara Falls, Ontario  
Information: [catttrenchlessroadshow.ca](http://catttrenchlessroadshow.ca)

Thursday, June 9

## NASTT's Gas Good Practices Course

Smithfield, Rhode Island  
Information: [nastt.org/calendar](http://nastt.org/calendar)

Thursday, June 9

## NASTT's HDD Good Practices Course

Montreal, Quebec  
Information: [nastt.org/calendar](http://nastt.org/calendar)

Tuesday, June 14

## NASTT's Pipe Bursting Good Practices Course

Vernon, British Columbia  
Information: [nastt.org/calendar](http://nastt.org/calendar)  
Contact: [Kieran.Field@opusdaytonknight.com](mailto:Kieran.Field@opusdaytonknight.com)

Thursday, June 16

## NASTT's Pipe Bursting Good Practices Course

Victoria, British Columbia  
Information: [nastt.org/calendar](http://nastt.org/calendar)  
Contact: [Kieran.Field@opusdaytonknight.com](mailto:Kieran.Field@opusdaytonknight.com)

April 9-13, 2017

## NASTT's 2017 No-Dig Show

Gaylord National Hotel & Convention Center,  
Washington, D.C.  
Information: [nodigshow.com](http://nodigshow.com)



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educate • train • research • publish

## THANK YOU, TRENCHLESS CHAMPIONS!

NASTT instructors are experts in their field and volunteer their time to educate the trenchless industry. Thank you to our 2015 instructors for helping to advance NASTT's mission to educate, publish, research and train!

## Honor Roll of Instructors

|  |  |
|--|--|
| Edward Alan Ambler, P.E.<br><i>City of Casselberry</i>                 | Rick Melvin<br><i>TT Technologies</i>  |
| Sam Ariaratnam, Ph.D., P.E., P.Eng.<br><i>Arizona State University</i> | Kenneth C. Morgan, P.E.<br><i>Town of Gilbert</i>                            |
| Kevin Bainbridge<br><i>Robinson Consultants Inc.</i>                   | Mary Neher, P.E.<br><i>Bennett Trenchless Engineers</i>                      |
| David Bennett, Ph.D., P.E.<br><i>Bennett Trenchless Engineers</i>      | Collins Orton<br><i>TT Technologies</i>                                      |
| Aaron Cohen<br><i>Arizona State University</i>                         | Derek Potvin, P.Eng.<br><i>Robinson Consultants Inc.</i>                     |
| Don Del Nero, P.E., C.D.T.<br><i>Stantec</i>                           | Cindy Preuss, P.E.<br><i>HydroScience Engineers Inc.</i>                     |
| Jennifer Glynn, P.E.<br><i>RMC Water and Environment</i>               | George Ragula<br><i>PSE&amp;G</i>  |
| Alan Goodman<br><i>HammerHead</i>                                      | Kaleel Rahaim<br><i>Interplastic Corp.</i>                                   |
| Noel Guercio, P.E.<br><i>Stantec</i>                                   | Piero Salvo, P.Eng.<br><i>GAME Trenchless Consultants</i>                    |
| Larry Kiest, Jr.<br><i>LMK Technologies</i>                            | Jason Schiro<br><i>Interplastic Corp.</i>                                    |
| Joe Lane<br><i>HEBNA</i>   | Kimberlie Staheli, Ph.D., P.E.<br><i>Staheli Trenchless Consultants Inc.</i> |
| Jason Lueke, Ph.D., P.Eng.<br><i>Associated Engineering</i>            | Ray Sterling, Ph.D., P.E.<br><i>Louisiana Tech University</i>                |
| Chris Macey, P.Eng.<br><i>AECOM</i>                                    | Arvid Veidmark, III<br><i>Specialized Services Company</i>                   |
| Jeff Maier, P.E.<br><i>C&amp;L Water Solutions</i>                     | Matt Wallin, P.E.<br><i>Bennett Trenchless Engineers</i>                     |
| John Matthews, Ph.D.<br><i>Pure Technologies</i>                       |  |

# 2015

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North American Society for Trenchless Technology  
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# Evolution of Surface Casing

## 'Conductor Barrels' are Instrumental to HDD

HARRY DICKINSON  
KAMLOOPS AUGERING  
& BORING LTD.

**W**hat is a surface casing and why do you need one? Initially, a surface casing was referred to as a conductor barrel, and this terminology is still widely used in the horizontal directional drilling (HDD) industry. Surface casings or conductor barrels are required to isolate unconsolidated formations (gravel and cobble layers) and ensure full fluid return back to the rig. This unstable ground can be disastrous while drilling as this material can lock into place in the cavity created by the down-hole tooling and prevent the tool from moving forward and backwards. A surface casing is installed at a designed angle and driven down until it can be seated into

bedrock.

The surface casing is not only important for the initial bore on the entry side, but also during the pull back of the final product pipe. The conductor barrel provides a clean hole that will not fill in or erode during construction, and is designed based on the size of the product pipe being pulled back once the crossing has been completed. The surface casing/conductor barrel is typically rammed into the ground using a pneumatic ramming tool. The pipe is rammed into place and another segment is welded on. The length/depth of the surface casings is dictated by entry angle, ground conditions, and size of the pipe rammer. Depending

on the angle and ground conditions, it may be possible to clean out the casing with an auger boring machine (ABM); if not, the HDD rig can clean out the casing with a forward reamer.

Kamloops Augering & Boring Ltd. (KABL) completed their first surface casing in 1996 for Olympic Pipeline under the Toutle River near Castle Rock, Washington. The oil pipeline was approximately 56 kilometres (35 miles) away from Mount St. Helens, and years of volcanic runoff (including large rock) had threatened the integrity of the pipeline which needed to be replaced before the line could spill. The surface casing was installed at a 15-degree angle which allowed the drill





rig to start on-target and advance the drill bit down to the bedrock without any steering problems. A decision was made to telescope the surface casing by installing 60 metres (200 feet) of 750-millimetre pipe and 150 m (500 feet) of 600-mm pipe. The need to telescope arose from the requirement to remove the surface casing once the HDD crossing was complete. There were valid concerns that the casing could not be removed due to skin friction if not for the telescoping which left only 90 m (300 feet) of the 600-mm casing surrounded by soil. As a result, the rig was able to set up 152 m (500 feet) from the river bed and drilled to an approximate depth of 21 m (70 feet) below the river and followed a 1,400-m (4,600-foot) radius to the exit point on the side of a mountain. Once the crossing was complete, the surface casing was removed without incident.

Our experience, expertise, innovation



and need for efficiency have led us to develop a portable structural ramp that can be mobilized to site to expedite the casing installation. Traditionally, a dirt ramp is constructed prior to our arrival at the designed angle of the surface casing. The dirt is either brought in or sourced from within the construction site.

Depending on the entry angle of the surface casing, our ABMs may not be able to clean out the casing, which means the directional drill needs to be moved into position and the dirt ramp removed. The construction of an earth ramp can take up to a day to complete.

Construction, demobilization and HDD casing cleanout may be required several times during the installation of a surface casing. Our ramp was built out of steel tubing and steel plate that could be adjusted for various installation angles. The entire structure fits onto a standard trailer with no setup required once on site. The use of our ramp has reduced installation times by several days, saving the owner money and reducing our environmental impact by not having to bring in dirt to construct an earth ramp.

KABL's continuous pursuit and investment in innovation and technology has led to revolutionizing surface casing installations. The pneumatic air hammer still has its place on smaller surface casings, but our Hydrohammer® has removed the need for telescoping and allowed for larger-diameter installation at greater lengths. The Hydrohammer is an S-90 hydraulic piling hammer manufactured by IHC Hydrohammer that is operated with KABL's patent-pending Hydrohammer Harness with Hydraulic Crowd Support System. KABL designed the harness to work with our American Auger 84-96 boring machine.

Depending on entry angle and with our regular set-up, the harness can be removed





and the ABM can be used to clean out the casing upon completion. The set-up and installation rate of a surface casing has almost been cut in half as compared to our traditional pneumatic installations. The surface casings can be installed between 10 and 30 degrees, and the casings require only minimal clean-out for welding on the next joint of pipe during the installation procedures.

The Hydrohammer does not require periodic spoil removal to advance the casing due to the high energy transfer. The system incorporates a hydraulically charged, fully enclosed driving device with a compressed nitrogen chamber that is fired internally. The main advantage is the energy is transferred directly into the casing by means of an ultra-high-energy, low-frequency impact with an immense high-velocity acceleration (up to 1,800 Gs), which causes the soil particles to be





forcibly sheered. Secondly, there is a dramatic reduction of the carbon footprint as the amount of diesel required to operate the Hydrohammer is significantly less than what is required for a pneumatic air-hammer installation.

Since 1996, KABL has successfully completed hundreds of surface-casings installations and extractions for numerous HDD contractors. The surface casing has become instrumental in the HDD industry and is designed into many crossings where unconsolidated formations are present on both entry and exit side. The result has been a more consistent pipeline installation with less environmental impact and reduced costs. KABL has been very successful installing surface casings due to continued innovations such as the Hydrohammer, and we're continuing to strive to set the standard within the trenchless industry.

The advertisement features a large, red pipe being installed by a yellow excavator. The pipe is laid out in a series of parallel lines, creating a strong visual rhythm. The excavator is positioned at the end of the pipe, and its arm is visible, lifting the pipe. The background is a clear sky.

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# Cleaning Abbotsford Pipes

**MATT BRIGDEN**  
OPUS DAYTONKNIGHT  
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The City of Abbotsford (CoA) had a problem on the JAMES Interceptor (Interceptor). After being in constant use since its commissioning in 1982, the Interceptor was inspected by Vancouver-based AquaCoustic Remote Technologies through a combined sonar and CCTV system in 2008. The inspection revealed that the pipe itself was in good condition

with minimal corrosion; however, there were three sections where large amounts of sediment had settled and were significantly reducing the hydraulic capacity. In one location, the cross-sectional area in the pipe had been reduced by 62 percent. The single most important sewer in the City's system was being choked.





CoA asked Opus DaytonKnight Consultants Ltd. (Opus) in 2009 to review the inspection reports and record drawings to come up with a cleaning plan for the three worst sections. Two common methods of cleaning were reviewed for cleaning the pipes: pigging and jetting. Pigging would require isolating the main between two manholes. The Interceptor is the main trunk sewer with a design capacity ranging from 41 to 230 megalitres per day and could not be isolated without expensive bypass pumping. Unlike pigging, jetting does not require isolating the main. It does require

site access for heavy equipment, including water supply trucks if an immediate water source is not available. This was a problem, as all three sites had access issues for the required heavy equipment.

#### Easements and Site Access

Site access issues are fairly common along the Interceptor's alignment. Much of the Interceptor's alignment is along agricultural land and the easements the CoA negotiated for the Interceptor's construction generally contained conditions that any impacted land would be restored to its original state. This

prevented any permanent access from being built for the Interceptor at the time. To make matters worse, all three of the restricted sections were in areas that had been restored to their original state.

Site 1 was on a blueberry farm with soft soils and required crossing Kinder Morgan's Trans Mountain pipeline. The manholes upstream and downstream of the restriction were buried in a blueberry field. The ground was constantly saturated and considered poor quality. Site 2 was located near a watercourse in an actively farmed field with soft soils. Again, the manholes were buried and the





ground was considered poor quality. Site 3 was between two active railways in an area with a high water table and extremely compressible, mostly organic soils. The interceptor was also quite shallow in this area with less than one meter of cover in some places.

Opus brought on Levelton Consultants (now WSP) to provide geotechnical recommendations on site access. For Sites 1 and 2 a permanent gravel access road was proposed. The ground conditions below the topsoil were adequate to support a gravel road (geotextile was required for Site 1) and there was enough cover above the Interceptor that it wouldn't be impacted.

Site 3 was not as straight forward. The geotechnical investigation revealed that the ground above the Interceptor was composed of largely organics. Constructing a permanent gravel road would require significant and costly ground improvements. The site was also hampered by being located between two different active rail lines. Further, there were also BC Hydro Transmission Lines that wouldn't allow a permanent road anyways. The City and Opus looked to the resource industry for temporary access ideas and decided upon rig mats, which could be removed upon completion. By chance there happened to be a new rig mat manufacturer located right in Abbotsford that would reduce freight costs significantly.

The two rail lines paralleling the Interceptor meant the rig mats would have to be placed right above it. There was concern that even with the rigs mats that the excess weight above the Interceptor could potentially damage it. Opus recommended building a small test section that could be loaded and monitored for settlement. The test was a success with minimal settlement over the test period.

### **Approvals, Permits, Success**

Designs now complete, the CoA went



about acquiring the necessary approvals and permits to build two permanent and one temporary access roads. For Sites 1 and 2, located in the Agricultural Land Reserve, this meant approval from the Agricultural Land Commission as there would be alteration to active farm land and the purchasing of easements. In addition, Site 1 required permission from Kinder Morgan to cross their pipeline and Site 2 needed approval from the Department of Fisheries and Oceans due to its proximity to a watercourse. Agreements with CP Rail, Southern Rail and BC Hydro were needed for the temporary road at Site 3.

The permanent roads were the first to be built with construction in 2010. Once the road had crossed Kinder Morgan's pipeline at Site 1 the rest of the road was completed in no time. Site 2 was also completed quickly once all the approvals were in place. The rig mats were placed with ease at Site 3 in 2013 providing access to the manholes needed for the cleaning operation.

With access to manholes at all three problem sections having been secured, McRae's Environmental was contracted to perform the cleaning. When AquaCoustic was brought back to inspect the Interceptor post-cleaning, they confirmed that enough sediment was removed to reduce the restriction from an average 38 percent down to 10 percent at Site 1. The cleaning went just as well at Sites 2. Three years later, Site 3 was cleaned. This site was over 50 percent blocked by sediment before jetting; the blockage was reduced down to around 10 percent after jetting.

The CoA was able to extend the life of their largest sewer by getting rid of constrictions caused by sediment. They also now have permanent access to two known problem areas for future maintenance and a supply of rig mats that they can use to access other problem sites in the future.



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# HDD at Cultus Lake

ERIC DYKMAN

TRENCHLESS DRILLING SERVICES INC.

**C**ultus Lake is a busy swimming, camping and boating destination for Metro Vancouver and Fraser Valley folk. Its many campsites, trails, and seasonal attractions make this lake a prized local amenity in Vancouver's backyard.

Recently taking ownership and responsibility for the existing water system throughout Cultus Lake, which largely consisted of poorly recorded private water systems, the Fraser Valley Regional District (FVRD) was required to upgrade and update the water system to modern standards. The FVRD identified a section of watermain crossing Sweltzer Creek that, over the course of time, had become exposed and presented a serious environmental and social risk. The existing 200-

millimetre watermain, was exposed and lying on the bottom of the creek unprotected for a total of 65 metres from shoreline to shoreline.

To make matters worse, the existing watermain material was cast iron speculated to have been installed sometime in the 1960s. The crossing was within 5 m of a pedestrian bridge highly visible to residents, over the only creek draining Cultus Lake and a known spawning ground.

To address the project's risks, the FVRD chose horizontal directional drilling as their preferred method of construction for replacement. In late summer 2015, Trenchless Drilling Services Inc. was retained to supply, fuse, and directional drill the new watermain crossing.

The crossing was to be replaced with a

new 250-mm HDPE DR11 watermain approximately 2 m parallel to the existing cast-iron watermain for a total distance of 97 m. Geotechnical reports indicated the crossing formation consisted of 150 mm minus cobbles and sands with medium density and as such would present a very real "frac-out" risk. Gravels and cobble present the highest risk of frac-out in the horizontal directional drilling industry due to their sloughing nature and restricting the flow returns to the entry/exit pits.

However, Trenchless Drilling Services Inc. had a few cutting-edge tricks and procedures to overcome this risk, and mobilized and proceeded with construction in March 2016.

Due to the pending spring runoff and rise in water level of Cultus Lake and the



seasonal influx of visitors to the lake, TDS was required to complete drilling with an expedited schedule in order to respect and prevent any social and environmental

implications a delay or schedule overrun would incur or possibly encounter.

To expedite schedule and meet the tight deadline of the project, TDS deployed a

large crew and large spread of HDD equipment. TDS set up on the west side of Sweltzer Creek and began fusing and assembling the 250-mm HDPE on the







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east side where a large open beach provided sufficient laydown and assembly of the product pipe. Turbidity monitors were set up on the upstream and downstream side of the crossing to monitor any frac-outs that occur underwater.

With the experience and procedures that TDS utilized, zero increase in turbidity was encountered during the pilot drill. The crossing was designed to be 4.0 m or greater under the bottom of the creek and actual depth was increased to 5.0 m below creek bottom.

Pilot drilling was completed on the second day with pullback to commence the same day. Pullback through the cobbles and gravels caused zero increase to turbidity, which allowed TDS a seamless, uninterrupted pullback that took approximately 2.5 hours to complete with a final pull of 23,000 pounds on the product pipe.

The overall schedule on the project was for five working days, but TDS completed its work by the third day. The watermain was installed to the FVRD's requirements and exceeded all their expectations for time, quality and professionalism.

The watermain was tested, chlorinated and commissioned by the FVRD within the following days and will provide many years of reliable water service with zero to minimal risk of scouring in the future.

While the geotechnical report suggested challenging and unfavourable drilling conditions, Trenchless Drilling Services Inc. overcame them and were able to provide their client a solution that addressed the risks of such formation while maintaining a quality installation on a tight schedule timeline.

Trenchless Drilling Services Inc. is committed to constantly evolving and providing innovative solutions to their clients so as to provide today's underground utility service operators with viable, economical trenchless solutions.



# Better Backreamers for Durability at HDD Sites

## DITCH WITCH

**D**itch Witch has released a new line of heavy duty (HD) backreamers to help underground construction operators improve productivity and tool durability on horizontal directional drilling (HDD) job sites. New to all model designs, the HD backreamers are now equipped with standard API threads to fit any industry drill under 100,000 lbs.

The new models include the Beavertail HD, Warthog™ HD, Kodiak™ HD and Compact Fluted HD backreamers.

“Reamers are the frontline soldiers to tackle expanding requirements of extreme soil conditions, which is why we pride ourselves on providing long-lasting and ruggedly built reamers,” said Jaime Wines, Ditch Witch’s director of parts sales and marketing.

“The heavy-duty design of our newest models enhances tool life and durability, providing drill operators with confidence to bore through the toughest soil conditions.”

For improved fluid flow, the Beavertail HD backreamers are equipped with replaceable, hardened steel Allen head nozzles. A flow-through shaft and rugged cutting design give this backreamer efficient fluid mixing capability, requiring far less horsepower for rotation in a variety of soil conditions. These also use a box design on the trailing side of the reamer



*Beavertail HD Backreamer*



*Warthog HD Backreamer*



*Kodiak HD Backreamer with Clevis*

for step reaming, direct connect swivels or threaded tabs to fit each contractor's needs using 3 1/4-inch shafts and above. Step reaming reduces the number of passes needed to attain an accurate hole size, saving time and money on the job.

The Beavertail HD backreamers are available in two versions, accommodating small and large drill rigs. The small version includes a 2 3/4-inch shaft available in eight diameter sizes from 6 to 20 inches, and a pull tab integrated directly in the

shaft. For larger equipment, reamers are available with 3 1/4-inch, 4 1/4-inch and 4 3/4-inch shafts ranging in diameter up to 40 inches, including the box design.

Designed to require less torque and reduce drag when back reaming, the Warthog HD model improves production and flow efficiency around the cutters and reamer body. Similar to the Beavertail design, the Warthog HD backreamers also feature hardened steel Allen head nozzles and utilize the same box design for flexi-

bility to set up the ideal configuration for specific job needs using 3 1/4-inch shafts and above.

For compact drill rigs, the Warthog HD backreamers have a 2 3/4-inch shaft available in diameters from 10 to 36 inches. For larger equipment, the Warthog HD backreamers are available with 3 1/4-inch, 4 1/4-inch and 4 3/4-inch shafts ranging in diameters from 10 to 36 inches, including the box design.

To reduce friction and the possibility of jams while drilling, the Kodiak HD backreamer enables cuttings and fluid to flow over the product and out the bore hole by providing optional drilling fluid from the rear of the tool. The Kodiak HD backreamers are available in 2 3/4-inch, 3 1/4-inch, 4 1/4-inch and 4 3/4-inch shaft sizes ranging in diameter from 8 to 36 inches. All sizes feature an integrated swivel with a clevis or tab option, which places the product closer to the reamer and reduces the chance of binding. A new clevis design eliminates the need for multiple connections between the clevis and product.

Similar to the Kodiak HD design, the Compact Fluted HD backreamer reduces friction and the possibility of jamming by forcing fluid out the swivel plate. The improved heavy-duty casting design provides smooth pushback and maximum durability. Integrated swivel with a clevis or tab option reduce the possibility of binding by placing the produce closer to the reamer and eliminate the need for multiple connections between the drill and reamer.

The new line of HD backreamers were on display at last fall's International Construction and Utility Equipment Exposition ICUEE in Louisville, Kentucky.



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# Carbon Reduction, Trenchless Technology, and the Path to Change

DAVID O'SULLIVAN  
PW TRENCHLESS CONSTRUCTION LTD.

**C**hanging people is a rather difficult task. We all get comfortable in our ways, and even though we know

change is needed we are always looking for the other person to do it. Think of it with regard to taxess: We always want more from

the government, but we ourselves do not want to pay any more tax – we want the person next to us to pay. Well, when all of us are



pointing to the person next to us, then guess what? WE ARE IT! We are that “next” person.

The easiest way for government to change a behaviour is to make it cost more. If we look at the cost of liquor in Canada, it is two to three times the cost in the United States. Our government is trying to send us a message: DRINK LESS. Government also works to make it more difficult to buy liquor by restricting where we can purchase it, and at what age.

In the last number of years in Canada, various governments have started to recognize that carbon emissions and related greenhouse gases are not a good thing for the environment, and they have been looking at ways of reducing these emissions. Since most emissions are from the average citizen, they have to change how you and I carry out our daily lives. There are different solutions open to government to induce change. For individuals, the easiest way is to hit us positively or negatively in the wallet. Therefore, the government offers us money to buy hybrid or electric cars, and the tax-influenced price of gasoline penalizes us for driving gas guzzlers.

For big carbon emitters, governments can use the same tactics or they can just pass laws that say “you shall not emit carbon.” In the case of big emitters (2,500 tonnes or

## “NASTT-BC has been concentrating on the carbon credit for the last three years”

more), it is easier to measure these companies as there are few in any society and they’re easy to spot and cost-effective to measure. Thus the big emitters are controlled by restrictive laws.

Trying to get even a province to act in unison is difficult enough, but trying to get all parts of a country to act as one is extremely difficult. Canada, being a federal entity of provinces and a central government, has an assortment of political leaders who move at different rates on any given issue. Carbon emissions are a very difficult item to control. The even bigger problem is that “carbon control” has to be handled on a global scale. However, since there is a per-

ception that the control of carbon will slow down one’s own economy, there is a major incentive for governments to NOT adopt carbon-reduction strategies, or at best various governments are watching other governments to see who moves first.

A polluting liquid is relatively easy to control, as soil tends to limit its spread. However, a gas released to the atmosphere is not controllable. The carbon dioxide we release today is gone and over the Atlantic in a matter of days. This brings the argument from people, Why bother reducing our emissions if we are going to be breathing China’s carbon dioxide in a few days while ours is off in Europe?

We also need to remember that all governments are made up of people. These people are just like you and me, but we ask them to make these world-changing decisions. They are as vulnerable as you or I to criticism and self-doubt.

They are also in these positions of power because we put them there, and they can be taken out by us, the voters. So telling us to change in ways we may not like is risky for them; we have to be convinced through some very good conversations, or else we may build up our anger and kick out the politicians when we have the chance. It is a little like firing your gym trainer because he keeps telling you to “stop eating too much”; this may stop the whining in your ear, but you are still overweight! In much the same way, we sometimes vote in the politicians who tell us the things we like to hear even though we know they are wrong or will do us no good.

So this is the problem. We want the world to be a better place, or most of us do, but we see others (countries and neighbors) not changing and still benefiting from the changes and sacrifices we make. What do we do? If there are only a few, we may shame them into changing; if there are a lot, we generally join them. If the latter happens, the change the government desires does not take place.

So, where we are going with this is that we all need to change how we do what we do. We all need to do our part. The best way

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government can push us into doing this is to make it as seamless as possible.

Consider what happens if we encourage people to use electric cars to drive to work. Most do not know or care what is under the hood and making the vehicle move, as long as it works. So municipal governments and others are encouraging us to use electric rather than gas by installing charging stations in more and more places while raising taxes on fossil fuels to discourage the use of gas cars. Most U.S. states and Canadian provinces have these or similar policies.

If we take that concept and apply it to the installation of utilities, here is how it would work.

Suppose we need to install a pipe. Conventional construction would dictate that we remove, say, 2.4 sq. m (2m deep X 1m wide) of soil to install a pipe which has an area of 0.031 sq. m or 1.3% of the area. This process is a very wasteful process. If, however, we can change the process and still achieve the same results using a lot less energy, then we win. This type of solution should

be easy to sell to the public, but all change is a slow process.

One of the ways we can lessen the pain of change and push the change along is to offer to give people who change some money back. In this case in British Columbia, because we tax carbon emissions, we are in effect charging those who emit excessive carbon and giving those taxes to those who emit less carbon than normal through grants for electric cars. This is a way of accelerating change. Once people have made the change, they generally maintain the changes. Just look at recycling: Who would now put their glass or cardboard in the garbage bin? However, even in the case of recycling, we still have incentives and inducements such as a deposit on bottles and cans, as well as easy pickup for the cardboard and plastic.

So in B.C. we are very close to being able to offer to municipal governments money (carbon credits) for their trenchless programs. This is made possible because of the inherently more efficient way in which trenchless allows pipes to be installed. This

will be a win-win for all societies in the future, but until it becomes commonplace the government encourages it with tax rebates.

In 2008, the province legislated that it would be carbon neutral by 2010 and that the cities would be carbon neutral by 2012 in day-to-day operations. As construction was outside this mandate, any carbon savings presented a possibility of being a credit. NASTT-BC has been working on the overall carbon reduction strategy for nine years but has been concentrating on the carbon credit for the last three years. Metro Vancouver has taken up the task in the last three years and is now very close to having approval. This approval of a credit methodology will allow municipalities to gain a credit for their trenchless program by going on a government website and filling in a form. Just like we the public do on our income taxes. This will, however, be the first jurisdiction in the world to allow a carbon credit from trenchless technology. That's change we can all get behind, right?

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# Maintenance Program is a Model for Contractors

## HAMMERHEAD TRENCHLESS EQUIPMENT

**“E**quipment maintenance programs for serviceable earth-piercing tools fall into two categories: letting someone else do it or doing it in-house” says Andy Braithwaite, a Certified Engineering Technician and Canada territory manager for HammerHead Trenchless Equipment.

Braithwaite is also a veteran trenchless methods instructor with over 25 years’ experience in HDD, ramming and bursting applications, and he says that both maintenance methods have their proponents. “When a contractor has only a few tools to maintain that are not in constant use, the expense and delay of sending them out for service might be acceptable bumps in the cost of ownership. On the other hand, contractors building up a tool fleet see those costs multiply rapidly.”

Braithwaite points to a model program evolved by one of his company’s customers in Georgia, U.S.A., as an example of the latter method. Southeast Connections, LLC (SEC) needed to reduce both the cost and the downtime for repair and maintenance of their expanding earth-piercing tool inventory. SEC is a pipeline, facilities and HDD/boring construction contractor providing services to the natural gas industry from its eight offices in Georgia, Tennessee, Alabama and Virginia.

### In-House Maintenance

Shannon Mulkey, SEC’s warehouse and service manager, had hoped performing in-house servicing and making repairs immediately on the earth tools that SEC previously owned would not only save on service costs but promote routine maintenance to extend tool life, maintain peak performance, and increase overall utilization and productivity.

Unsatisfied with his own attempts to rebuild the tools, he sought training through his dealer, Ditch Witch of Forest Park, Georgia. Through the expertise provided by his dealer’s service department, Mulkey learned right away that it was going to require more than he bargained for. “I didn’t realize how complicated our tools were,” Mulkey said, “or that SEC would need to invest in a special high-power wrench with at least 1,400 psi to open the tool. We didn’t have anything in our shop that could do that.”

Even with the required equipment, it would take up to two hours to take down and reassemble the tool. So when Mulkey saw a technician at the other side of the workshop working on a different brand, he wasn’t certain they were doing the same thing to them. “He had it apart, cleaned and together again in about 20 minutes.”

That was Mulkey’s introduction to the HammerHead Mole. “I made up my mind

on the spot – I wanted what that guy had.”

### Three Design Strategies

Piercing tools available in the market today are designed under one of three distinct design strategies. One, a brand can be disposable, meant to run until it loses so much performance it must be discarded and replaced.

Two, they can be repaired and rebuilt with special equipment, like SEC’s former piercing tools. The owner generally sends the tools out for service and repair.

In contrast, the HammerHead Mole was designed to be an earth-piercing tool



*Andy Braithwaite, HammerHead  
Trenchless Equipment*





*HammerHead 13 cm Catamount Mole on a job site*

an operator could fix in the field if needed—the third strategy.

The Mole was exactly what Mulkey needed to keep his tool fleet's cost of ownership down while SEC's tool fleet grew to keep pace with the burgeoning demand for its earth piercing services.

SEC completed its swap-out to the Mole three years ago. During the first year, SEC's own technicians were performing all maintenance on the tool except for piercing heads. SEC generally uses HammerHead's active heads on their two- to three-inch Moles in the Atlanta area's clayish soil conditions, relying more on static heads elsewhere. But to achieve his ultimate goal of 100 percent in-house service capability for the earth piercing tools, Mulkey decided to consult with HammerHead again.

The company worked with Mulkey to create a hands-on Mole training seminar at SEC's site in Conyers, Georgia. "In just two days of training," Mulkey said, "we serviced all of our Moles,

completely breaking them down, cleaning them, replacing what-ever might need replacing, and putting them back together.

Everyone got hands-on training."

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The trainees were taught to distinguish types of damage and to look for their most likely cause, such as improper oiling and dirt contamination. There were also topics Mulkey would not have expected.

"For instance, they took time to educate

my guys on our compressors and the relationship of volume to pressure," Mulkey said. "These tools are designed to run on 110 psi. Most of the compressors used for this industry are rated anywhere from 120 to 160 psi. But you can't count on that. It's

more about volume. You have to make sure the compressor has enough volume to maintain that pressure.

"A small-volume compressor might say that it's rated 110 but only be giving you 70 while you're in the middle of your run. You don't want the tool to stop working halfway through the run."

On the other hand, running a piercing tool at excessive pressures can lead to even more serious problems. "Guys think it will make the tool more productive to run higher than 110 psi. Of course, it can – for a bit – but it's damaging the tool. It made me think of missiles I'd seen come in before with broken or deformed bodies, flanges, tail pieces."

Mulkey said that crew safety was far more important than maintenance cost. "Some of the stuff happening to tools running that hard is dangerous and could hurt someone. They're down in the pit next to them."

All of SEC's compressors now have regulators to maintain correct psi, protecting both tools and equipment from excessive pressures.

Mulkey has been tracking maintenance costs, which has proven the merits of his plan: "I have nothing but good news.

We're saving 35 percent a year on overall maintenance. Also figure in that the tool itself costs less than the brand we were buying, that the tools are turned around and go back to work the next shift, and it's a no-brainer. This was the way to go!"

Subsequent training is also provided in-house, Mulkey said: "I applied what I learned to make our own training courses."

Mulkey said in the three years he has worked with HammerHead Moles, he hasn't seen one wear out yet. "But even when that day comes, since every part of the Mole is replaceable, we'll just keep rebuilding them until we decide we 'want' a new one."



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This year's conference – an opportunity

to connect with exhibitors, network with colleagues, engage in educational sessions, and build your skills and industry knowledge – takes place May 1-3 in Whistler at the Fairmont Chateau Whistler and Whistler Conference Centre. It features one of the largest trade shows in Western Canada and two full days of presentations and discussions for more than 1,200 industry professionals.

The BCWWA is celebrating 44 years of bringing the water community together for dialogue, collaboration and knowledge-sharing on key industry issues. It represents over 4,600 water professionals who work every day to keep our water systems clean and safe. More information on the association is available online at [bcwwa.org](http://bcwwa.org).



*Last year's BCWWA Annual Conference and Trade Show was held in Kelowna.*



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# NOMINATIONS BEING ACCEPTED FOR NASTT'S HALL of FAME Class of 2017

In 2010, the NASTT Board of Directors voted to create a Hall of Fame in order to ensure that the Society's most outstanding and praiseworthy members received due recognition. The intent of NASTT's Hall of Fame is to preserve the outstanding accomplishments of these exceptional individuals and to honor their contributions to the advancement of both the trenchless industry and the Society. Members may be elected from all NASTT membership categories: Manufacturers and Suppliers; Engineers and Consultants; Municipal and Utility Employees; Contractors; and Academia.

Nominee \_\_\_\_\_

Birth Date \_\_\_\_\_ Year NASTT Membership Started \_\_\_\_\_

## Nominee or Next-of-Kin Contact Information

Name \_\_\_\_\_

Business Name (if applicable) \_\_\_\_\_ Business Phone \_\_\_\_\_

Business Address \_\_\_\_\_

Home Address \_\_\_\_\_

Home Phone \_\_\_\_\_ Email Address \_\_\_\_\_

## Summary of Outstanding Achievements

Please state in 3-4 sentences the contribution(s) made by this nominee that justifies his/her induction. You may also attach a document to this application if you need more space.

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## Contact Information for the Principal Nominator

Name \_\_\_\_\_

Business Phone \_\_\_\_\_ Email Address \_\_\_\_\_

Completed applications along with (3) letters of recommendation and biographical information on the nominee should be directed electronically to Michael Willmets, NASTT Executive Director at [mwillmets@nastt.org](mailto:mwillmets@nastt.org) and must be received by no later than July 1, 2016.



**nastt.org**

North American Society for Trenchless Technology  
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USA Phone: 216-570-8711



|                                     |     |
|-------------------------------------|-----|
| ABC Pipe Cleaning Services Ltd.     | 24  |
| Akkerman Inc.                       | 29  |
| Brandt Tractor                      | 3   |
| CCI Inc.                            | 22  |
| The Crossing Company                | 15  |
| Direct Horizontal Drilling          | 7   |
| Earthworm Horizontal Drilling Ltd.  | 33  |
| Geoscan Subsurface Surveys          | 29  |
| Kamloops Augering & Boring Ltd.     | OBC |
| The Langely Concrete Group          | 22  |
| LMK Technologies                    | 9   |
| Logiball Inc.                       | 27  |
| Mar-Tech Underground Solutions Ltd. | IFC |
| Northern Lites Technology Ltd.      | 33  |
| Opus Dayton Knight Consultants Ltd. | 19  |
| Paragon Engineering Ltd.            | 30  |
| Parsons Inc.                        | 30  |
| PW Trenchless Construction          | 4   |
| Trenchless Drilling Services        | 24  |
| Ulmer Contracting                   | 26  |
| Waterworks Technology School        | 30  |

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