BC's Magazine for Trenchless Construction

BRITISH

CHAPTER

INV

NASTT

Meeting Infrastructure Challenges in B.C.

DiG?

Official Publication of the North American Society for Trenchless Technology • British Columbia Chapter WWW.NaStt-bc.org



Pipeline Inspection, Maintenance & Rehabilitation Traffic Plans, Lane Closures & Flagging Services



Mar-Tech specializes in providing pipeline rehabilitation for all aspects of infastructure maintenance in underground utilities such as video inspection, grouting, internal point repairs, smoke testing, flushing and root control. With special emphasis on trenchless rehabilitation, Mar-Tech is considered one of the top "one-call" companies in the industry. Our clients are varied, and include municipalities, contractors, engineering firms as well as the general public.

5166 - 272nd Street, Langley, BC V4W 1S3 Ph: 604.888.2223 or 604.857.2200 Fax: 604.857.2700 www:mar-tech.ca

Ditch Witch



THE UNDERGROUND AUTHORITY.

🚺 Ditch

Brandt Tractor features a full line of DitchWitch and Hammerhead equipment to meet all your underground construction needs. Industry-leading product performance keeps you productive and profitable while our team of parts and service experts deliver legendary customer support when and where you need it, which now includes 27 branches, nationwide. That's Powerful Value. Delivered.

DIRECTIONAL DRILLS TRENCHERS TRENCHLESS INSTALLATION SOLUTIONS VACCUUM EXCAVATION PRODUCTS SUBSITE ELECTRONICS SKID STEERS

-90



brandt.ca 1-888-227-2638

PW TRENCHLESS CONSTRUCTION LTD. TRENCHLESS TECHNOLOGY YOUR LOW CARBON SOLUTION













PW Trenchless Construction LTD. 11618 130 Street Surrey BC 604 580 0446

Don't dig it...let PW Split it!!!

P₹

TABLE OF CONTENTS





North American Society for Trenchless Technology - BC Chapter



FEATURED...

Ross Bay

For a Victoria cemetery project, contractors had to take measures to protect precious pieces of B.C. history



Tunneling

Careful application of trenchless technology ensured preservation of John Hart Lake's ecological integrity



Still Boring

A Kamloops company has rebranded after more than 40 years; they'll still auger and bore for your project

Also...

Draaidant'a Maaaana

	-	
	8	
4		

President's Message	6
Message from NASTT	7
Y-Join NASTT-BC?	8
Calendar — Events & Training	9
Trenchless Technology Road Show	10
Burrard Street Trenchless Crossing	22
New Ditch Witch Powerhouse	26
	29
NASTI-BC Board of Directors	33
Index to Advertisers	34

COVER PHOTO: City of Vancouver



Unit 1 – 73 Fontaine Crescent Winnipeg, Manitoba Canada R2J 2H7

© Copyright 2017 PTR Communications Inc. All rights reserved. The contents of this publication may not be reproduced by any means, in whole or in part, without the express written permission of the Publisher.

> President **Elaine Chouinard** 204.255.6524

elaine@ptrcommunications.com

Editor **Mike Stimpson** 807.346.0510 mike@ptrcommunications.com

Advertising Sales Darlene Madill 218.324.2801 darlene@ptrcommunications.com

Layout & Design **Lunch Pail Productions** 204.237.6611 lunchpailproductions@shaw.ca

While every effort has been made to ensure the accuracy of the information contained herein and the reliability of the sources, the Publisher in no way guarantees or warrants the information herein, and is not responsible for errors, omissions, or statements made by advertisers. Opinions or recommendations made by contributors or advertisers are not necessarily those of PTR Communications Inc., its officers or employees.

> Publication mail agreement **#41901514** Return undeliverable Canadian addresses to: PTR Communications Inc. Unit 1 - 73 Fontaine Cres., Winnipeg, Manitoba Canada R2J 2H7

Printed in Canada 05/17

5

PRESIDENT'S MESSAGE



President's Message

Kieran Field

renchless technologies continue to thrive and drive progress in utility installation in British Columbia. Trenchless installations are held in high regard as being a cost-effective, low impact, greener alternative to traditional open-cut installation techniques.

The society has been continuing its efforts to advance the science and practice of trenchless technology for the public benefit. In 2016 we held a seminar on Pipe Bursting Good Practices. We were delighted to have had Dr. Alan Atalah (of Bowling Green State University) and Dr. David Bennett (of Bennett Trenchless Engineers) as instructors for the course. The sessions held in Victoria and Vernon were very well received.

Looking forward to the coming months, we are proud to say the Trenchless Technology Road Show will be returning once again to B.C. This road show is a result of a joint effort between the Centre for Advancement of Trenchless Technologies (CATT), Benjamin Media Inc. and NASTT-BC.

This year's Road Show will be at the Sheraton Vancouver Airport Hotel in Richmond and will follow the same format

Trenchless Progress

as in previous years, i.e. one day of courses followed by two days of technical presentations. But this year will offer even more to choose from. The courses include:

- Trenchless Technology 101,
- Watermain Renovation,
- Horizontal Directional Drilling,
- · Trenchless Carbon Savings & Credits and
- Planning Trenchless with SUE.

We also have some cutting-edge technical presentations lined up for the following two days, with three sessions running concurrently. These will cover a range of topics including condition assessment, pressure and gravity pipe renovation, SUE, HDD, tunnelling and case studies.

The exhibit hall, which we plan on having open to the public, is sure to be another highlight of the Trenchless Technology Road Show. The hall will be filled with the latest and greatest from the trenchless technology world, offering great networking opportunities with industry peers.

We are extremely thankful for the efforts CATT and Benjamin Media are putting into this event. You can find more info at roadshow2017.cattevents.ca.

In addition to the Trenchless Technology

Road Show, the B.C. chapter will also be hosting a one-day seminar on Assessment and Trenchless Rehabilitation of Culverts. Culvert collapses and blockages have recently hit the news headlines and demonstrate how major property damage, traffic diversions and general inconvenience to the public occur when culverts fail to function. This workshop will cover culvert management principles that would benefit public sector organizations including municipalities, cities and highway authorities. The workshop is presented by a number of experienced practitioners both from the consulting and construction spheres of industry. This course will be held on June 14 in Victoria and on June 15 in Parksville.

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 and business with others in their industry. More information can be found on page 8.

MESSAGE FROM NASTT



Successful No-Dig in D.C.

FRANK FIRSCHING

ello, British Columbia Chapter members. As the year gets underway, I'm excited for the future during my term as Chair of NASTT's Board of Directors. The year is off to a great start. NASTT's 2017 No-Dig Show and ISTT's 35th International No-Dig in Washington, D.C., were very successful on all accounts. The exhibit hall was a sellout once again, and we experienced excellent attendance. We were thrilled to host delegates from all over the globe.

NASTT exists because of the dedication and support of our volunteers and our 11 regional chapters. Our No-Dig Show Program Committee members volunteered their time and industry knowledge to peer-review the 2017 abstracts. These committee members ensure that the technical presentations are up to the standards we are known for.

This year we had 160 technical presentations over the course of three days on all aspects of trenchless technology. We also presented three roundtable discussions featuring industry experts on the panel and input from the audience. The topics: Pressure Pipe Inspection and Rehabilitation; CIPP Past, Present, and Future; and Improving Design Documents – Views from Contractors.

If you would like to join the 2018 Program Committee to help us plan the technical sessions and special events for next year's conference, meet us in Palm Springs, California, this summer! Please contact us at info@nastt.org for more information. The North American Society for Trenchless Technology is an organization for trenchless professionals. Our goal is to keep our finger on the pulse of our industry and provide beneficial initiatives. To do that, we need involvement and feedback from our professional peers. If you are interested in more information, please visit our website at nastt.org/volunteer. There you can view our committees and learn more about these great ways to stay involved with the trenchless community and have your voice heard. Please consider becoming a volunteer – we would love to have you get more involved.

NASTT has a very promising future because of our amazing regional chapters. Thank you again for your continued support and dedication to NASTT and the trenchless technology industry.



INNOVATING SINCE 1993

Cleanout System

- ASTM F3097 Compliant
- VAC-A-TEE[®] Saddle Kits
- Minimally Invasive Installation
- · Easy to Install

Mainline Repair

- ASTM F2599 Compliant
- Inverted In-Place Sectional
- CIPP Lining

Main to Lateral Lining

- ASTM F2561 Compliant
- T-Liner[®], Shorty[™], and Stubby[™] One-Piece Connection Lining Systems
- Insignia[™] Compression Gaskets

Gasket Sealing

- Insignia End Seals
- 6 in. 54 in. Diameters Available

CIPP Lateral Lining

- 100% Trenchless
- Performance Liner® CIPP Lining
- · Lining Through A Cleanout

Manhole Rehabilitation

- CIPMH™ Full Depth Lining
- CIPMH Chimney Lining
- · One Size Fits Most



 MAINLINES
 LATERALS
 MANHOLES
 GASKET SEALS
 EQUIPMENT

 Phone:
 (815)
 640-9302
 Email: info@Imktechnologies.com
 Web: Imktechnologies.com

7

NASTT MEMBERSHIP

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 vears 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**.

JOIN NASTT and NASTT-BC TODAY!

To become a member of NASTT-BC, contact Charlotte Wong at charlottenapwong@gmail.com

CALENDAR

Events & Training Opportunities

May 28-30, 2017

BCWWA Annual Conference Fairmont Empress and Victoria Conference Centre Victoria, British Columbia Information: bcwwa.org

June 4, 2017

NASTT's Gas Short Course Bryant University Smithfield, Rhode Island Information: nastt.org/training/events/

June 14, 2017

Assessment and Trenchless Rehabilitation of Culverts (Seminar) Comfort Inn & Suites Victoria, British Columbia Information: kieran.field@opusinternational.ca

June 15, 2017

Assessment and Trenchless Rehabilitation of Culverts (Seminar) Quality Resort Bayside Inn Parksville, British Columbia Information: kieran.field@opusinternational.ca

September 25, 2017

Trenchless Technologies 101 Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

September 25, 2017

Watermain Renovation Using Structural, Semi-Structural and Non-Structural Lining Systems Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

September 25, 2017

Horizontal Directional Drilling: Design to Construction Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

September 25, 2017

Trenchless Carbon Savings and Credits Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

September 25, 2017

Planning Trenchless with Subsurface Utility Engineering Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

September 26-27, 2017

Trenchless Technology Road Show 2017 Sheraton Vancouver Airport Hotel Richmond, British Columbia Information: roadshow2017.cattevents.ca

March 25-29, 2018

NASTT's 2018 No-Dig Show Palm Springs Convention Center Palm Springs, California Information: nodigshow.com





CCTV & HIGH PRESSURE CLEANING

Professional Quality Municipal, Commercial & Industrial

Smoke Testing • Hydro Excavation • Pipe & Manhole Rehabilitation

Prince George, BC 1-800-661-6177 www.northernlitestechnology.ca





September 26-27, 2017 Richmond, British Columbia, Canada

Pre-Event Courses September 25



SAVE OUR SURFACES WHO SHOULD ATTEND?

This program is for municipal/public works professionals, consultants, contractors and other underground construction professionals.

Help Municipalities Save Millions of **Dollars** on Infrastructure Renewal

- Pre-Event Courses
- Technical Sessions
- Over 50 Exhibitors Live Demos

PRESENTED BY:



TO REGISTER VISIT TRENCHLESSROADSHOW.CA

or call **519-888-4770** for more information. LIMITED SEATING AVAILABLE • EARN CEUS

TOPICS INCLUDE:

- Trenchless Planning and Analysis
- Geotechnical and Environmental Considerations
- Trenchless Design and Construction
- Trenchless Rehabilitation
- Asset Management
- Condition Assessment
- Subsurface Utility Engineering
- · Environmental Benefits of Using Trenchless Construction Methods
- New Products and Materials
- Trenchless Pipe Materials

- Advances in Buried Infrastructure Asset Management
- Regulatory Frameworks; Risk Management and Communication; Change Management and Organizational Behaviour
- State of Water Infrastructure: Level of Service, Performance Indicators
- Water Infrastructure Financing and Rate Setting
- Sprayed-in-Place Pipe

WWW.TRENCHLESSROADSHOW.CA

PLATINUM SPONSOR:







SILVER SPONSOR:



SUPPORTING ORGANIZATIONS:







CAM HUTCHINS PW TRENCHLESS CONSTRUCTION LTD.

Storm Sewer Rehabilitated with Trenchless Technology

Variable Columbia's capital, quickly outgrew its cemetery by the early 1870s. Residents looked east, to land subdivided by the widow of one of Fort Victoria's founders, for the site of new burial grounds. Twelve acres were purchased and Ross Bay Cemetery buried its first inhabitant in December 1872; the cemetery's official opening happened the next year. By the early 1920s it was already close to capacity and a new Royal Oak Burial Park had to be built.

Originally the Ross Bay Cemetery had a few creeks running through it, so storm sewers (1,550 millimeters wide and 995 mm high) were built for the creeks to be filled in, allowing for more area for graves. The creeks, of course, do not run in straight lines, so the actual sewer is a hand-built dual layer of bricks that has many curves and elevation changes.

The Ross Bay Cemetery has for a long time been more of a park for the locals than a cemetery. Almost a tourist destination, it has many remarkable inhabitants who helped shape the province in many ways. One of the first people to be interred at the Ross Bay Cemetery was Sir James Douglas, the second governor of Vancouver Island (1851-1863) and first governor of B.C. (1858-1864). Some of the B.C. premiers buried at Ross Bay include Sir Richard McBride, Alexander Davie, Theodore Davie, Amor De Cosmos, George A. Walkem and James Dunsmuir.

Perhaps the most famous British Columbian buried at Ross Bay is writer and painter Emily Carr, interred in 1945. Many tour the cemetery just to visit Carr's grave, and many are surprised at the modest granite plaque set in the ground. The grave was unmarked until 1963 when the Victoria Historical Society placed the plaque.

The cemetery is now used as a walking area for many residents and holds a place near and dear to their hearts. In any sewer rehabilitation project, care would be needed to protect this precious bit of history.

Repairs to this brick storm drain had been done over the years, but it was time for a more permanent solution. PW Trenchless was contacted to repair the sewer line in May 2016, and in June the firm sent a team of technicians to access the varying dimensions of the complete length of the sewer line. A comprehensive survey of the pipe was completed.

To measure and order the pipe needed for this project, a "pipe mandrel" mimicking the proposed new pipe's outer dimen-







The best work starts with building the best team.

Improving your walk along Shuswap Lake is just one benefit of our work to reline the sanitary trunk sewer. We are the people behind your infrastructure.



sions (1,396 mm x 895 mm) was manually pulled through the complete length of the existing brick pipe. Measurements were carefully taken to account for 12 horizontal curves and four vertical drops. The pipe mandrel had to be adjusted in size numerous times to compensate for smaller diameters through the existing sewer main. Once all the pipe was measured, drawings were made of each different size and shape of pipe and the pipe was ordered from the manufacturer in Dubai.

Blueprints divide the project into two sections. The higher section, 3A, starts at the storm drain manhole DO195 on Fairfield Road and runs to storm drain manhole DO194, a length of 98.9 metres. Section 3B was 123 metres from DO194 to DO193 on Dallas Road, which runs adjacent to Ross Bay itself.

The invert of the pipe at Fairfield Road was 5.4 m deep and then 5.88 m deep at the DO194 manhole. Initially a location on Dallas Road was selected for the entrance pit. A more suitable location approximately midway along the project where the service road intersects the pipe location was used. The depth at the entrance pit was 10 m.

The next step was to build an access point for the new pipe sections to be lowered into the existing host pipe. A large excavation was dug on the existing roadway within the cemetery where the roadway intersected the sewer below.



Trench shoring cages were used during the excavating process and then concrete box culvert sections were stacked on end for a safe work space to enter and exit the host pipe. All members of the crew had been trained in confined space rescue and work processes.

The crew needed to create specialized equipment for moving the pipe sections over 300 m inside the host pipe. This equipment was then used as transportation devices for the technicians to move the workers and also tug sections of pipe into place.

Each pipe is inserted into the host pipe from the access point and then moved into place at either end of the existing host pipe. The pipe sections have the gaskets installed and lubed with pipe lubricant and are winched into place by winches hooked to anchor points mounted on the previously laid pipes.

The pipes are set into place on grade and held in place with blocks of wood that allow for grout to be pumped into the void between the host pipe and the new glassreinforced plastic pipe without the new pipe moving or "floating."

Each pipe is inserted into the host pipe from one location and then moved into place at either end of the existing host pipe, making this similar to angioplasty through a vein or artery in the leg.

Once the pipes were completed and connected to the end-point manholes, the entrance pit installed for this process had a concrete lid placed over it with a manholetype entrance suitable for entrance for maintenance and inspection.

The project went extremely well, and the many concerned citizens were very interested in how the project was completed with minimal impact upon their hallowed and much loved public space.

Microtunneling at John Hart Lake

LAURA ANDERSON

MARKETING AND COMMUNICATIONS DIRECTOR AKKERMAN

esidents of Campbell River are fortunate to have access to a generous supply of clean fresh water sourced in majority from manmade John Hart Lake through a hydroelectric generation plant owned by BC Hydro.

John Hart Lake, northwest of the Campbell River on Vancouver Island, is within the boundaries of Elk Falls Provincial Park. BC Hydro's John Hart Generating Station has been supplying water for electrical power operation since 1947. To provide safer, efficient and more reliable service, BC Hydro embarked on the construction of a new underground hydro power generation facility slated for completion in 2018. The change required the City of Campbell River to devise an independent means for sourcing its drinking water.

The resulting project, the Campbell River Water Supply Upgrade,

required an \$18.3-million investment from BC Hydro and \$10 million from the City to construct and operate an independent water conveyance system and build a new water treatment facility and pump station alongside John Hart Lake on BC Hydro's property. The design provides better efficiencies to reduce costs, and also reduces park impact by combining operations at one location and eliminating a section of transmission line through the park.

Phase 1 required the open-cut installation of 1.2 kilometres of connecting pipe. Phase 2 involves the construction of 1.4 km of connecting lines, the lake intake structure, pump station and water treatment facility. The City's new system will provide service to residents by the end of 2017.

The Raw Water Intake Project Phase 2/Project 1 calls for a new



Frontier-Kemper Constructors crew members smile in front of their SL60C after completing work at John Hart Lake.

1,524-millimetre (60-inch) microtunneled pipeline connecting a caisson adjacent to John Hart Lake to a submerged intake screening system at 14-metre depths. The intake tunnel comprises 116 m (380 linear feet) of 1,556-mm ID Permalok® microtunnel section joined to the intake screening system with a submerged 147-m, 1,600-mm fused joint HDPE pipeline.

Stantec Consulting Ltd. of Victoria and Highland Engineering and Surveying of Campbell River are responsible for the design and administration of Phase 2/Contract 1 of the Campbell River Water Supply Upgrade Project. Aecon Infrastructure-Frontier-Kemper Constructors JV was awarded Contract 1 on May 10, 2016, with Frontier-Kemper Constructors, Inc. (F/K) of California performing the microtunneling work. Fraser Burrard Diving Limited of Maple Ridge was subcontracted for the MTBM's wet retrieval.

The lakeside geologic conditions for the

microtunnel installation consisted of clays and sands with sand primarily present at the interface of the lake. Microtunneling is an ideal means of accurate pipe jacking in low blow count and flowing soil because its closed slurry system offers continuous support to the MTBM face to balance groundwater and soil pressure during excavation. It's also the safest choice in high water levels since the MTBM is remotely controlled by an operator in the control container at the surface level.

Frontier Kemper used their Akkerman SL60C MTBM system with a mixed ground cutter head to contend with the mixed face geology. The system includes an MT875K jacking frame with 800 tons of thrust capacity, a control container with the operator control console, power distribution center and MTBM drive motor, a series of pumps to assist with excavation and slurry circulation and a Derrick[®] slurry separation plant.

The project's 9-m-diameter, 15.2-m-deep

caisson intake structure for the pump station temporarily served as the microtunneling jacking shaft and was modified for microtunneling use with a shaft seal to prevent lake water and ground intrusion, a concrete reaction block to bear jacking thrust loads and scaffolding stairs for crew access.

Microtunneling on projects with high volumes of ground water offers unique challenges and requires a delicate balance of expertise, operator skill and risk mitigation. F/K project manager Nestor Garavelli explained, "F/K viewed the interface with the lake and the disconnection of the MTBM from the jacked pipe as the two points of high risk on the project. We employed Fraser Burrard Diving Limited to survey the interface and remove any foreign material that may create an obstacle for the MTBM. In fact, a tree stump along with a few boulders required removal prior to breakthrough into the lake."

F/K was concerned with the shallow cover



The John Hart Lake project's caisson intake structure for the pump station temporarily served as microtunneling jacking shaft.



The views along John Hart Lake on Vancouver Island are picturesque.

and flowable material present at the lake interface. "The pipe would be subject to uplift when disconnected from the MTBM, thus making the connection with the remaining pipeline an issue," Garavelli stated. To counter this upon MTBM breakthrough, he explained, "the diving crew would add concrete blocks with straps to weigh down the section of pipe behind the MTBM to prevent pipe floatation. A grouting campaign through the pipe would also be undertaken to ensure that no cavity existed between the pipe and the excavated ground surface."

To prevent the tunnel and shaft from flooding, Garavelli said, "a double bulkhead was built into the end pipe section closest to the MTBM. The in-pipe bulkhead was welded in place at 1.2 m in the first pipe joint. Next, small hydraulic jacks were installed between the end of the MTBM and the bulkhead of the last pipe section, which were controlled from the shaft side within the pipe, to allow for the release of the MTBM from the pipe section."

Of great concern for the owner was the preservation of the ecological integrity of the lake, which not only provides drinking water for city residents but also feeds the Campbell River which contains prime salmon habitat. A floating debris boom was installed in John Hart Lake just beyond the construction region to inhibit potential contaminants during construction.

The microtunneling system, ancillary equipment and pipe arrived on the City of Vancouver's car carrier barge to Vancouver Island. Frontier Kemper crew mobilized to the picturesque Vancouver Island



in early September. "The location of the MTBM installation and slurry plant was adjacent to the lake and the job site surroundings were impeccable with an abundance of wildlife," remarked F/K MTBM operator Mike Abbott. "The natural beauty of the site location made the job that much more enjoyable for the crew."

The SL60C MTBM was launched on September 6, 2016. The first seven 1,594mm-OD Permalok® pipe joints were fully welded to prevent joint separation from the weight of the MTBM when it emerged into the lake bed and subsequent buoyant force when the MTBM was removed. Between each 3-m pipe set, a pipe clamp helped to counter the average 18 psi static ground water pressure and hold the most recently installed pipe in place while the next pipe set was lowered and welded.

Along the 116-m alignment, the MTBM encountered soil variances from soft silts to glacial till seams. Frontier Kemper's seasoned operator precisely navigated the MTBM through the changeable ground.

It's common to find tree stumps in manmade reservoirs, and an extra-large specimen was discovered on the lake bed in the alignment path. While microtunneling was underway, Fraser Burrard's dive crew used underwater chainsaws to dislodge a large stump and massive root system lying in the path of the MTBM's entrance into the lake. On September 21, with the obstruction removed, the MTBM had a clear path to emerge into the lake at 14-m depths on line and grade.

Afterward, F/K entered the tunnel from the caisson side to disconnect the microtunneling utility lines and install the MTBM's bulkhead cover. Next, crew retracted utility lines from the first pipe section, closed the bulkhead hatch door and air-pressurized the chamber between the MTBM and pipe bulkhead. Abbott described, "Prior to releasing the MTBM from the pipe, a pressure test was conducted on the bulkhead to ensure that no leaks were present and the hydraulic jacks were also given a test run to



MTBM operator Mike Abbott stands next to a section of the 9-metre-diameter tree stump moved from the MTBM alignment path.

ensure that there were no failures."

The MTBM was successfully released and retrieved from the lake surface without any water breaching the bulkhead. Fraser Burrard's team retrieved the MTBM from the lake on September 30 and hoisted it to land Aecon Infrastructure completed the intake connection with a 147-m fused-joint 1,600-mm HDPE pipeline which was floated and submerged into the lake and attached to the microtunnel, angled downward towards the intake screen. "The project was deemed a big success for F/K and the project team," Garavelli concluded. "This was the first lake tap that F/K had undertaken, and the crew's knowledge and teamwork were instrumental in the success. The support of the owner and engineer along with AECON formed the perfect team to allow for a very important piece of infrastructure for the Campbell River community to be completed on time and on budget."



Supplying products communities are built on.

18 NASTT - Y-Dig • 2017

Our Work is Boring: A Kamloops Company Rebrands

HARRY DICKINSON, ASCT. The Tunneling Company

the crossroads with a civil construction project he was working on in Quesnel, B.C.

Bachand Construction was a sewer and water contractor, and unfortunately for him the adjacent highways project and service roads were completed and paved before his service connections were done. Open cutting the freshly paved asphalt was not an option. Monte contacted a contractor that had the equipment to do the job, but would not complete it. To finish his project with over 200 services that needed to be connected, he needed a viable solution.

Monte did not allow this setback to hold him back. He was resourceful enough to find a small auger boring machine out of Fort St. John, and acquired it to complete the crossings. Monte seized an opportunity and bought the gear off of the local contractor, and Kamloops Augering Ltd. was created.

Horizontal directional drilling then became Monte's next venture. He is considered a pioneer in this industry as his fleet of directional drill rigs worked all over North America. His reputation and perseverance to complete every crossing afforded Kamloops Augering to grow. He had a fleet of auger bore machines and pipe rammers that sons Malcolm and Richard would soon take over. In 1997 the directional drilling assets were sold to a young startup called The Crossing Company.

Malcolm and Richard continued to work and build Kamloops Augering & Boring Ltd.(KABL) into one of the largest road boring companies in Western Canada. The expansion of the company











included acquisition of Rampro Casing & Crossings Ltd. The addition of Shawn Gaunt has allowed the company to grow and continue innovating in the use of different technologies.

The combined years of experience and imagination afforded KABL to reinvent surface casing installations — first by use of the patented Hydro Hammer to mitigate telescoping and increase drive lengths, and then via high-angle surface casings installation with Electric Auger Bore Machine, Surface Casing Ramp (SCRamp) and Down the Hole (DTH) Hammer systems. Using these innovations, KABL completed a 30-degree angle surface casing that was telescoped from 30 inches to 24 inches to 18 for a total length of 120 metres.

A 40-year milestone was achieved in 2016, and now the business is going through a rebranding phase with The Crossing Company, which acquired majority shares of KABL approximately four years ago. Moving forward we will be known as The Tunneling Company, which is a part of The Crossing Group which is now in its 20th year of business. Nine companies have amalgamated to form The Crossing Group with offices in Alberta (Calgary, Grande Prairie, Nisku and Taber), B.C. (Kamloops) and California (Sacramento).

The Crossing Group has an impressive fleet of equipment that can service the trenchless industry. We have 30 HDD rigs, 10 spreads of auger boring/tunneling equipment and 10 hydro-vac trucks. The 200-plus employees make up the most valuable resource which has afforded growth and success in four distinct lines of service. Our work may have been "boring" but now we are "Going to Greater Lengths[™].

Burrard Street Trenchless Crossing

JASVINDER SINGH HOTHI CITY OF VANCOUVER

n March 2016 City of Vancouver Sewer Operations embarked on a major trenchless crossing at the intersection of Burrard Street and Broadway. The trenchless crossing was a part of the Burrard South improvement project that consisted of major infrastructure improvements from the foot of the Burrard Street bridge to West 17th Avenue. Improvements included the twinning of the existing combined storm main, road improvements, street repaying and installation of a new water main.

The majority of City sewers infrastructure work has traditionally been completed using open-cut construction methods. While the City's construction crews are proficient in these methods, the demand for a less disruptive and more efficient solution was explored in this situation.

Burrard Street is a rather busy northsouth arterial road within Vancouver. West Broadway is a dedicated truck, transit and major traffic route connecting city traffic from east to west.

After considering traffic impacts, pedestrian impacts and disruption to local business, a decision was made to complete this portion of the project by a trenchless method. The crossing was over 90 metres in length and completed in very challenging conditions.

In May of 2015, trenchless technology



was introduced into operations and successfully utilized in four major in-house projects. The success of these four projects gave Sewer Operations the confidence to complete the Burrard Street project inhouse.

The scope of the work included installation of a separated storm and sanitary wastewater system. Trenchless methods employed in this work included use of an Akkerman 4800 Series guided boring machine with 36-inch and 24-inch cutting heads to install a 92 m length of sanitary sewer and a 92-m storm main.

The invert elevation of the install was 18 feet deep. Shoring and excavation of the launch pit was not easy. With parallel underground utilities running on one side of the launch pit and the existing combined sewer main on the other, excavating and shoring the large launch pit – 40 feet in length, 16 feet in width and 18 feet in diameter – required considerable attention to safety.





To make the excavation even more of a challenge, the bottom 10 feet of the excavation material was contaminated by high volumes of hydrocarbons that were above the allowable limits for the soils being excavated. This contamination was cause by a gas station that was located adjacent to the launch pit area. This excavation material had to be handled with due care, and was transported and disposed of at an approved disposal facility by approved haulers.

After excavation of the launch pit. the crew started the process of pushing the pilot tubes; the laser was set for the desired grades of 2.27%. Even though the ground conditions were contaminated with hydrocarbons, the soil along the alignment of the crossing was favourable for the pilot tube methodology. This was confirmed with bore holes and a sweep with ground-penetrating radar.

The crew completed the crossing of the pilot tubes, 92 m, in just 16 hours. After the augering was completed, crews started setup for the 36-inch Akkerman power cutting head and the direct jack of the Hobas pipe.

Direct jacking was another first for the trenchless crew. After some very minor setbacks, the pipe was installed and the crossing completed to the desired grade and invert.

After the storm main crossing was complete, crews started the setup for the 24inch sanitary. Again, the pilot tubes were pushed across at the same rate as before. For the sanitary, the augers were downsized to 11.5 inches, which would fit the 24-inch power cutting head. The smaller augers allowed for efficiencies for the auger process and reduced time to get across. As with the storm main, the sanitary was direct jacked at a grade of 2.27%. The crew persevered and overcame many challenges, such as equipment failures,







Creating What Matters For Future Generations

Water, Wastewater, Asset Management, Transportation, Geomatics North Vancouver | Abbotsford | Kelowna | Prince George | Smithers | Terrace | Victoria | Whitehorse

www.opusinternational.ca

contaminated soil, and minor scheduling delays.

This trenchless crossing was a large undertaking from inception to completion. City staff did an excellent job completing the project with less than one year of experience in trenchless construction and no history of direct jacking Hobas pipe. This further demonstrated the great teamwork between the internal design and build teams at the City of Vancouver.

With continued success in trenchless construction, Sewer Operations will continue looking for projects where trenchless work can be integrated for cost effectiveness and efficiencies.



NORTH AMERICAN SOCIETY FOR **TRENCHLESS TECHNOLOGY**

THANK YOU, TRENCHLESS **CHAMPIONS!**

NASTT instructors are experts in their field and volunteer their time to educate the trenchless industry. Thank you to our 2016 instructors and panelists for helping to advance NASTT's mission to educate, publish, research and train!

Honor Roll of Instructors

Alan Ambler AM Trenchless

Brad Anderson Anderson Consulting

Sam Ariaratnam Arizona State University

Alan Atalah Bowling Green State University

Kevin Bainbridge Robinson Consultants Inc

Dave Bennett Bennett Trenchless Engineers, LLP

Glenn Boyce McMillen Jacobs Associates

Mikita Browning City of Atlanta

Craig Camp Mott MacDonald, LLC

Aaron Cohen Arizona State University

Ben Cote Sanexen Water Inc

Don Del Nero Stantec

Robin Dornfest Lithos Engineering

Jennifer Glynn RMC, a Woodard & Curran Company

Jason Holden Akkerman

Tara Lamoureux City of Casselberry

Jason Lueke Associated Engineering

Chris Macev AECOM

Jeff Maier C&L Water Solutions

George Mallakis TT Technologies, Inc

John Matthews Trenchless Technology Center

Jeff Moore Garney Construction

Mary Neher Bennett Trenchless Engineers, LLP

Jeff Oliver City of Golden Valley

Collins Orton Trenchless Solutions

Paul Pasko SEH



Red Pederson Quam Construction

George Ragula PSE&G

Kaleel Rahaim Interplastic Corporation

Owen Randall City of Ft Collins

Don Silar Stantec

Ray Sterling Louisiana Tech University

Craig Vandaelle Michels Tunneling

Matt Wallin Bennett Trenchless Engineers, LLP

Dennis Walsh PSE&G

Eddie Ward TT Technologies, Inc

Dan Willems City of Saskatoon

nastt.org

North American Society for Trenchless Technology 14500 Lorain Avenue #110063 • Cleveland, Ohio 44111 Phone: 888-993-9935

New Ditch Witch Powerbouse brandt tracter Ltd.

egina-based equipment dealer Brandt Tractor Ltd. has added Ditch Witch's innovative new JT40 horizontal directional drill (HDD) to their exclusive offering of Ditch Witch products. The JT40 is being described as a complete re-imagining of current drilling technology, designed in consultation with on-the-job

HDD operators to ensure maximum productivity and ROI.

Engineered with next-generation enhancements, the new Ditch Witch machine features increased power and an array of patent-pending new features to optimize drilling productivity and operator comfort. It is all built around a compact new platform that reduces jobsite footprint while adding increased pipe-rack capacity compared to previous models. Additionally, the new model boasts an expanded operator interface and station for a more transparent view into all machine operations, improved operator comfort and enhanced operational control.





"We're tremendously excited to introduce this new unit into the Canadian market," says Van Wall, Brandt's Tractor Division Manager. "The unique combination of increased power and compact footprint is going to be a game-changer for contractors, especially those regularly working in tight confines."

For improved performance, efficiency and productivity, Ditch Witch's advanced operator displays are optimized with the data that operators need most. Equipped with two advanced seven-inch LED displays for increased visibility into all machine functions and diagnostics, tracker information is also displayed, allowing operators to monitor multiple jobsite functions beyond drill operation. Along with the digital displays, a carriage-position indicator provides operators with real-time drill status data for increased productivity and intuitive operation. The machine is also equipped with radial operator control (ROC), with the multifunctional controller highlighted on the machine display for better control efficiency, including mud-flow, rotation and more.

"The JT40 represents the future of horizontal drilling," says Seth Matthesen, Ditch Witch's Senior Product Manager, Horizontal Directional Drills. "The unit integrates machine data into an innovative display to keep operators informed and productive on the job. As with all of our products, we continue to seek customer feedback to improve uptime, profitability and performance, and this machine features several new pending patents to do exactly that."

The new model ups the ante with increased output from two solid power plant options: the industry-proven 148-horsepower Cummins QSB4.5 Tier 3 diesel, available where regulations allow, or a new 160hp Tier 4 Cummins option that gives operators 20 more horsepower than competitive 15ft drill-pipe models in its class, all in a smaller package.

Producing 40,000 pounds of thrust and pullback, the JT40 provides 30 percent more thrust in a more compact unit than other models in its class and offers an innovative, two-speed, rotational drive system that produces 5,500 foot-pounds of torque for improved drilling efficiency. Ditch Witch's newly-updated hydraulic platform utilizes company-proven technology to provide the most efficient power downhole. For increased support for the drill pipe as it enters the ground, the new design also minimizes pipeentry distance, reducing wear on guide blocks and decreasing the overall footprint on a job.

To enhance the JT40's downhole flow capabilities, Ditch Witch has equipped it with a 70-gpm, 1,100-psi mud pump, resulting in increased fluid course from the mud pump to the swivel, AND it features a new patent-pending reversible pipe box for added jobsite versatility.



"Our customers are going to love the fact that this unit holds up to 600 feet of drill pipe onboard," adds Brandt's Wall. "That is definitely more than previous models OR competitive machines and will allow for longer bores, reduced cycle times and increased return on investment. And, Ditch Witch has been very responsive to operator input when developing this product; optimizing the carriage speed to deliver the class-leading cycle times that make for faster installations."

With Ditch Witch's unique add-a-pipe design, operators are now able to manually insert multiple sticks of drill pipe once the pipe box is empty, improving overall productivity. With the drill's handy fold-out, lift-off service doors, operators gain easy access to daily maintenance points, and there are no daily grease zerks, allowing operators to spend less time on maintenance and more time drilling. An integrated pipe lubricator has also been added on this model, making it easier for operators to change out lubrication buckets for more efficient machine maintenance.

The JT40 is available with the option of a fully enclosed cab, featuring tinted glass and premium heat and air capabilities, or an open operator's station designed with integrated vandal covers. Both options feature a premium heated ergonomic seat with adjustable suspension, extended legroom and place the operator at a 45-degree angle, which provides industry-leading visibility for all critical vision points, including ground entrance, shuttle-retract location and rear connection. To further enhance operator visibility, Ditch Witch has added new patent-pending opensided vise wrenches that are rotated toward the operator. The operator's platform is also equipped with telescoping capability providing the optimal drilling view for improved jobsite operations.

For more precise control and positioning,

the JT40 has been equipped with a modular stake-down system that can now be feathered and is available in two optional configurations, standard and heavy-duty. The addition of an advanced remote control gives operators the ability to set up the rig outside of the cab, allowing more precise positioning of the JT40 on the job. The controller includes multi-mode ground drive; dual, independent stabilizers, stake down, cab traverse, and dual pivot.

"We're confident that the industry is going to love this machine and we're proud to be offering it, along with the complete line-up of Ditch Witch products, through our Canada-wide network of Brandt Tractor dealerships," concludes Wall. "From genuine Ditch Witch parts to factory-trained service to expert advice, no one works harder than we do here at Brandt to keep contractors productive and profitable."



By Category

Auger Boring The Tunneling Company

Directional Drilling & Supplies Earthworm Horizontal Drilling

Engineering Design R.F. Binnie & Associates Ltd. Parsons Inc.

General Consulting R.F. Binnie & Associates Ltd. Opus International Consultants (Canada) Ltd.

Grouting ABC Pipe Cleaning Services Ltd. Mar-Tech Underground Services Ltd. The Tunneling Company

Guided Boring Systems Akkerman

Horizontal Directional Drilling Brandt Tractor Ltd. Direct Horizontal Drilling

Hydro Excavation ABC Pipe Cleaning Services Ltd. Brandt Tractor Ltd. Mar-Tech Underground Services Ltd. Northern Lites Technology

Inspection & Evaluation R.F. Binnie & Associates Ltd. Mar-Tech Underground Services Ltd.

Joint Repair LMK Technologies Mar-Tech Underground Services Ltd.

Lateral Rehabilitation ABC Pipe Cleaning Services Ltd. LMK Technologies Mar-Tech Underground Services Ltd.

Manhole Rehabilitation LMK Technologies Mar-Tech Underground Services Ltd.

Microtunneling Service The Tunneling Company

Microtunneling Systems & Equipment Akkerman

Piercing Rods/Pushers Brandt Tractor Ltd. The Tunneling Company

Pilot Tube Method Installation The Tunneling Company

Pipe Bursting & Splitting PW Trenchless Construction Ltd. **Pipe Cleaning** ABC Pipe Cleaning Services Ltd. Mar-Tech Underground Services Ltd. The Tunneling Company

Pipe Jacking Akkerman The Tunneling Company

Pipe Jacking Equipment Akkerman

Pipe Ramming The Tunneling Company

Pipe Relining LMK Technologies Mar-Tech Underground Services Ltd.

Pipe Sealing LMK Technologies Mar-Tech Underground Services Ltd.

Precast Concrete Products The Langley Concrete Group

Sewer Rehabilitation R.F. Binnie & Associates Ltd. LMK Technologies Mar-Tech Underground Services Ltd.

Sliplining The Tunneling Company

Spot/Point Repair ABC Pipe Cleaning Services Ltd. LMK Technologies Mar-Tech Underground Services Ltd.

Surface Casing The Tunneling Company

Trenching Brandt Tractor Ltd.

Tunnel Boring Equipment Akkerman

Tunnel – Large Diameter The Tunneling Company

Utility Locating Brandt Tractor Ltd.

Vacuum Excavating Brandt Tractor Ltd. Mar-Tech Underground Services Ltd.

Video Inspection ABC Pipe Cleaning Services Ltd. Mar-Tech Underground Services Ltd

By Company Name

ABC Pipe Cleaning Services Ltd.

Walnut Grove, PO Box 32042, Langley, BC V1M 2M3 www.abcpipecleaning.com video@abcpipecleaning.com 604-888-2618 or 800-565-5570

Video, lateral, and manhole inspection; flush/vacuum; hydro excavation; chemical grouting; pigging; pressure testing; PVC rerounding; decommission; lateral/spot lining.



Akkerman

24749 600th Ave., Brownsdale, MN 55918 www.akkerman.com Contact: Akkerman Sales sales@akkerman.com 800-533-0386

Established in 1973, Akkerman develops, manufactures and supports advanced pipe jacking and tunneling solutions that accurately install a variety of underground infrastructure.



R.F. Binnie & Associates Ltd.

205-4946 Canada Way, Burnaby, BC V5G 4H7 www.binnie.com Contact: John Kupskay, P.Eng. JKupskay@binnie.com

778-945-6160

We can help you understand the condition of your buried pipelines, and how to rehabilitate and prolong their service life.



Brandt Tractor Ltd.

Hwy#1 East, PO Box 3856, Regina, SK S4P 3R8 www.brandt.ca Contact: Van Wall vwall@brandt.ca

780-577-3773

Brandt Tractor features a full line of Ditch Witch, Hammerhead and Deere equipment to meet all your construction needs.



LMK Technologies

manholes.

1779 Chessie Lane, Ottawa, IL 61350 www.lmktechnologies.com Contact: Pete Dannenberg info@lmktechnologies.com 815-640-9302

LMK is recognized by many municipalities and engineering firms as the innovative leader for the trenchless renewal of sewer laterals, mainlines and

The Langley Concrete Group

20152 Logan Avenue, Langley, BC V3A 4L6 www.langleyconcretegroup.com info@langleyconcretegroup.com 604-533-1656 or 1-800-667-9600

The Langley Concrete Group produces a variety of dry and wet cast concrete drainage products for the construction of underground infrastructure.



Mar-Tech Underground Services Ltd. 5166 272 Street, Langley, BC V6W 1S3 www.mar-tech.ca

604-888-2233 or 604-857-2200

Providing pipeline rehabilitation for all aspects of infrastructure maintenance in underground utilities. Considered as one of the "one call" companies in the industry.

Direct Horizontal Drilling

26318 Township Rd 531A, Acheson, AB T7X 5A3 www.directhorizontal.com Contact: Justin Hedemann justin.h@directhorizontal.com **403-269-4998** "Trenchless solutions from the sharpest minds in the business."

Earthworm Horizontal Drilling

Contact: Bob or Roland earthworm@shaw.ca 250-962-9682

Over 20 years of experience in the drilling industry, with meticulous planning and execution and reasonable pricing points.

Northern Lites Technology

Prince George, BC www.northernlitestechnology.ca 1-800-661-6177

A family run business since 1994, with expert staff to help you with cleaning, hydro excavation, inspection, and rehabilitation of underground pipes and service issues.



Opus International Consultants (Canada) Ltd.

210-889 Harbourside Drive, North Vancouver BC V7P 3S1 www.opusinternational.ca Contact: Gurjit Sangha Gurjit.Sangha@opusinternational.ca 604-990-4800

Services include: trenchless technologies, water, wastewater, infrastructure, asset management, transportation, environmental, survey.

Parsons Inc.

20152 Logan Avenue, Langley, BC V3A 4L6 www.parsons.com

604-438-5300 or 250-477-2206

A technology-driven engineering services firm with more than 70 years of experience in the engineering, construction, technical, and professional services industries.



PW Trenchless Construction Ltd. 11618 130 Street, Surrey, BC V3R 2Y3 www.pwtrenchless.com 604-580-0446

Trenchless pipe installation is 30% cheaper than traditional open cut, producing 90% less CO2 emissions and causing less disruption.



The Tunneling Company

10085 Dallas Drive, Kamloops, BC V2C 6T4 www.thecrossingcompany.com Contact: Nick Hyde nhyde@crossinggroup.com 250-573-7814

Industry leader in pipe ramming, auger boring, pilot tube method installations, and surface casing installation with experience in conventional tunneling and microtunneling.





NORTH AMERICAN SOCIETY FOR TRENCHLESS TECHNOLOGY

Pipe Bursting Good Practices Guidelines Manual

• Laterals Good Practices Guidelines Manual

 CIPP Good Practices Guidelines Manual

A PIPELINE OF TRENCHLESS RESOURCES

EDUCATE

BAIN

Horizonal Directional Dritting (HOD)

Introduction to Trenchless Technology Short Course

Cured In Place Pipe (CIPP)

NASTT'S No-Dig Show -Exhibits, Technical Program and Networking

0

Free Trenchless Webinar Series

> Herr Installation Methods

Pipe Bureling

PUBLISH Introduction to Trenchless Technology Rehabilitation Manual Introduction to Trenchless Technology New Installations Manual Horizontal Directional Drilling (HDD) Good Practices Guidelines Manual

RESEARCH

- Calculator
- Industry Partnerships

 NASTT's Carbon • World's Largest Online Trenchless Library

Scholarships

nastt.org

North American Society for Trenchless Technology 14500 Lorain Avenue #110063 • Cleveland, Ohio 44111 Phone: 216-570-8711

BOARD OF DIRECTORS

2017 NASTT-BC Board of Directors

CHAIR

Kieran Field, EIT Opus International Consultants (Canada) Ltd. 604-990-4800 Kieran.Field@opusinternational.ca

TREASURER

Preston Creelman, P.Eng. Royal Pipe Systems CreelmanP@royalbuildingproducts.com

DIRECTORS

Harry Dickinson The Tunneling Company hdickinson@crossinggroup.com

Michael Ireland Michels Canada Co. Mikelreland@michelscanada.com

> Karl Mueller, P.Eng. Keir Wood Leidal KMueller@kwl.ca

David Neveu, AScT WSP Global David.Neveu@wspgroup.com

David O'Sullivan (Past Chair) PW Trenchless Construction Inc. David@pwtrenchless.com

ABC PIPE CLEANING SERVICES LTD.



Video Inspection Lateral Inspection Manhole Inspection Flush / Vacuum Hydro Excavation Chemical Grouting Pigging Pressure testing Smoke Testing PVC Rerounding Decommission Lateral / Spot Lining



www.abcpipecleaning.com | video@abcpipecleaning.com Tel: (604) 888-2618 or (800) 565-5570 Walnut Grove PO Box 32042, Langley BC V1M 2M3





INDEX TO ADVERTISERS

ABC Pipe Cleaning Services Ltd. www.abcpipecleaning.com	
Akkerman Inc. www.akkerman.com	
Binnie www.binnie.com	13
Brandt Tractor www.brandt.ca	3
Direct Horizontal Drilling www.directhorizontal.com	IBC
Earthworm Horizontal Drilling Ltd. earthworm@shaw.ca	9
The Tunneling Company www.thecrossingcompany.com	OBC
The Langely Concrete Group www.langelyconcretegroup.com	
LMK Technologies www.lmktechnologies.com	7
Mar-Tech Underground Solutions Ltd. www.mar-tech.ca	IFC
Northern Lites Technology Ltd. www.northernlitestechnology.ca	9
Opus International Consultants (Canada) Ltd. www.opusinternational.ca	
Parsons Inc. www.parsons.com	
PW Trenchless Construction www.pwtrenchless.com	4

Please support the advertisers who have made this publication possible



ANY SIZE. ANY LENGTH. ANYWHERE.

Calgary (403) 269.4998 **Edmonton** (780) 960.6037 **www.directhorizontal.com**

Trenchless solutions from the sharpest minds in the business!



100

WE'VE EMERGED FROM 40 YEARS OF EXPERIENCE.

KAMLOOPS AUGERING & BORING LTD. IS NOW THE TUNNELING COMPANY



Since 1976, Kamloops Augering & Boring Ltd. has helped its clients advance through some of the most challenging terrain in the world. Our entire team will continue to

provide the experience, the expertise and technology that is central to your success - as *The Tunneling Company* - the newest member of The Crossing Group.



