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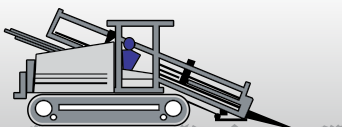
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1	Applications: Potable Water (Lead Free), Raw Water, Reclaimed Water, and Wastewater <i>References: AWWA C901, C906, C151, & NSF 61 + Health Effects of HDPE Pipes and Fittings for Potable Water Applications, NSF 2024</i>	✓	✓
2	Open Cut Construction: Design and install per AWWA Standards and Manuals eliminating thrust blocks <i>Ref: AWWA M55, M41 + MAB-3, MAB-6</i>	✓	✓
3	Trenchless Construction: Material of choice for HDD, Pipe Bursting, Sliplining, and Compression Fit <i>Ref: ASTM F585, F1962, F3508 + MAB-5, MAB-7, MAB-11</i>	✓	X
4	Fully Restrained Joint-Free System: Minimize need for fittings to facilitate horizontal and vertical deflections <i>Ref: AWWA M55, M41</i>	✓	X
5	Longevity & Corrosion: Pipes, Fittings, and Joints have the least potential for corrosion or tuberculation <i>References: Durability and Reliability of Large Diameter HDPE Pipe for Water Main Applications, EPA/WRF/WERF 2025 + Critical Need for Corrosion Management in the Water Treatment Sector, NACE 2019 + PPIPACE.com + Long-Term Aging of Polyethylene Pipes, UKWIR 2020</i>	✓	X
6	Flow Capacity: New pipes have similar flow capacity per AWWA Standards and Manuals <i>References: AWWA M55, M41 and PPIPACE.com</i>	✓	✓
7	Water & Energy Conservation: Fused Joints have zero allowable water leakage and zero infiltration <i>References: AWWA M55, M41 + ASTM F2620, F3190, F3565 and MAB-1, MAB-2, MAB-8</i>	✓	X
8	Cost Effective: Has the lowest initial cost, lowest life cycle cost, and lowest restoration cost for trenchless installations <i>References: Life Cycle Analysis of Water Networks, CSIRO 2008 + Annual Drinking Water Quality Report for 2014, Kittery Water District, 5/31/15</i>	✓	X
9	Resilient: Ability to resist water hammer and ground movements due to droughts, freeze/thaw, earthquakes and hurricanes with the ability for flow control and squeeze off <i>References: Recent Earthquakes: Implications for U.S. Water Utilities, WRF 2012 + Polyethylene Pipeline Performance Against Earthquake, Kubota 2018 and MAB-9, MAB-10</i>	✓	X
10	Permeation/BTEX: Pipes and elastomeric joints need to be properly engineered for contaminated conditions <i>References: AWWA C901/C906 and C111/C151, Sec. 4</i>	X	X



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TEN YEARS OF TRENCHLESS TECHNOLOGY GROWTH & SUCCESS IN THE NORTHEAST

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MESSAGE FROM NASTT-NE CHAIR

Charlie Tripp, P.E., BC.PLW, NASTT-NE Chair

Welcome to the 20th edition of the *Northeast Journal of Trenchless Technology Practices!* I appreciate you taking the time to dive into this publication and explore the work our Chapter has assembled. Producing this journal is truly a team effort, and I want to recognize the volunteers and contributors who make it possible – along with our Publisher, who consistently delivers a polished and engaging final product. I hope you find the articles in this issue both practical and thought-provoking as you navigate your day-to-day work.

As you read through this edition, you’ll notice a common thread: the continued evolution and value of trenchless technologies across our industry. The authors featured here bring not only technical expertise, but also a genuine enthusiasm for advancing our field. Their contributions reflect a shared commitment to innovation, collaboration, and the long-term success of trenchless solutions in the Northeast and beyond.

2025 NASTT-NE Conference Recap

Our annual conference remains a cornerstone event for the Northeast trenchless community, bringing together professionals from across the region to share knowledge and connect. The 2025 conference in Nashua, New Hampshire was a great example of that continued success, featuring strong attendance, multiple technical tracks, a robust exhibitor presence, and engaging live

.....
“PRODUCING THIS JOURNAL IS TRULY A TEAM EFFORT.”
.....

demonstrations. Events like this reinforce the strength and momentum of our Chapter (see pgs 26 - 30).

2026 NASTT-NE Conference Preview

Planning is already underway for this year’s conference, which will take place at the Saratoga Hilton in Saratoga Springs, New York. We’re excited about what’s ahead and encourage you to stay tuned for additional details in the coming months. As always, we welcome your participation – particularly through our upcoming Call for Papers, expected early this summer. Your insights and project experiences are what make this event valuable for everyone involved! (see pg 31).

.....
“OUR ANNUAL CONFERENCE REMAINS A CORNERSTONE EVENT.”
.....

NASTT NEC Updates:

This year also marks a transition in Chapter leadership. I’d like to thank Jonathan Kunay for his dedicated service as Chair over the past two years; his leadership has helped position the Chapter for continued success.

As I step into this role, I’m looking forward to working alongside our Board to build on that foundation – expanding engagement, strengthening connections within our industry, and continuing to promote trenchless technologies throughout the region.

We’ve also implemented our regular leadership rotation to bring fresh perspectives to the Executive Committee. Tom Loyer now serves as Vice Chair, Nick Strater as Treasurer, and Sam Wilbur as Secretary. I encourage you to review the full listing of our Board and Committee members included in this publication.

Thank you again for being part of the NASTT Northeast Chapter community. Staying informed and engaged is essential in an industry that continues to evolve as rapidly as ours. I hope you enjoy this issue, and I look forward to connecting with many of you at our upcoming events – especially in Saratoga later this year.

Wishing you a productive and enjoyable summer!

Charlie Tripp

Charlie Tripp, P.E., BC.PLW
Chair, NASTT-NE

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MESSAGE FROM NASTT CHAIR

Greg Tippett, P.Eng., NASTT Chair

Dear Northeast Members & Supporters,

As Chair of the Board for NASTT, it is my great pleasure to congratulate the Northeast Chapter on celebrating its 10th anniversary as an official NASTT Regional Chapter.

Over the past decade, the Northeast Chapter has become a shining example of what strong regional engagement can accomplish. Through dedicated leadership, passionate volunteers, and an unwavering commitment to advancing trenchless technology, the Chapter has built an incredible foundation that continues to strengthen the trenchless community throughout the region.

One of the Northeast Chapter's greatest strengths has always been its people. The volunteer base supporting this Chapter is truly remarkable. From organizing educational opportunities and technical programming to supporting networking events and industry outreach, your volunteers consistently go above and beyond to create meaningful experiences for members and industry professionals alike. The energy, professionalism, and collaboration demonstrated by this Chapter have made a lasting impact not only in the Northeast region, but across the broader NASTT community.

Regional Chapters play an essential role in fulfilling NASTT's mission to promote education, innovation, and awareness of trenchless technology. The Northeast Chapter has embraced that

.....
“YOUR DEDICATION, TIME, AND ENTHUSIASM ARE DEEPLY APPRECIATED!”
.....

mission wholeheartedly over the last ten years by delivering high-quality events, fostering valuable industry connections, and creating opportunities for knowledge sharing at the local level. Your efforts continue to help advance trenchless solutions that improve infrastructure while reducing disruption to communities.

As we celebrate this milestone anniversary, there is also much to look forward to. I encourage members and industry professionals to join the Northeast Chapter this fall for the upcoming Regional Chapter Conference taking place November 9–10 in Saratoga Springs, New York. Events like these are a testament to the Chapter's ongoing commitment to education and engagement, and they continue to provide valuable opportunities for learning, collaboration, and professional growth.

I would also encourage everyone to plan to attend NASTT 2026 No-Dig North

conference, taking place November 2–4 in Calgary, Alberta. No-Dig North continues to bring together trenchless professionals from across North America and beyond to share technical expertise, explore emerging technologies, and strengthen industry relationships. The support and participation of Regional Chapters like the Northeast Chapter help make these events such a success year after year.

On behalf of the NASTT Board of Directors, thank you to every volunteer, leader, committee member, speaker, sponsor, and supporter who has contributed to the Northeast Chapter's success over the last ten years. Your dedication, time, and enthusiasm are deeply appreciated. Volunteer-driven organizations thrive because of individuals who are willing to step forward, share their expertise, and invest in the future of the industry. The Northeast Chapter is clearly built on that spirit of commitment and collaboration.

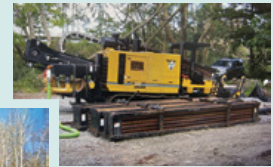
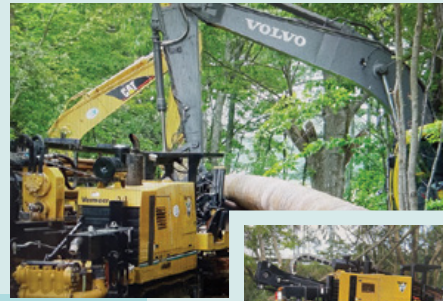
Congratulations again on this important anniversary milestone. We are grateful for all that the Northeast Chapter has accomplished and excited to see what the next decade will bring.

Greg Tippett

Greg Tippett, P.Eng.
NASTT Board of Directors Chair



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NASTT-NE BOARD 2026-2027 EXECUTIVE COMMITTEE



CHAIR
CHARLES TRIPP, P.E., BC.PLW
HDR Inc.
charlie.tripp@hdrinc.com

Charles Tripp, P.E., BC.PLW is a Pipeline Rehabilitation Technical Lead at HDR in Boston, MA. He has 20 years of experience working as a manager, technical lead, and design engineer on a variety of trenchless projects including pipeline rehabilitation, condition assessment, risk modeling, and general asset management.

Charlie was first introduced to trenchless technologies through his involvement in multiple sanitary sewer rehabilitation projects. He also briefly served as a Field Engineer for a world leading CIPP construction company. This experience provided a wealth of exposure and instilled a desire to pursue and advocate for the use of trenchless technologies in projects as a way of mitigating the impacts of excavation in urbanized areas, but also as a means of cost-effective design.

Charlie studied Civil Engineering at the University of Massachusetts Amherst earning his B.S. and went on to receive his M.S. in Environmental Engineering from the Worcester Polytechnic Institute. He is a licensed professional engineer across New England and the Tri-State area, PACP/MACP/LACP certified by NASSCO, and a Board-Certified Pipeline Engineer-Water (BC.PLW) by ASCE.

As Chair of the Northeast Chapter of NASTT, a past recipient of the Trent J. Ralston Young Trenchless Achievement Award, and a qualified NASTT CIPP Good Practices Instructor, Charlie continues to capitalize on his devotion to trenchless technologies and in advocating for its use in the local construction market.



VICE CHAIR
TOM LOYER
ECI – ENGINEERS
CONSTRUCTION INC.
tom@ecivt.com

Tom Loyer serves as the Vice President of the Trenchless Technologies Division at Engineers Construction Inc. (ECI) in Williston, VT, where he leads operations in directional drilling, pipe ramming, auger boring, tunneling, and pipe bursting. Since joining ECI in 2011, Tom has been instrumental in advancing underground utility construction projects and driving business development initiatives. Previously, he owned Trenchless Technologies of New England, Inc., pioneering underground utility installations and introducing pipe ramming technology to the Northeast.

Tom's expertise has been highlighted in numerous industry publications, and he has presented at national conferences, further demonstrating his influence in the field.

Beyond his professional accomplishments, Tom is deeply involved in the community. He has served on several boards, including The Associated General Contractors of Vermont as the chairman of the legislative committee and held a position on the board of directors, and as a trustee for the Fraternal Order of Eagle Aerie # 793 as well as volunteering with Shelburne Little League, CSB Youth Hockey, and the CVU Football Boosters Board.

Since 2011, Tom has been the President of The Classic Mike Loyer Foundation, a non-profit, whose primary mission is to assist Vermont families who are dealing with the accidental worksite death of a loved one.

Tom studied business at Champlain College and continues to lead and innovate in the utility construction industry, drawing on his experience and dedication to excellence. Tom, and his wife, Lori, live in Shelburne, VT.

NASTT-NE BOARD 2026-2027 EXECUTIVE COMMITTEE



TREASURER
NICK STRATER
BRIERLEY ASSOCIATES
nstrater@brierleyassociates.com

Nick Strater, P.G. has over 30 years of design and consulting experience, focusing on trenchless applications throughout the United States, Canada and South America. His specialties include geotechnical characterization, feasibility and risk assessments, detailed design, construction management and forensic evaluation. Nick serves Brierley Associates' Trenchless Sector Lead.

Mr. Strater is a frequent invited lecturer on the topics of trenchless method selection, geotechnical characterization and risk management. He has authored over 25 technical papers on these topics and received the NASTT Outstanding Paper Award in 2020. Nick also represents the industry on multiple ASCE committees and was one of the principal authors on multiple ASCE/ Utility Engineering and Surveying Institute (UESI) Manuals of Practice, including *Pilot Tube and Other Guided Boring Methods (MOP No. 133)*, *Horizontal Auger Boring (Jack and Bore) Projects (MOP No. 106)*, and *Direct Steerable Pipe Thrusting (MOP 155)*.

Nick is passionate about the application of trenchless methods for the purpose of infrastructure expansion and improvement, and recognizes the importance of research, development and continuing education in this expanding arena.



SECRETARY
SAM WILBUR
DELVE UNDERGROUND
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Sam Wilbur, P.E. is a consulting engineer with Delve Underground in Burlington, MA. Over the course of his career in the underground industry, Sam has worked on major tunneling and trenchless projects throughout the United States. He has been involved in projects for clients such as City and Borough of Sitka Alaska; DC Water; Eversource; the Massachusetts Water Resource Authority; the Narragansett Bay Commission; New York City Department of Environmental Protection; the New York State Department of Environmental Conservation; NYC Department of Design and Construction; Nassau County; and the US Army Corps of Engineers.

For the past thirteen years, Sam has focused on trenchless construction management, design and construction of transit, water and wastewater projects, and tunnel and conveyance design projects. He has worked on various pipeline projects utilizing auger boring, microtunneling, pilot-tube guided boring, pipe jacking, sliplining, tunnel boring machines, and rehabilitation methods.

Sam has a Bachelor of Science in Civil Engineering and a Minor in Applied Mathematics from the University of Colorado. He is a licensed professional engineer in New Hampshire. Sam recognizes the importance of the NASTT NE Chapter in its promotion of the rapidly growing trenchless design and construction methods in the United States. One of Sam's goals as a young professional is to engage his peers in the NASTT NE Chapter to become involved in the trenchless industry early in their careers.



The advertisement features a dark background with a pattern of overlapping pipe sections. In the top left corner is the logo for the HDPE Municipal Advisory Board, which consists of a stylized 'H' made of vertical bars in various colors. In the top right corner is the logo for the Plastics Pipe Institute (PPI), featuring a stylized 'PPI' with a circular graphic element. The main text in the center reads "Your Video Library Resource" in a large, white, serif font, followed by "HDPE Installation Reports from the Field" in a smaller, white, sans-serif font. Below this text is the phrase "Find out more:" followed by a square QR code. At the bottom left, there is a small copyright notice: "© 2024 Plastics Pipe Institute, Inc."

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PAST CHAIR
JONATHAN KUNAY. P.E. PMP
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Jonathan Kunay, PE, PMP is an Associate Engineer and Conveyance Discipline Leader for CDM Smith in Boston, MA. He has more than 23 years of experience working as a design engineer, project manager and technical specialist on a variety of trenchless projects including infrastructure assessment with traditional and state-of-the-art investigative techniques, rehabilitation using CIPP, CCCP, HDD, microtunneling and pipe bursting, facilities and master planning, leak detection of water distribution systems, enterprise asset management and risk/criticality studies.

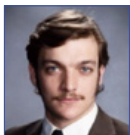
While trenchless technologies have been his primary focus over the past 19 years, he has also worked on civil site design for commercial developments and municipalities, navigated Consent Order driven long-term programs, designed new pumping stations and water distribution systems, and developed alternatives

for sewer separation projects. Jonathan is based in New England; however, his diverse project experience has brought him many places to experience unique perspectives in the trenchless marketplace. He has worked on trenchless projects all over the United States including Arizona, California, Texas, Illinois, Tennessee, Louisiana, South Carolina, Nebraska, Virginia, Florida and Georgia. He has also implemented trenchless projects and programs internationally in the Middle East, China, South America, the Pacific Islands, Japan and Europe.

Jonathan was the project manager and design engineer responsible for helping to bring service lateral lining into the New England market in 2008 as part of a comprehensive sewer system rehabilitation program. This comprehensive model has now been adopted across the country as a proven methodology by which infiltration and inflow can be removed in large quantities from the sewer collection system. This comprehensive approach has been presented at conferences to showcase the validity of utilizing a holistic trenchless methodology when large percentages of I/I by volume must be eliminated.

Jonathan has a Bachelor of Civil Engineering and a Minor in Environmental Engineering from the University of Cincinnati, is involved in multiple committees in the National Association of Sewer Service Companies (NASSCO), is PACP, MACP and LACP certified, and is the Chair of the WEFTEC Collection Systems Symposia.

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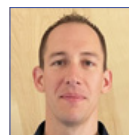
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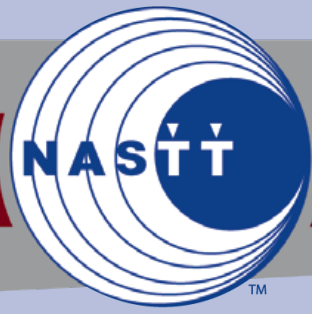
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PRECISION IN HARD ROCK

Telescoping, Horizontal Down-the-Hole (DTH) Hammer Bore for 405-Foot Gravity-Sewer Installation

By: Robert Titanic, Bortech Company Inc.

PROJECT OVERVIEW

Southampton, Bucks County, PA – November 10 to December 17, 2025

In the challenging geology of southeastern Pennsylvania – where competent granitic gneiss dominates the subsurface – conventional trenchless methods can face significant limitations. For the Buck Road Bridge Water and Sewer Main Relocation project, the Northampton Bucks County Municipal Authority required the installation of 405 linear feet of 24-inch steel casing to house an 8-inch gravity sanitary sewer main. The alignment paralleled Mill Creek within a constrained easement and required strict hydraulic tolerances to maintain positive gravity flow.



The bore alignment paralleled Mill Creek within a constrained easement, limiting construction access that eliminated conventional open-cut installation

Bortech Company, Inc. was selected to perform the work using the Horizontal Hammer Hammer Bore (HHB) method. This endeavor illustrates how project-specific engineering, conservative tooling assumptions, and telescoping installation techniques can successfully extend DTH applications in hard rock environments.



Subsurface conditions consisted of highly competent granitic gneiss with elevated abrasivity throughout the alignment



Rock outcrop along the borepath

GEOTECHNICAL CONTEXT

Subsurface investigations confirmed that the bore alignment was entirely within white-to-gray-pink granitic gneiss. The rock exhibited:

- High recovery values (of 86 - 100 percent)
- Rock Quality Designation (RQD) values of 77-100 percent
- Minor quartz veining
- Close-to-moderate horizontal fracturing

Auger refusal occurred consistently between approximately 13 and 30 feet, and drilling rates slowed significantly once competent bedrock was encountered.



Competent hard rock and elevated abrasivity created conditions where conventional trenchless methods presented increased operational and tooling challenges

These conditions were favorable for DTH hammer boring but presented a key challenge: **accelerated tooling wear due to abrasivity.**

PRODUCTION CHARACTERISTICS AND TOOLING CONSTRAINTS

Penetration rates averaged between 8 and 11 feet per hour, consistent with strong, abrasive rock formations. Based on these conditions, Bortech determined that a single 24-inch ring bit would reach its conservative factor-of-safety limit at approximately 250 linear feet of drilling.



24-inch ring bit - key challenge was accelerated tooling wear from hard and abrasive rock requiring conservative tooling assumptions

While industry benchmarks often assume approximately 300 feet of service life in hard rock, for a ring bit, Bortech's experience in similar rock formations agreed with the 250-foot distance set forth in the project specifications.



To remain within tooling limits a telescoping approach was implemented

TELESCOPING INSTALLATION METHODOLOGY

To achieve the required 405-foot installation while remaining within tooling limits, a telescoping approach was specified in the project specifications and implemented by Bortech.

Stage 1 – 36-inch Installation (First 160 Feet)

Using a horizontal DTH hammer system with an overburden pilot and ring-bit assembly, a 36-inch steel casing was advanced approximately 160 feet.

A 36-inch project-specific starter casing was engineered and fabricated at Bortech's



The 36-inch starter casing was precision-positioned to establish initial line and grade control for the telescoping installation

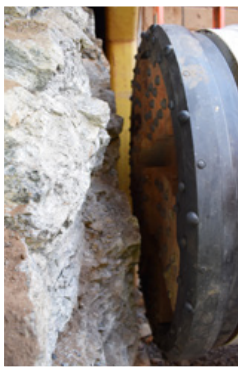
East Coast New York facility to control line and grade at launch. During advancement, the hammer's percussive action fractured the rock while air augers conveyed spoil back to the launch shaft.

Stage 2 – Tool Retrieval and Transition

At approximately 160 feet, the downhole assembly – including pilot bit, hammer, shock sub, and augers – was removed, leaving the 36-inch ring bit in place at the bore face.



Removal of the downhole hammer assembly following completion of the initial 36-inch telescoping phase



Ring and Pilot Bit in place at the bore face

A Bortech-designed centralizing system was then installed within the 36-inch casing to guide the subsequent installation and maintain the proper alignment.

Stage 3 – 24-inch Final Installation (Remaining 245 Feet)

A 24-inch starter casing modified by Bortech at its East Coast New York facility – was inserted through the centralizing system, which was used to ensure precise tracking. This allowed the 24-inch ring bit to pass through the stationary 36-inch ring bit while maintaining strict line and grade tolerances. A 14-inch class DTH hammer advanced the remaining casing segments through the predrilled alignment.



A project-specific centralizing system guided the 24-inch casing through the predrilled alignment while maintaining strict line and grade tolerances

The centralizing system ensured precise tracking and allowed the 24-inch ring bit to pass through the stationary 36-inch ring bit while maintaining strict line and grade tolerances.

SCALABILITY OF TELESCOPING METHODOLOGY

The telescoping approach not only addressed tooling limitations on this project but also demonstrates the scalability of horizontal DTH hammer boring in hard rock environments.

Based on Bortech’s experience and their means and methods, a **single telescoping phase** can achieve bore lengths on the order of **500 feet** in competent rock formations while maintaining controlled alignment and predictable tooling performance.

When project conditions, tolerances, and staging allow, the incorporation of a **second telescoping phase** can extend achievable bore lengths to approximately **750 feet** in similar hard rock conditions.

The ability to extend to these lengths depends on several factors including the level of rock abrasivity, alignment tolerances, casing straightness, and overall system design. However, the telescoping method provides a practical and repeatable framework for extending DTH installations beyond conventional limits while maintaining production efficiency and line-and-grade control.

LINE AND GRADE CONTROL

Strict adherence to line and grade was required to maintain gravity sewer performance. Project tolerances required a slope of 2.092 percent to 2.90 percent and horizontal deviation of ≤ 1 percent.

To meet these requirements, Bortech engineered and fabricated a project-specific custom starter casing system at its East Coast New York facility to eliminate reliance on any assumed “drop” angle at launch – a common industry practice in horizontal hammer boring.

Instead, establishing and maintaining alignment mechanically and geometrically from the outset allowed the bore to track as predicted within the specified envelope tolerance throughout the installation.

OPERATIONAL HIGHLIGHTS

- **Launch Pit:** 59 feet long x 43 feet clear span to allow for 40-foot casing segments where 39 feet would allow for 20-foot segments, extending 3.5 feet below casing invert
- **Spoil Removal:** Rock dust conveyed via air and removed using hydrovac excavation
- **Dust Control:** Water injected into the downhole air stream to suppress airborne particulates
- **Operation:** Fully radio-remote controlled from surface
- **Safety:** No personnel exposure within the bore; no thrust wall required
- **Schedule:** Completed within a five-week installation window

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RESULTS

The 405-foot installation was completed:

- On line
- On grade
- Within schedule
- Within budget

Upon breakthrough, the ring bit exhibited wear consistent with pre-construction projections, validating the conservative engineering assumptions. The 8-inch gravity sewer carrier pipe was subsequently installed without issue.

These outcomes also highlight broader considerations in trenchless method selection for hard rock environments.

COMPARATIVE PERFORMANCE AND METHOD SELECTION

While microtunneling remains the preferred trenchless method for installations requiring continuous real-time steering and extremely tight line and grade tolerances, the competent granitic gneiss conditions anticipated on the Buck Road Bridge project presented potential challenges related to cutterhead wear, intervention requirements, operational complexity, and overall installation cost. It is worth noting that with Microtunneling, the smallest diameter that allows for face access to change cutters is 60 inches in diameter. These project-specific considerations prompted the design engineer to evaluate alternative trenchless methods capable of maintaining the required tolerance envelope while improving production efficiency and schedule predictability in the hard rock formation, which ultimately led to the bid documents recommending the use of horizontal DTH hammer boring methodology.

In contrast, horizontal DTH hammer boring directly applies high-frequency percussive energy to the rock face, enabling consistent penetration rates in strong formations. On this project, production rates of approximately 8 to 11 feet per hour were achieved in granitic gneiss, reflecting efficient energy transfer and minimal sensitivity to ground variability.

Where project design allows for a defined tolerance envelope – rather than

continuous real-time steering corrections – the DTH method offers several advantages:

- **Increased production rates in competent rock formations**
- **Reduced tooling complexity compared to cutterhead systems**
- **More predictable performance requiring fewer interventions**
- **Simplified operation with lower sensitivity to geological variability**

As a result, many hard-ground utility tunnel installations that do not require

.....
“INCREASED PRODUCTION RATES IN COMPETENT ROCK FORMATIONS.”
.....

microtunneling-level precision can be successfully completed using DTH hammer boring while realizing:

- **Cost savings due to reduced equipment and support systems**

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The 24-inch starter casing (ring bit removed) advanced through the centralizing system and exited within the project's required line and grade tolerances

- **Improved schedule certainty driven by consistent production rates**
 - **Operational efficiency through simplified means and methods**
- Where design tolerances permit

a controlled installation envelope rather than continuous precision steering, horizontal DTH hammer boring provides a highly efficient and predictable alternative for hard rock tunneling.

KEY ENGINEERING CONSIDERATIONS

This project reflects a set of engineering principles and practices that were developed and refined through extensive experience in horizontal DTH hammer boring across a wide range of ground conditions.

- Conservative tooling assumptions are essential in abrasive formations to maintain predictable performance and avoid unplanned interruptions
- Telescoping installation methods provide a scalable solution for extending bore lengths beyond conventional limits while maintaining control
- Starter casing design and fabrication are critical to achieving and maintaining precise line and grade, particularly for gravity installations
- Centralization systems must be engineered for each application to ensure alignment when transitioning between casing diameters

These considerations form the basis of a repeatable and reliable approach to executing horizontal DTH hammer bore installations in competent rock environments.



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Since 2004, Bortech Company, Inc. has completed a significant number of horizontal hammer-bore utility tunnels in a wide range of ground conditions, ranging from 4-inch to 54-inch installations in boulder, cobble, hard rock, blasted fill, and mixed-face environments.

.....
**“THE DTH METHOD
 OFFERS SEVERAL
 ADVANTAGES.”**

CONCLUSION

This installation demonstrates that horizontal DTH hammer boring, when supported by project-specific engineering and controlled execution, can successfully deliver long-distance trenchless installations in highly competent rock formations.

The telescoping methodology provided a practical solution for extending bore length while maintaining strict line and grade tolerances—offering a viable alternative for similar hard rock utility crossings.

Bortech acknowledges the Northampton Bucks County Municipal Authority, Pennoni Associates, and the general contractor for their collaborative approach throughout the project. The result was a high-precision gravity sewer installation completed safely, on schedule, and within budget in ground conditions that would have challenged many conventional trenchless methods.

For contractors facing similar hard-rock utility crossings, telescoping DTH hammer boring presents a proven, low-risk alternative capable of maintaining line and grade while achieving consistent production in competent formations.

ABOUT THE AUTHOR:



Robert Titanic is founder and CEO of BORTECH, he continues to develop evolving means and methods that result in real solutions when installing underground utility tunnels in complex and varying underground lithology.

Robert has spent more than 30 years developing trenchless installation methodologies for complex underground utility crossings in varying geologic conditions.

His work has focused on advancing practical trenchless solutions that improve constructability, safety, and reliability in challenging ground conditions. He continues to enjoy the industry and the hard working people who are committed to more innovative, reliable, environmentally responsible and safer approaches to constructing underground utility infrastructure.



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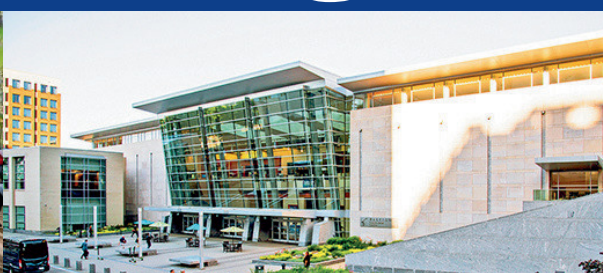
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UMASS LOWELL REPORT

SPRING/2026



From the Classroom to the Exhibit Hall:

UMASS LOWELL STUDENT CHAPTER TRIP TO NASTT 2026 NO-DIG SHOW

March 29 – April 2 PALM SPRINGS CA



With generous support from the NASTT-NE Chapter, and from NASTT, five students from the UMass Lowell NASTT Student Chapter traveled all the way across the country to take in all the networking and learning offered at the **NASTT 2026 NO-DIG SHOW** March 29 – April 2 in Palm Springs CA. In the words of student chapter member Charles Kihumuro:

“For the first time, I had the privilege of attending as a student, an experience that proved to be far more than a line on a resume. Over the course of three days, I was immersed in a world of advanced infrastructure innovation. I was surrounded by engineers, researchers, contractors, and industry leaders who are shaping the future of underground construction and rehabilitation. The No-Dig Show is the premier trenchless technology conference in North America, drawing professionals and students from across the continent. For a civil engineering student with a growing passion for underground infrastructure, it was nothing short of a defining experience.”

Faculty Advisor Dr. Raj K. Gondle and NASTT Education Manager Kari Webb, provided guidance and support for the students’ learning opportunity. As Kari Webb observed:



“While attending the 2026 No-Dig Show, I had the opportunity to watch our students fully immerse themselves in the trenchless industry and embrace every aspect of the conference experience. They displayed curiosity and enthusiasm as they explored the exhibit hall, participated in technical sessions, and built meaningful professional connections. I look forward to seeing the impact they will make as they continue expanding their knowledge base and advancing their careers in this evolving industry!”

The UMass Lowell NASTT Student Chapter remains committed to recruiting students passionate about trenchless technology, putting them into real world practical situations, and networking with industry leaders, who are also potential future employers of these rising trenchless stars!



UML Student Chapter members at the Terracon tradeshow booth during the NASTT 2026 No-Dig Show in Palm Springs (from l to r): Prof. Raj Gondle, Faculty Advisor, Jason Magulu, Godwin Akumu, Current Student President, Karla Cuarezma, first Student Chapter President, now at City of Somerville, Dennis Doherty, Industry Advisor – Terracon Consultants, Charles Kihumuro, Matthews DeSouza, Mike Willmets, former NASTT Executive Director

ABOUT THE FACULTY ADVISOR:



Dr. Raj K. Gondle is an Associate Teaching Professor and Associate Chair for Undergraduate Studies in the Department of Civil and Environmental Engineering at UMass Lowell (UML). He serves as a faculty advisor for the NASTT Student Chapter. In recognition of his exceptional dedication to student mentorship, Prof. Gondle received the 2026 UML Award for Excellence in Mentoring Students. To his students, he is a trusted mentor, advocate, and source of constant guidance and support.



Jason Magulu

“A TREASURE TROVE OF PRACTICAL EXPERIENCE”

Attending for the first time as a student, I expected a valuable technical learning experience; however, the event quickly proved to be far more comprehensive than I’d anticipated.

Whether you’re an experienced engineer or fresh to the field, the NASTT No-Dig Show is a transformative experience to say the least. In contact with and surrounded by engineers, contractors, researchers, and industry leaders who actively shape the future of construction – I experienced the world of civil engineering firsthand before even actually stepping into the workforce. One can only imagine the copious amounts of knowledge and expertise that surrounded me. For me, it was akin to a blacksmith and a furnace – refining what I already know and building onto it. This experience made it clear that engineering extends far beyond the classroom.

The technical sessions were not simply confined to the surface of trenchless technology as you hear it but rather dig deep into detail about every aspect. From HDDs to Pipelines, Micro tunneling to Sewer Rehabilitation, condition & risk assessment to stormwater management and project planning. No trenchless field is out of reach. And each session is a technical, and more importantly practical, gateway into a particular field of study in the trenchless world.

One concept I found rather intriguing was the application of trenchless technologies to underground electric power systems. While undergrounding power lines improves resilience against environmental disruptions, it also introduces new challenges in maintenance and fault detection. Unlike overhead systems, where failures are often visible, underground systems require more advanced methods to locate issues, creating a tradeoff between reliability and maintainability. This reinforces a broader reality within engineering: solutions are rarely absolute, and effectiveness depends on how well competing factors are balanced rather than how fully a single objective is optimized.

The exhibit hall was what I’d call the young civil engineer’s dream come to life. All the knowledge and structures and machines talked about in the technical sessions were no longer just words but were now live in front of you. The room was filled to the brim with exhibitors that were excited to take only one thing from you. Your attention. So that they could share their work and story with you. And these weren’t just exhibitor

“THE YOUNG CIVIL ENGINEER’S DREAM COME TO LIFE ...”



UMass Lowell NASTT Student Chapter members joining students from the Mexico Student Chapter

staff alone, along with many of them were executive company members: vice presidents and presidents of the companies, that want to interact with you regardless of age or experience. Each booth offered a different take and approach on a field and its challenges even while they were in the same aspect of trenchless. Engaging directly with professionals allowed me to move beyond simply understanding how technologies work, toward understanding how they are evaluated, selected, and applied within real projects. In essence, it’s a treasure trove of practical experience and naturally, of connections.

Engineering is inherently collaborative – not just in the systems we design, but also in the way we grow within the field. Progress is rarely achieved in isolation; individual capability has its limits, but collective effort allows you to grow faster, reach further, and create greater impact. The presence of a strong network not only accelerates personal development but also creates opportunities to contribute to the growth of others. Often, for something stronger to be built, parts must first be rethought, refined, and rebuilt. And as engineers, we do more than build structures – we build each other.



Matthews DeSouza

“BRIDGING THE GAP BETWEEN ACADEMIC KNOWLEDGE AND REAL-WORLD APPLICATIONS”

The NASTT No-Dig Show gave students the opportunity to learn both technical and professional aspects of trenchless engineering. The conference covered a wide range of trenchless technologies, provided real-life applications of engineering concepts, and allowed us to connect with industry professionals as well as other students. As a civil engineering student focusing on geotechnical engineering and underground infrastructure, this event was highly relevant to my academic and career interests.

Trenchless technologies are becoming increasingly important in modern civil engineering due to the challenges associated with aging infrastructure and urban development. As cities continue to grow and underground systems deteriorate, engineers must design solutions to rehabilitate and install infrastructure while minimizing disruption to surrounding communities. Through this event, I was able to see how these technologies are applied in practice to create efficient and sustainable underground construction solutions.

One of my first experiences at the conference was attending a North American Society for Trenchless Technology Northeast Chapter meeting. This provided a unique opportunity to understand how professionals engage beyond technical work. During the meeting, I observed how decisions are made, how discussions are structured, and how professionals collaborate to plan future initiatives. This experience gave me valuable insight into the leadership and organizational aspects of the industry, which are not always emphasized in academic settings.

The technical sessions emphasized the importance of understanding subsurface conditions, including soil behavior and groundwater, as these factors directly affect the performance and safety of trenchless operations. They also highlighted the role of proper planning, alignment control, and equipment selection in successful project execution. Overall, the conference reinforced that trenchless engineering requires a combination of methods tailored to specific project conditions rather than relying on a single approach.

Another valuable component of the conference was the inclusion of case study presentations by PhD students. These sessions focused on research-based applications and provided a deeper understanding of the analytical and problem-solving processes involved in trenchless engineering. The presentations showed how advanced modeling and data analysis can improve

“I AM GRATEFUL FOR THE OPPORTUNITY”



Hearty breakfast before a busy day of technical sessions, networking and hands-on learning in the Exhibit Hall. UML Student Chapter joining Mexico Student Chapter with Dennis Doherty, Industry Advisor and Prof. Raj Gondle, UML Faculty Advisor.

both design and construction practices. These case studies helped connect academic research with real-world applications, offering a more complete perspective of the field.

The exhibition hall also provided valuable networking opportunities. Conversations with engineers, contractors, and vendors offered insight into how engineering decisions are made in practice and what day-to-day work looks like in this field. These interactions helped bridge the gap between academic knowledge and real-world applications.

Learning about different trenchless methods helped me think beyond design and consider how projects are actually constructed. It emphasized the importance of constructability and highlighted the challenges associated with underground work, particularly in urban environments. This understanding allowed us to develop a more practical and realistic design approach. This is an experience I will not forget, and I am grateful for the opportunity to have participated in it.



Aanya Bharti

“A BETTER UNDERSTANDING OF TRENCHLESS TECHNOLOGY”

Going into the No-Dig conference, I honestly didn't know exactly what to expect. I had a general idea of trenchless technology from class, but being there in person made everything feel a lot more real. It wasn't just concepts anymore, it was actual people, companies, and technologies being used in the field. Overall, the experience helped me understand how big this industry really is and how many different areas connect to it.

One of the biggest things I noticed from the presentations was how focused everything is on efficiency and minimizing disruption. A lot of the talks emphasized how trenchless methods allow work to be done underground without tearing everything up above ground. That sounds simple, but hearing real examples made me realize how important that is for cities, traffic, and even the environment.

Something that stood out to me personally was how much technology and data are becoming part of this field. There were discussions about AI and data-driven platforms being used to manage infrastructure. As someone studying computer science, this really caught my attention.

I didn't expect to see such a strong connection between software and something like underground pipelines, but it actually makes a lot of sense. You need data to understand conditions, predict problems, and make decisions.

Another theme I kept seeing was inspection and maintenance. A lot of presentations talked about how important it is to catch issues early instead of waiting for something to fail. There are so many tools now for inspecting pipes, monitoring conditions, and analyzing data. It made me realize that infrastructure isn't just about building things, it's also about constantly maintaining and improving them.

The networking part of the conference was probably the most interesting for me. Talking to people directly made everything feel more practical and less abstract. Even though my notes are a little messy, I had some really good conversations.

One of the cooler conversations I had was with a company that works with inspection cameras. They explained how cameras are used inside pipes to see what's going on. It sounds simple, but it's actually a huge part of how data is collected and analyzed in this field.

Looking back, one of the biggest things I took away from this experience is how interdisciplinary this field is. Before this, I thought of infrastructure as mostly civil engineering, but now I

“HELPED ME UNDERSTAND HOW BIG THIS INDUSTRY REALLY IS”

see that it involves software, data, materials science, and more. There are so many different roles, and they all work together.

Overall, I'm really glad I got to attend No-Dig. It gave me a better understanding of trenchless technology and showed me how it's actually used in the real world. The presentations helped build my knowledge, but the networking is what really made the experience meaningful. Talking to people and hearing about what they do made everything feel more real and helped me see how I could be part of this field in the future.



UMass Lowell students enjoying the sights in Southern California on their way to Palm Springs.



Charles Kihumuro

“A PLAYGROUND OF INNOVATION”

Over the course of three days, I was immersed in a world of advanced infrastructure innovation. I was surrounded by engineers, researchers, contractors, and industry leaders who are shaping the future of underground construction and rehabilitation. The No-Dig Show is the premier trenchless technology conference in North America, drawing professionals and students from across the continent. For a civil engineering student with a growing passion for underground infrastructure, it was nothing short of a defining experience. The sessions were technically rich, the exhibit hall was a playground of innovation, and the networking opportunities were invaluable. This week in the desert reshaped my perspective on what a career in civil engineering can look like.

The technical sessions at No-Dig 2026 spanned an impressive range of topics across seven concurrent tracks, covering everything from Horizontal Directional Drilling (HDD) and microtunneling to CIPP rehabilitation, condition assessment, stormwater management, and project planning. Attending as many sessions as possible was both a requirement of the student scholarship and a personal goal, and each one delivered something new.

The exhibit hall at the Palm Springs Convention Centre was an experience unlike anything I had encountered in a classroom or lab. Rows of booths displayed the full spectrum of the trenchless industry — from large equipment manufacturers to specialty lining material suppliers, inspection technology developers, and geotechnical service firms. The opportunity to interact directly with exhibitors and ask questions about real products and real projects was one of the most valuable aspects of the show. For a student still building foundational knowledge, seeing this level of expertise was humbling and inspiring. Walking away from each booth, I had not just brochures and business cards but a clearer sense of how different corners of the industry fit together.

If the technical sessions expanded my knowledge, the networking opportunities at No-Dig 2026 expanded my perspective on what a career in trenchless engineering can look like. The Student Orientation was a welcoming entry point, providing an overview of the scholarship requirements and connecting with student attendees from universities across North America. The Underground Mixer on Monday evening in the Oasis Halls was a highlight. It was a lively, informal gathering that brought together students, academics,

“THE TRENCHLESS COMMUNITY OPERATES WITH A SENSE OF COLLEGIALITY AND SHARED PURPOSE”

and industry professionals in an environment designed for conversation. Over the course of the event, I exchanged contact information with engineers, project managers, and researchers from a wide range of specialties and regions. Each connection was a reminder that the trenchless community, despite the scale of the industry, operates with a sense of collegiality and shared purpose that makes it a genuinely welcoming place for students.

My biggest professional takeaway is that relationship building is not a soft skill — it is an engineering skill. The conversations I had in the exhibit hall, in session rooms, and at networking events were as instructive as any lecture. I return to UMass Lowell with a renewed commitment to staying engaged with NASTT and the trenchless engineering community, exploring opportunities within the student chapter, and pursuing internships and research experiences that connect classroom learning to real-world infrastructure challenges. The No-Dig Show gave me not just knowledge, but direction. To future students considering the No-Dig Show: attend, engage, ask questions, and listen carefully. You will leave with more than you can carry in a conference bag.



NINTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2025 A SUCCESSFUL OUTREACH GATHERING!



Regional Trenchless Education & Networking in Scenic New Hampshire!

Building on previous conference successes and outreach efforts by the NASTT-NE Chapter, the ninth annual NASTT-NE Northeast Trenchless Technology Conference 2025 was held November 10 – 11 at the historic Sheraton Nashua set against the vibrant colors of New Hampshire in the fall. It was another productive, well-attended gathering, providing trenchless

technology education and outreach in a semi-rural setting in the heart of New England. Well attended, the Conference furthered NASTT-NE Chapter efforts to expand the footprint and heighten awareness of trenchless technology applications across New York and the great New England states.



The historic Sheraton Nashua was site of the 9th Annual NASTT-NE Trenchless Technology Conference, November 10-11, 2025

THE NASTT-NE CHAPTER BOARD OF DIRECTORS THANKS EVERYONE FOR THEIR PARTICIPATION IN A HIGHLY SUCCESSFUL NINTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE. WE LOOK FORWARD TO SEEING YOU LATER THIS YEAR AT OUR 10TH ANNUAL CONFERENCE IN SCENIC SARATOGA SPRINGS NY NOVEMBER 9-10!



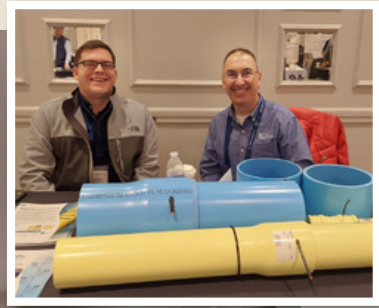
In conjunction with the NASTT-NE Board, the UMASS Lowell Student Chapter members keep everything running efficiently

The Northeast Trenchless Conference has become a well-established must attend opportunity for friends and colleagues, both old and new, to convene again, exchange ideas and gain knowledge of the latest innovations and advancements in trenchless technology.

More than 125 trenchless professionals, municipal attendees, industry exhibitors and students gathered together to enjoy a full day of networking and 14 peer-reviewed, presentations in two tracks, detailing environmentally friendly trenchless solutions and cost-saving opportunities for municipalities and utilities.



Highlight of the conference was the lunch-hour keynote address by Brian Dorwart PE, PG, Brierley Associates, long-time NASTT-NE Chapter member and NASTT Hall of Fame inductee



Networking and close personal access to industry exhibits showcasing leading edge trenchless technologies are key features of the annual NASTT-NE Conference

There were also 25 informative trade exhibits showcasing a wide range of leading edge trenchless and condition assessment technologies. A great feature of the conference is locating the exhibits in the same room as all of the networking activities, which greatly facilitates interaction with industry vendors. Another great feature are the live product demonstrations of trenchless methods, provided at this conference by Digital Control Inc. and MTC/Azuria.

A highlight of the conference was the lunch-hour keynote address by Brian Dorwart PE, PG, Brierley Associates, long-time NASTT-NE Chapter member and NASTT Hall of Fame inductee. His speech was warmly received by the delegates, and he was presented with a plaque of appreciation by NASTT-NE Chair, Jonathan Kunay P.E. and NASTT-NE Vice-Chair, Charles Tripp P.E.



Attendees enjoyed a full day of 14 informative peer-reviewed presentations on a wide range of trenchless technology topics in two separate tracks



NASTT-NE Conference is an excellent opportunity to renew old friendships and forge new industry partnerships



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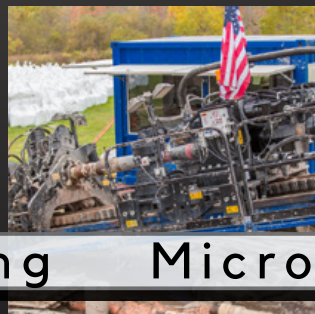
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Keynote Speaker Brian Dorwart PE, PG, Brierley Associates (left) with fellow NASTT Hall of Fame member Dennis Doherty, P.E., F. ASCE, Terracon Consultants (middle), and Phill Perron, MSc, PMP, The Crossing Company (right)



Raffle tickets were again a popular item and sold out quickly

The NASTT-NE Chapter Board of Directors thanks everyone for their participation in a very successful ninth annual 2025 NASTT-NE Northeast Trenchless Conference. We wish to extend our appreciation to all our volunteers, presenters,

moderators, and attendees for their participation, time and effort. A special note of thanks also goes out to our Premium Sponsors & Exhibitors. We thank you for your support!



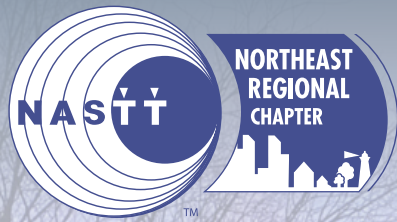
Outgoing NASTT-NE Chair Jonathan Kunay, P.E., welcomes delegates to the conference and introduces the new Board Executive



The NASTT-NE Board of Directors appreciates the ongoing support and involvement of 25 valued conference sponsors & exhibitors

For further details and updates please visit:
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We look forward to seeing everyone again November 9 - 10, 2026 in scenic Saratoga Springs NY for the Tenth Annual Northeast Trenchless Technology Conference!!!



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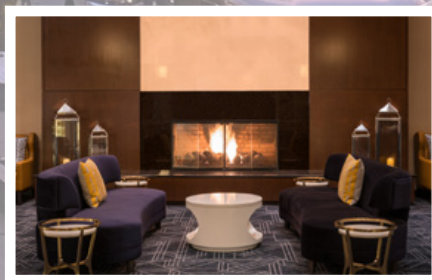
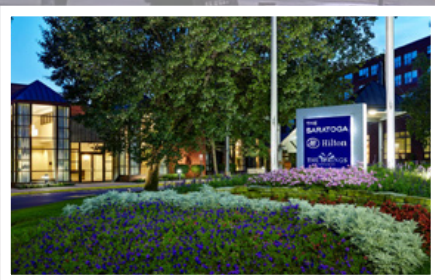
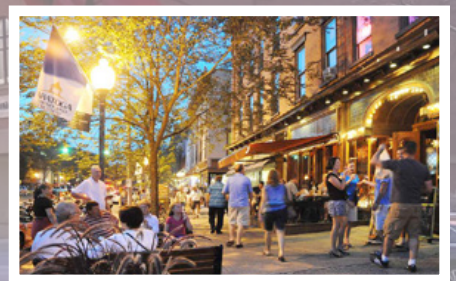
10TH ANNUAL NORTHEAST REGIONAL CHAPTER TRENCHLESS CONFERENCE

NOVEMBER 9 – 10, 2026

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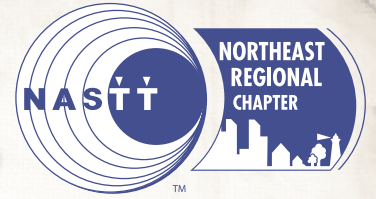
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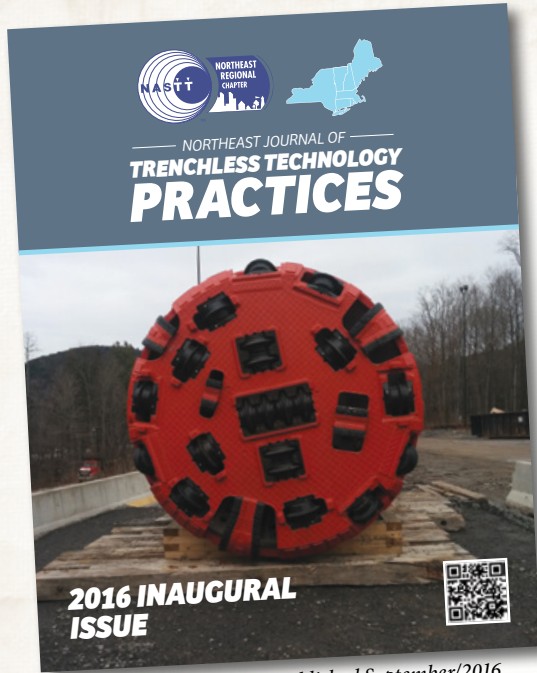
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TEN YEARS OF TRENCHLESS TECHNOLOGY GROWTH & SUCCESS IN THE NORTHEAST



The NASTT-NE Northeast Journal of Trenchless Technology Practices began publication shortly after the inception of the NASTT-NE Chapter in 2016, and since then has charted the illustrious history and steady growth of the Chapter, celebrating every step and key milestone along the way.

The Northeast Journal is an important adjunct, supporting efforts of the Chapter members to raise awareness of the applicability of trenchless methods and generally promote the wider use and acceptance of trenchless technology throughout Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. With in-depth feature articles, case studies and project reports the magazine demonstrates the cost savings, social benefits and environmental advantages of utilizing trenchless technology as the preferred method for re-building underground infrastructure in the Northeast.



Inaugural magazine cover published September/2016



MESSAGE FROM NASTT-NE CHAIR

Dennis J. Doherty, P.E., FASCE, NASTT-NE Chair

Welcome to the inaugural *Northeast Journal of Trenchless Technology Practices*. This annual Journal is the result of collaboration between members of the newly formed Northeast Regional Chapter (NASTT-NE) of the North American Society for Trenchless Technology (NASTT). The purpose of the Journal is to inform readers on the latest trends in trenchless technology methods, engineering practices, and management practices when utilizing trenchless methods.

The NASTT-NE Regional Chapter was formed from the former Northeast Trenchless Association (NTA), an independent group of mostly contractors and suppliers. NTA joined forces with NASTT to expand on its goal to inform owners, engineers, contractors and suppliers on the use of trenchless methods in today's modern world of critical underground infrastructure. On behalf of the NASTT-NE, we would like to thank and honor the founding and former members of NTA for creating a strong foundation for the new Northeast Chapter.

NTA's goal is the same as NASTT and NASTT-NE. To this extent, NASTT-NE will not only publish this *Northeast Journal of Trenchless Technology Practices* annually, but will also host both an annual conference,

and specialty seminars co-hosted by NASTT focused on specific topics such as cured-in-place pipe lining technology, methods for rehabilitation or installation of gas pipes, horizontal directional drilling, and service lateral rehabilitation and pipe bursting, to name a few. The NASTT-NE will also collaborate with the Department of Civil & Environmental Engineering at the University of Massachusetts Lowell (UMass Lowell), a premiere research university. In fact, NASTT-NE will co-host its first annual Regional Trenchless Conference at UMass Lowell's University Inn & Conference Center on November 17, 2016. (For more details, visit www.nastt-ne.org/seminars.html).

Another goal of NASTT-NE and the *Northeast Journal of Trenchless Technology Practices*, is to explore various trenchless methods and inform NASTT-NE member and Journal readers about the different methods and when to use them, and more importantly when not to use them. Each method has unique capabilities and applicability to today's underground infrastructure challenges.

The NASTT-NE plans to establish a NASTT Student Chapter for Trenchless Technology at U. of Mass Lowell, joining other universities including Arizona State, Vanderbilt, Virginia Tech, Louisiana Tech in the U.S., and Queens, University of Alberta, and

Concordia in Canada. The student chapters expose students to the world of trenchless, provide them with a foundational knowledge about trenchless technology, and inform them about careers in trenchless.

We hope you find this *Journal* and the new Northeast Regional Chapter a useful resource of information on all things trenchless.

Dennis Doherty

Dennis J. Doherty, P.E., FASCE
Chair, NASTT-NE



NASTT-NE SITE

Founding NASTT-NE Chair Dennis Doherty welcomed readers to the magazine's inaugural edition: "The purpose of the Journal is to inform readers on the latest trends in trenchless technology methods, engineering practices, and management practices when utilizing trenchless methods"



By: Babs Marquis, CCM, McMillen Jacobs Associates

Gilboa Dam, located in upstate New York, impounds Schoharie Creek and forms the Schoharie Reservoir, which is the northernmost reservoir in the Catskill System of the New York City water supply. To ensure the dam's continued long-term performance and reliability, the New York City Department of Environmental Protection (NYCDEP) embarked on a reconstruction program to extend the dam's service life under the current New York State Department of Environmental Conservation (NYSDEC) dam safety guidelines. A Low Level Outlet (LLO) is being constructed to facilitate the ability to drain the reservoir and meet proposed conservation releases. The LLO consists of two 9-foot diameter tunnels (a water leg and a land leg), ultimately terminating at a new portal/valve chamber that will release water to Schoharie Creek downstream of the reservoir. The two tunnels are approximately 2,160 LF combined, and will be completed using trenchless microtunneling construction methods, with microtunnel boring machine (MTBM) wet retrieval when the water leg is mined into the receiving site at the intake structure at the reservoir's bottom.

"THE TUNNELS WILL BE CONSTRUCTED USING MICROTUNNELING TECHNIQUES TO TAP INTO THE RESERVOIR FOR THE LLO WATER INTAKE, A METHOD UNCOMMON FOR TUNNELS OF THIS SIZE. THIS MAKES THE INSTALLATION UNIQUE FOR TODAY'S STANDARDS"

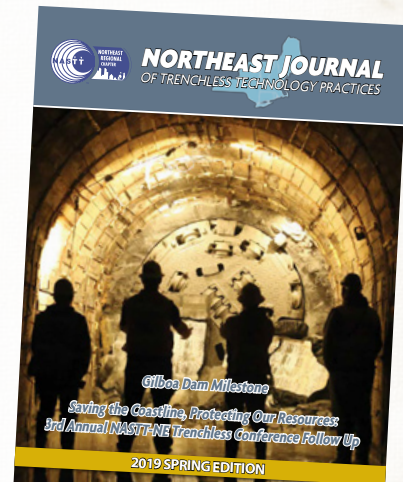
GILBOA DAM

The dam was constructed between 1919 and 1927 to create the Schoharie Reservoir impoundment as a key component of New York's water supply system. The original dam was a classic NYCDEP gravity dam design, consisting of a 160-foot high by 1,326-foot long spillway overflow structure constructed of mass Cyclopean concrete with a 3 to 5-foot thick Ashlar masonry facade of mortared quarried stone on the entire downstream face, and a portion of the upstream face. The dam is abutted on the west by a 160-foot high by 700-foot long earth filled embankment section consisting of homogeneously rolled earth fill with a concrete core wall. The stepped overflow structure cascades water from the spillway

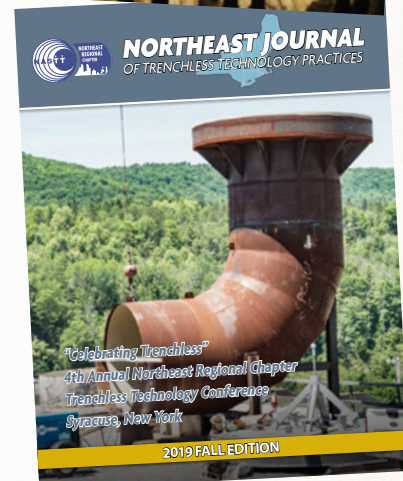
into the side channel, which varies from 80 to 270 feet in width. The stepped facade is designed to dissipate energy as water overflows the spillway.

DAM RECONSTRUCTION PLAN

To extend and ensure continued reliable operation of the dam over the next 100 years of service, the NYCDEP embarked on a series of construction projects scheduled to be completed in phases. To expedite commencement of work at the project site, NYCDEP staged the issuance of contracts and construction phases to allow some construction to proceed while other design activities continued. To date, the components of work completed as part of the reconstruction plan are:



Gilboa Dam Milestone
Saving the Coastline, Protecting Our Resources
3rd Annual NASTT-NE Trenchless Conference Follow Up
2019 SPRING EDITION



"Celebrating Trenchless"
4th Annual Northeast Regional Chapter
Trenchless Technology Conference
Syacuse, New York
2019 FALL EDITION

First-ever feature article covered the important Gilboa Dam Low-Level Outlet, key element in the NYC drinking water supply – NASTT-NE Board member Babs Marquis was Resident Engineer on the project. Follow-up articles detailing the project completion were published in the Spring and Fall/2019 editions. Project completed in summer/2020 following wet retrieval of the MTBM unit

NORTHEAST TRENCHLESS ASSOCIATION:

**GROUNDWORK FOR SUCCESS,
SEAMLESS CONTINUITY
2004 - 2016**



The Northeast Trenchless Association (NTA) was founded in 2004 by Scott Kelly, ETTI with the goal of advancing the professionalism of members and increasing awareness of the benefits of trenchless construction among owners and operators of utilities, contractors, engineers and the general public.

**"IN BUSINESS
LIFE IT IS VITAL
HONOR OUR
ORDER TO
CR
FUTURE."**

Matt Boeh, Danielle
Presidents' Speech

and in less than a year
ated web site est



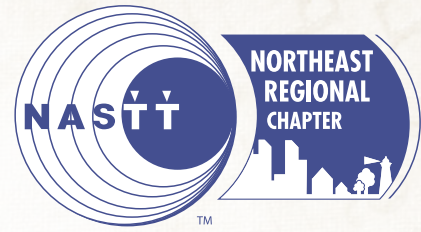
NASTT-NE & former Northeast Trenchless Association
Past Presidents met for dinner in 2018



NORTHEAST TRENCHLESS ASSOCIATION 2004 - 2016

The NASTT-NE Chapter proudly carried forward the torch from the excellent tradition of trenchless outreach first established in 2004 by the Northeast Trenchless Association. Formed initially from a group of progressively minded HDD practitioners the NTA was from the outset a focused and dedicated organization, committed to the growth and future of the New England trenchless industry. It's primary mission to increase awareness of the benefits of trenchless construction among owners and operators of utilities, contractors, engineers and the general public has grown and been further developed by the members and leadership of the NASTT-NE Chapter.

INAUGURAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2016 A GREAT SUCCESS!



By: Marshall Gaston, Fuss O'Neill, (NASTT-NE Board Member)

More than 150 trenchless technology professionals, municipal attendees, industry exhibitors and students met at the University of Massachusetts Lowell Inn & Conference Center November 17 for the Inaugural NASTT-NE Chapter Annual Northeast Trenchless Conference. It was a full day of trenchless presentations education and networking.



ANNOUNCEMENT 2016 NORTHEAST TRENCHLESS CONFERENCE

The NASTT-NE Chapter is hosting the inaugural Northeast Trenchless Conference Thursday November 17, 2016 | UMASS Lowell Inn & Conference Center | Lowell MA



Join us for a full day of trenchless presentations and networking along with breakfast, lunch and breaks! Registration includes a useful and informative technical program and mini trade-show product exhibit area. The 2016 Northeast Trenchless Conference offers all the benefits of a national conference without extensive travel.

The NASTT-NE Chapter is dedicated to providing opportunities to advance the science and practice of Trenchless Technology by promoting and conducting training and education through seminars, short courses and field demonstrations.

The 2016 Northeast Trenchless Conference will provide valuable information to people involved in underground infrastructure work including public works officials, utility company personnel, engineers, underground contractors, industry suppliers and students.

KEYNOTE SPEAKER: Frederick A. Laskey, Executive Director, Massachusetts Water Resources Authority (MWRA)

Executive Director Laskey is responsible for implementing MWRA programs, policies and procedures at the direction of the Board of Directors. MWRA's mission is to provide wholesale water and sewer services to 2.5 million people and more than 5,500 large industrial users in 61 metropolitan Boston communities.

For information regarding the Conference, Hotel accommodations and Registration, visit: www.nastt-ne.org/seminars.html

Early registration = \$100.00
Registration after October 17, 2016 = \$125.00 (municipalities \$60.00)
On-site registration on Nov. 17, 2016 = \$150.00



Participants gathered for a...



Inaugural Conference Keynote Speaker Frederick A. Laskey, Executive Director MWRA, receives plaque of appreciation from NASTT-NE Chair Dennis Doherty and Treasurer Babs Marquis

INAUGURAL NORTHEAST TRENCHLESS CONFERENCE 2016

The inaugural NASTT-NE Northeast Trenchless Conference was a tremendous success, exceeding all expectations for the first-time gathering. More than 150 trenchless technology professionals, municipal attendees, industry exhibitors and students met at the UMass Lowell Inn & Conference Center November 17 2016 for a full day of trenchless presentations education and networking.

2017: COOPERSTOWN NY

SECOND ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2017



Another Great Success!

By: Marshall Gaston, Foss O'Neill, (NASTT-NE Board Secretary)



More than 120 delegates gathered for a full day of trenchless technology education and networking.

More than 120 trenchless professionals, municipal attendees, industry exhibitors and students gathered in Cooperstown, New York on November 14 for the second annual North American Society for Trenchless Technology Northeast Chapter (NASTT-NE) Northeast Trenchless Conference & Municipal Outreach Forum.

Over the lunch Dennis Dobry, outgoing Chair of the NASTT-NE Chapter, presented presentations by the UMass Lowell Student Chapter and George Rappala, past Chair of NASTT-NE, a long time gas industry professional who works for Public Service Electric and Gas in New Jersey, gave the audience a historical perspective on how the industry



A highlight was the end-of-afternoon presentation by George Rappala, Director of Construction, BPECC, and the Water Utility Inspector.

2018: MYSTIC CT

THIRD ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2018 ANOTHER GREAT SUCCESS!



By: Marshall Gaston, Foss O'Neill, (NASTT-NE Board Secretary)



More than 120 delegates gathered for a full day of trenchless technology education and networking.

More than 120 trenchless professionals, municipal attendees, industry exhibitors and students gathered in Mystic, Connecticut on November 15 for the third annual North American Society for Trenchless Technology Northeast Chapter (NASTT-NE) Trenchless Technology & Municipal Outreach Forum.

Michael Williams, opening remarks about trenchless technology a service award presented to Paul Chai, Dennis Dobry, and a presentation by the UMass Lowell Student Chapter and much more.

One of the highlights of the one day event was the lunch time presentation by Mr. Scott W. Johnson, Chief Executive Officer of The Metropolitan District Commission (MDC) in Hartford, CT who provided an overview of the MDC's large construction

2019: SYRACUSE NY

FOURTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2019 - ANOTHER GREAT SUCCESS!



Another Year of Record-Setting Attendance!

More than 150 trenchless professionals, municipal attendees, industry exhibitors and students gathered at the Embassy Suites by Hilton Destiny USA in Syracuse, New York on November 12 for the fourth annual North American Society for Trenchless Technology Northeast Chapter (NASTT-NE) Trenchless Conference & Municipal Outreach Forum. Attendees were relaxed and in good spirits after a Social

From the night before at the world famous Dinosaur Bar-B-Que in downtown Syracuse. Ian Mead, outgoing Chapter Chair, moderated the day's proceedings, which started with departing NASTT Executive Director, Michael Williams, delivering opening remarks about the growth of trenchless technology and development of the NASTT organization during his tenure in the office, the present day



Delegates had day access to 24 trenchless technology exhibits and numerous industry experts.

NASTT-NE CHAPTER ANNUAL CONFERENCES:

2016-2026

- 2016 UMASS LOWELL (Inaugural) KEYNOTE: Frederick A. Laskey, MWRA
- 2017 COOPERSTOWN NY (2nd Annual) KEYNOTE: Irene McSweeney, BWSC
- 2018 MYSTIC CT (3rd Annual) KEYNOTE: Scott Jellison, Hartford MDC
- 2019 SYRACUSE NY (4th Annual) KEYNOTE: Shannon Harty, Onondaga County
- 2020 No conference due to COVID-19 - WEBINAR INSTEAD
- 2021 WEST POINT NY (5th Annual) KEYNOTE: Andrew Fera, NYSDEC
- 2022 PORTLAND ME (6th Annual) KEYNOTE: Matt Timberlake, Vortex
- 2023 ALBANY NY (7th Annual) KEYNOTE: Katie McKittrick, City of Albany
- 2024 STURBRIDGE MA (8th Annual) KEYNOTE: Heather Blakeley, Sturbridge DPW
- 2025 NASHUA NH (9th Annual) KEYNOTE: Brian Dorwart, Brierley Associates
- 2026 SARATOGA NY (10th Annual) KEYNOTE: Phill Perron, The Crossing Company

2023: ALBANY NY

SEVENTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2023 ANOTHER SUCCESS!

Continuous Outreach & Upwards Progress in Central NY!



Building on previous conference successes and outreach efforts by the NASTT-NE Chapter, the seventh annual NASTT-NE Northeast Trenchless Technology Conference 2023 was held November 15-16 at the spacious Crowne Plaza Albany Downtown Hotel. It was another worthwhile success resulting from years of diligent work of raising awareness of the many benefits and applications of trenchless technology across the Northeast. More than 120 trenchless professionals, municipal attendees, industry exhibitors and students gathered together to enjoy a



Attendees enjoyed a full day of trenchless technology education and networking.

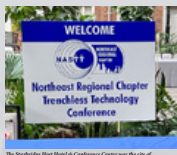
2024: STURBRIDGE MA

EIGHTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2024 A SUCCESSFUL OUTREACH GATHERING!

Progress in Regional Trenchless Education & Networking in Central Massachusetts!

Building on previous conference successes and outreach efforts by the NASTT-NE Chapter, the eighth annual NASTT-NE Northeast Trenchless Technology Conference 2024 was held November 15-16 at the expansive Huntington Hotel Hotel & Conference Center. It was another productive,

well-attended gathering, providing trenchless technology education and outreach in a rural setting, conveniently close to Boston. Very well attended, the Conference featured NASTT-NE Chapter efforts to expand the footprint and highlight awareness of trenchless technology applications across New England.



The Huntington Hotel Hotel & Conference Center was the site of the 8th Annual NASTT-NE Trenchless Technology Conference, November 15-16, 2024.

THE NASTT-NE CHAPTER BOARD OF DIRECTORS THANKS EVERYONE FOR THEIR PARTICIPATION IN A HIGHLY SUCCESSFUL EIGHTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE. WE LOOK FORWARD TO SEEING YOU LATER THIS YEAR AT OUR 9TH ANNUAL CONFERENCE IN HISTORIC NASHUA NH NOVEMBER 10-11!

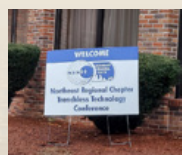
2025: NASHUA NH

NINTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2025 A SUCCESSFUL OUTREACH GATHERING!

Regional Trenchless Education & Networking in Scenic New Hampshire!

Building on previous conference successes and outreach efforts by the NASTT-NE Chapter, the ninth annual NASTT-NE Northeast Trenchless Technology Conference 2025 was held November 10-11 at the historic, Oberlin Inn in Scenic Saratoga Springs in the heart of New Hampshire. Well attended, the Conference featured NASTT-NE Chapter efforts to expand the footprint and highlight awareness of trenchless technology applications across New York and the great New England states.

technology education and outreach in a scenic rural setting in the heart of New England. Well attended, the Conference featured NASTT-NE Chapter efforts to expand the footprint and highlight awareness of trenchless technology applications across New York and the great New England states.



The Oberlin Inn, Saratoga Springs was the site of the 9th Annual NASTT-NE Trenchless Technology Conference, November 10-11, 2025.

THE NASTT-NE CHAPTER BOARD OF DIRECTORS THANKS EVERYONE FOR THEIR PARTICIPATION IN A HIGHLY SUCCESSFUL NINTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE. WE LOOK FORWARD TO SEEING YOU LATER THIS YEAR AT OUR 10TH ANNUAL CONFERENCE IN SCENIC SARATOGA SPRINGS NY NOVEMBER 9-10!

2020: WEBINAR (COVID-19)

NASTT-NE NORTHEAST TRENCHLESS WEBINAR A SUCCESS!

"Trenchless Challenges: Applications and Advancements in Renewing the Future in the Northeast"
12:00 – 1:30pm November 12, 2020

NASTT-NE members, municipal attendees, students, and other trenchless professionals joined the first-ever Northeast Regional Chapter Webinar "Trenchless Challenges: Applications and Advancements in Renewing the Future in the Northeast" capably moderated by Jonathan Katan, NASTT-NE Board Secretary. The webinar was held in lieu of the 2020 NASTT-NE Northeast Trenchless Technology Conference in Portland, ME, which was postponed due to the pandemic.

Hosted in a compact accessible "lunch and learn" format, the webinar was fast-paced, well-run and informative. After brief welcoming remarks from NASTT-NE Board Chair John Noyes, and an overview of the proceedings from NASTT-NE Board Secretary, Jonathan Katan, there were two excellent trenchless technology presentations:

"BREAKING THE TYPICAL TRENCH: Using Creative Techniques to Locate Existing Pipes in Small Systems"



PRESENTER:
David Bennett, PE,
CEM, South

"TRENCHLESS CONSTRUCTION HURDLES IN AN URBAN ENVIRONMENT - The East Boston Branch Street Project Construction"



PRESENTER:
John Noyes, CEM,
M&E/EP, Jacobs
Associates

Webinar Agenda
12:00 PM – 1:30 PM EST

- Welcome address and chapter update – John Noyes
- Conference questions/answers – Jonathan Katan
- Presentations:
 - Breaking the Typical Trench: Using Creative Techniques to Locate Existing Pipes in Small Systems – David Bennett, PE
 - Student Chapter Scholarship Award – Eric Schuler & Dennis Binkley
 - Presentations:
 - Trenchless Construction Hurdles in an Urban Environment – The East Boston Branch Street Project Construction – John Noyes, CEM
 - 2020 Conference Webinars – Eric Schuler
 - Appreciation and Closing remarks – Eric Schuler

2021: WEST POINT NY

FIFTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2021 GREAT SUCCESS!



Rebound Year after Year Hiatus!

Back in action after a year's hiatus due to the Covid-19 pandemic, the fifth annual NASTT-NE Northeast Trenchless Technology Conference 2021 held November 15 – 16 at the historic Thayer Hotel in West Point NY was a roaring success. A great time was had by all in attendance. It was a happy occasion for everyone to gather in person again as the Covid-19 pandemic continues to wane.

More than 125 trenchless professionals, municipal attendees, industry exhibitors and students gathered together to enjoy a full day of networking and 19 paper oral and poster presentations in two tracks, detailing environmentally friendly trenchless solutions and cost-saving opportunities for municipalities and utilities. There were also 10 informative trade exhibits showcasing a wide range of leading edge trenchless and condition assessment technologies.



NASTT-NE Board Member Guy Campagna, Tom of Waverline MA, and Bob Drisko, BECF Group enjoy the view from the historic West Point grounds.



Oliver Lovell Student Chapter member provides invaluable logistical support for the Conference.

2022: PORTLAND ME

SIXTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE 2022 MAINE SUCCESS!



Building on previous conference successes and ongoing outreach efforts by the NASTT-NE Chapter, the sixth annual NASTT-NE Northeast Trenchless Technology Conference 2022 held November 14 – 15 at the luxurious Portland Sheraton Salsbury Plaza Conference Center in Portland, Maine reminded everyone once again of the value and productivity of in-person gatherings. Very well attended, the Conference

reaffirmed and strengthened the presence of trenchless technology in Maine, the environment state in the US. Delegates agreed the 6th annual conference was another worthwhile happy success. The Northeast Trenchless Conference has become a well-established event at which opportunity for friends and colleagues, both old and new, to converge again, exchange ideas and the latest innovations and advancements, and continue



WELCOMING NORTH AMERICA'S UNDERGROUND INFRASTRUCTURE COMMUNITY TO THE POPULOUS NORTHEAST!

The Northeast Chapter of the The North American Society for Trenchless Technology looks forward to hosting the 2024 No-Dig Show in Providence, Rhode Island April 14-18. Hosting North America's premier trenchless educational and networking event in the Northeast for the first time, presents a golden opportunity for the Northeast Trenchless community to showcase the progress it has made in utilizing trenchless applications as the preferred method for underground infrastructure construction in the Northeast.

"BE A PART OF THE EXCITEMENT AS A PRESENTER, SPONSOR AND EXHIBITOR!"

Within an easy day's drive from most cities in the populous northeast - Providence is just a few hours' drive from Portland ME, Philadelphia, PA, NY, NJ, VT and CT. The 2024 NASTT No-Dig Show promises to draw significant attention from top infrastructure decision makers across the Northeast including municipal authorities, utilities, engineers, contractors, suppliers and policy-makers.

The 2024 NASTT No-Dig Show motto "Come Above, Green Below" emphasizes the trenchless industry's position as an important steward of our environment and natural resources, utilizing approaches that have significant environmental and social benefits. Trenchless Technology is at the forefront of ongoing efforts to reduce GHG emissions.

As our planning kicks into high gear, check the website www.nodigshow.com for updates and further information.

The excitement and anticipation is building - be a part of the excitement as a presenter, sponsor and exhibitor!

Bob Marquis CCM
Deve Underground
2024 No-Dig Show Planning Committee Chair
Secretary, NASTT Board of Directors
Past Chair, NASTT-NE Chapter

NASTT NO-DIG SHOW 2024

The NASTT No-Dig Show is being hosted in the Northeast for the first time

Rhode Island Convention Center
Providence is an easy day's drive from most cities in the Northeast

For the first time ever, the Northeast hosted the world's premier trenchless educational and networking event with the NASTT NO-DIG SHOW in Providence RI, April 14 – 18, 2024


NORTHEAST TRENCHLESS CONFERENCES 2016 - 2026

Advancing the central goal of the NASTT-NE Chapter to promote trenchless technology by providing opportunities for training and education, the annual NASTT-NE Northeast Trenchless Conference held every November offers all the benefits of a much larger conference in a smaller relaxed setting. With an abundance of networking and learning opportunities, the NASTT-NE Conference is also a whole lot of fun, and has become one of the most popular underground infrastructure events in the Northeast.

THE NASTT-NE CHAPTER BOARD OF DIRECTORS THANK EVERYONE FOR THEIR PARTICIPATION OVER THE YEARS IN THE ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE. WE LOOK FORWARD TO JOINING YOU AGAIN TO CELEBRATE OUR 10TH ANNUAL CONFERENCE IN SARATOGA SPRINGS NY NOVEMBER 9 – 10, 2026!

NASTT-NE BOARD EXECUTIVE CHAIRS 2016 - 2026:

Over the past 10 years, the growth and development of the NASTT-NE Chapter has been guided with steady hands and professional expertise by six dedicated Chairs providing leadership for the Board and Chapter members. Saluting their tireless devotion and positive energy investing their own personal time to ensure the organization is on a stable footing poised for future growth.




MESSAGE FROM NASTT-NE CHAIR

Dennis J. Doherty, P.E., FASCE, NASTT-NE Chair

"WE HAVE ARRIVED AS A REGIONAL SOURCE FOR ALL THINGS TRENCHLESS."

Welcome to the fall 2017 edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. I hope you find this issue interesting and educational beginning with an article written by members of our Student Chapter in how they are learning about Trenchless Technologies. There is a review of our fall conference being held in Cooperstown, NY (CME ENR US), articles on pipe rehabilitation, horizontal directional drilling in challenging geology, and asset management. There is also an article on the importance of understanding cross bore issues as well as an article on Risk Based Engineering for trenchless projects. I hope you find this fall 2017 *Trenchless Technology Practices* interesting, educational, and that you save it for future reference.

With respect to the Regional Chapter, it was a pleasure to have organized a dedicated independent group of contractors, suppliers, and engineers merged with the North American Chapter of Trenchless Technology (NASTT) in the Northeast Regional Chapter of NASTT. Much has been accomplished in a short time. It has established a strong relationship with the University of Tennessee in our efforts to provide training and education to the next generation of trenchless professionals. It has also established a strong relationship with the National Trenchless Association (NTA) in our efforts to provide training and education to the next generation of trenchless professionals. It has also established a strong relationship with the National Trenchless Association (NTA) in our efforts to provide training and education to the next generation of trenchless professionals.



Dennis Doherty
(2016 - 2017)
"We have arrived as a regional source for all things trenchless"



MESSAGE FROM NASTT-NE CHAIR

Ian W. Mead, P.E., BCEE, NASTT-NE Chair

"PLEASE GET INVOLVED."

Welcome to the spring 2018 edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. Our chapter is very fortunate to be represented by a wide variety of trenchless professionals working on great projects, and many of them are represented in this issue. We encourage you to review the status of research at Ulman Lowell, including the efforts of our new and engaged student chapter. We introduce our newly elected Board of Directors and the executive committee; we encourage you all to engage any of the Board members with questions, comments, and suggestions. We are also very excited to announce that our 2018 conference will be held in Boston, CT at the Mohegan Sun on Tuesday November 13. There will be a Welcome Reception the evening of Monday November 12 (starting 7:00).

Success of our chapter depends on the commitment of our dedicated volunteers. Many thanks to our past Chair, Dennis Doherty for setting the high bar from the onset of our chapter, and letting us see where we were headed. It is my role as past Chair, Dennis will be engaging the members of our previous organization, the Northeast Trenchless Association, to ensure that our chapter continues to benefit from the knowledge and expertise of these professionals. Our focus is on our former and current Board of Directors, and to the executive team of all your support. Finally, and most importantly, thanks to all of you, our chapter members, for participating and supporting these initiatives. Please get involved!

Ian W. Mead, P.E., BCEE
NASTT-NE




Ian W. Mead
(2018 - 2019)
"We have found our groove"



MESSAGE FROM NASTT-NE CHAIR

Babs Marquis, CCM, NASTT-NE Chair

"THE FUTURE IS LOOKING BRIGHT!"

Welcome to our Spring 2021 edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. I hope you find this issue interesting and educational beginning with an article written by members of our Student Chapter in how they are learning about Trenchless Technologies. There is a review of our fall conference being held in Cooperstown, NY (CME ENR US), articles on pipe rehabilitation, horizontal directional drilling in challenging geology, and asset management. There is also an article on the importance of understanding cross bore issues as well as an article on Risk Based Engineering for trenchless projects. I hope you find this fall 2017 *Trenchless Technology Practices* interesting, educational, and that you save it for future reference.

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Babs Marquis
(2020 - 2021)
"The future is looking bright!"



MESSAGE FROM NASTT-NE CHAIR

Eric G. Schuler, P.E., NASTT-NE Chair

"LEARNING FROM THE PAST, ALLOWS US TO EVOLVE FOR THE PRESENT, WHICH HELPS US GROW FOR THE FUTURE."

Welcome to the 12th edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. I hope you find this issue interesting and educational beginning with an article written by members of our Student Chapter in how they are learning about Trenchless Technologies. There is a review of our fall conference being held in Cooperstown, NY (CME ENR US), articles on pipe rehabilitation, horizontal directional drilling in challenging geology, and asset management. There is also an article on the importance of understanding cross bore issues as well as an article on Risk Based Engineering for trenchless projects. I hope you find this fall 2017 *Trenchless Technology Practices* interesting, educational, and that you save it for future reference.

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Eric Schuler
(2022 - 2023)
"Learning from the Past, allows us to evolve for the Present, which helps us grow for the Future"



MESSAGE FROM NASTT-NE CHAIR

Jonathan Kunay, P.E., PMP, NASTT-NE Chair

"WE ARE PLEASED TO WELCOME OUR NATIONAL NASTT LEADERS AND MEMBERS TO THE NORTHEAST FOR THE VERY FIRST TIME!"

Welcome to the 16th edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. Thank you for taking the time to open this publication and check out the content that we are putting together for the conference. We are always looking for good content for the program, so please do send us your "Call for Papers" submission to have a look.

"We are pleased to welcome our national NASTT leaders and members to the Northeast for the very first time!"

Jonathan Kunay, P.E., PMP
NASTT-NE



Jonathan Kunay
(2024 - 2025)
"We are pleased to welcome our national NASTT leaders and members to the Northeast for the very first time!"



MESSAGE FROM NASTT-NE CHAIR

Charlie Tripp, P.E., BCPLW, NASTT-NE Chair

"PRODUCING THIS JOURNAL IS TRULY A TEAM EFFORT."

Welcome to the 20th edition of the NASTT Northeast Regional Chapter's *Trenchless Technology Practices*. I hope you find this issue interesting and educational beginning with an article written by members of our Student Chapter in how they are learning about Trenchless Technologies. There is a review of our fall conference being held in Cooperstown, NY (CME ENR US), articles on pipe rehabilitation, horizontal directional drilling in challenging geology, and asset management. There is also an article on the importance of understanding cross bore issues as well as an article on Risk Based Engineering for trenchless projects. I hope you find this fall 2017 *Trenchless Technology Practices* interesting, educational, and that you save it for future reference.

With respect to the Regional Chapter, it was a pleasure to have organized a dedicated independent group of contractors, suppliers, and engineers merged with the North American Chapter of Trenchless Technology (NASTT) in the Northeast Regional Chapter of NASTT. Much has been accomplished in a short time. It has established a strong relationship with the University of Tennessee in our efforts to provide training and education to the next generation of trenchless professionals. It has also established a strong relationship with the National Trenchless Association (NTA) in our efforts to provide training and education to the next generation of trenchless professionals.



Charlie Tripp
(2026 - 2027)
"Producing this journal is truly a team effort"



NASTT HALL OF FAME:

Three NASTT-NE members have been honored with induction into the NASTT Hall of Fame for their lifelong work and service contributing to the growth and development of the NASTT organization and trenchless technology in general. Trailblazers each in their own right, through their contributions they have each made an impact on the development of trenchless technology awareness in the Northeast.



George's deep involvement in both NASTT and gas industry organizations was instrumental in his work coordinating and facilitating the inception of the NASTT-NE Chapter at the 2016 NASTT No-Dig Show in Dallas. As the preeminent "bridge" connecting the gas industry and the trenchless technology industry together, George has been a long-term proponent and advocate for the greater utilization of various trenchless technology applications in gas distribution construction projects. He has been honored with several American Gas Association awards and continues to teach CIPL courses at the Northeast Gas Association Summer Operations School. He remains active in several organizations including the Northeast Gas Distribution Council, and serves as a knowledgeable advisor to the NASTT-NE Board and the Trenchless for Gas Infrastructure magazine.



Founding Chair of the NASTT-NE Chapter, Dennis has been foremost in championing the next generation of trenchless technology leaders, infusing the members of the UMass Lowell Student Chapter with an abiding passion for all things trenchless, providing solid guidance and mentorship to young people as they launch into productive engineering careers. A noted expert on risk management and the fundamental importance geotechnics in designing trenchless projects, Dennis has devoted considerable time to engaging and attracting young engineers into the trenchless industry. He continues to support student attendance at the NASTT No-Dig Show, regional conferences and project site visits, and still serves the NASTT-NE Board in an advisory capacity.



Brian has had deep, close involvement with regional trenchless technology organizations and advocacy in the Northeast going all the way back to the early days of the Northeast Trenchless Association (NTA), immediate predecessor of the NASTT-NE Chapter. He was the first practicing Engineer to join the NTA at its founding in 2004. In March 2016, as part of the NTA leadership, he was at the forefront of the efforts to merge the organization into the present-day NASTT-NE Chapter. Tirelessly promoting increased understanding and acceptance of trenchless methods across the Northeast, Brian's involvement in the NASTT-NE Chapter continues to this day as a regular participant and presenter at the annual NASTT-NE Trenchless Technology regional conferences and at other Chapter events.

GEORGE RAGULA, NOTED TRENCHLESS AUTHORITY, INDUCTED INTO 2018 NASTT HALL OF FAME

George Ragula, a noted trenchless authority, has been inducted into the 2018 NASTT Hall of Fame for his contributions to the industry. He is a past President of NASTT and a past Chairman of the Northeast Chapter. George has been instrumental in the development and growth of the NASTT-NE Chapter and has been a key figure in the industry for many years.

George has published over 100 papers and articles on trenchless technology and has been a frequent speaker at industry conferences. He has also been a member of several professional organizations, including the American Society of Civil Engineers and the American Society of Mechanical Engineers.

George's deep involvement in both NASTT and gas industry organizations was instrumental in his work coordinating and facilitating the inception of the NASTT-NE Chapter at the 2016 NASTT No-Dig Show in Dallas. As the preeminent "bridge" connecting the gas industry and the trenchless technology industry together, George has been a long-term proponent and advocate for the greater utilization of various trenchless technology applications in gas distribution construction projects.

NORTHEAST JOURNAL OF TRENCHLESS TECHNOLOGY PRACTICES

World Record 16-inch CIPL Gas Main Renewal
NASTT-NE Northeast Trenchless Conference 2017
2018 SPRING EDITION

FOUNDING CHAIR OF NASTT-NE CHAPTER INDUCTED INTO NASTT HALL OF FAME

Dennis Doherty, P.E., FASCE, is a notable senior principal engineer with 40+ years of professional experience in the design, construction, and management of underground structures. He has been a key figure in the industry for many years and has been instrumental in the development and growth of the NASTT-NE Chapter.

Dennis has been a frequent speaker at industry conferences and has published several papers on trenchless technology. He has also been a member of several professional organizations, including the American Society of Civil Engineers and the American Society of Mechanical Engineers.

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NORTHEAST JOURNAL OF TRENCHLESS TECHNOLOGY PRACTICES

Inspiring the Next Generation of Trenchless Technologists
Improving Pipeline Technology for 30 Years
2022 SPRING EDITION

LONGTIME MEMBER OF NASTT-NE CHAPTER INDUCTED INTO NASTT HALL OF FAME

Brian Dowart's Involvement in Northeast Trenchless Advocacy Stretches Back to the Days of the NTA

Brian Dowart, PE, PCl, is a notable senior principal engineer with 40+ years of professional experience in the design, construction, and management of underground structures. He has been a key figure in the industry for many years and has been instrumental in the development and growth of the NASTT-NE Chapter.

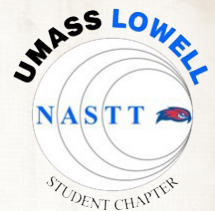
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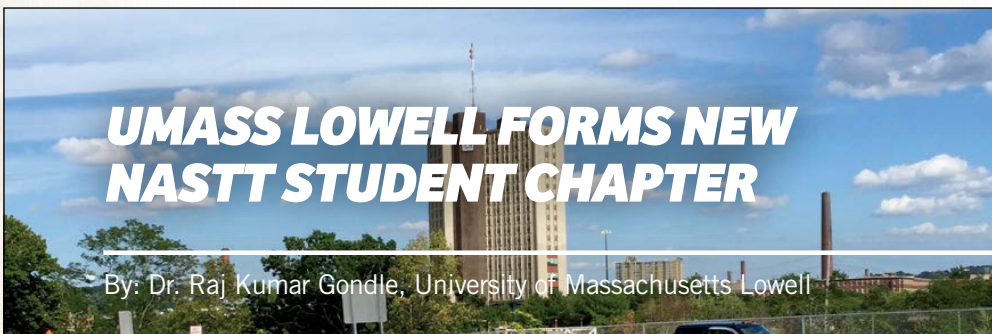


UMASS LOWELL NASTT STUDENT CHAPTER:

The UMass Lowell NASTT Student Chapter is committed to recruiting students passionate about trenchless technology and putting them into real world practical situations. Founded in Fall/2016, shortly after the establishment of the NASTT-NE Chapter, the primary objective of the Student Chapter is to actively engage in trenchless activities and practice trenchless engineering. Students, faculty, and industry professionals are involved to promote learning of the leading-edge trenchless technologies and build opportunities to advance trenchless practices and underground engineering.



Prof. Raj Gondle from the Department of Civil & Environmental Engineering (CEE) initiated the Student Chapter with strong support from the trenchless industry and continues to serve as the faculty advisor to help as needed. Industry leaders like Dennis Doherty also mentor and encourage students to step into the world of trenchless and underground construction. The inaugural NASTT Northeast Trenchless Technology Conference was held at UMass Lowell in 2016 and both organizations have grown together since then, with the students an essential part of the conference proceedings. Today, the Student Chapter is firmly established as a long standing and well run civil/geotechnical engineering youth club in the Northeast.



Located on the northern edge of greater Boston is the University of Massachusetts Lowell, a nationally ranked research university with more than 17,000 students pursuing bachelor's, master's and doctoral degrees in six colleges. A growing urban public university, UMass Lowell is committed to preparing students for work in the real world by providing affordable, high-quality education. The university's James B. Francis College of Engineering is named after the Chief Engineer who completed the 5.6 mile Lowell canal system as part of the first planned industrial city in the United States. The city of Lowell was established as a textile manufacturing center. Lowell was also the first urban national park as part of the US National Parks System in the US. The National Park Service is dedicated to preserving many of Lowell's historic manufacturing sites in Lowell National Historical Park.

A new North American Society for Trenchless Technology (NASTT) Student Chapter has been established at UMass Lowell, within the James B. Francis College of Engineering.

Students and faculty in the Department of Civil and Environmental Engineering (CEE) are enthusiastic about actively engaging in trenchless activities. The CEE Department is widely known and has 16 dedicated full-time faculty members committed to teaching, research, and community service. Chaired by Dr. Pradeep Kurup P.E., it has long enjoyed a strong reputation of producing "work ready" engineers for New England and nationwide. The new NASTT Student Chapter will consist of highly qualified engineering students in the CEE Department and College who have shown interest in trenchless technology.

The students are passionate, highly energetic and well informed. Tentative plans for the new Student Chapter include: (1) student participation in conferences, (2) inviting guest speakers who are industry leaders to discuss specific trenchless topics, (3) identifying trenchless projects and scheduling field visits for hands-on practice and experience with trenchless methods, and (4) conducting trenchless research under supervision of faculty. The students will also attend and contribute to the

a note of interest, a significant section of the Lowell Canal System with Locks is directly behind the Conference Center.

The NASTT Student Chapter at UMass Lowell will be advertised to encourage students who have not yet had any experience with trenchless technology to learn more about the trenchless world. Two UMass Lowell graduates with degrees in Civil Engineering, NASTT-NE Chair Dennis Doherty and NASTT-NE Secretary Walter Fromm, will provide support and guidance to the student initiative. †

ABOUT THE AUTHOR:



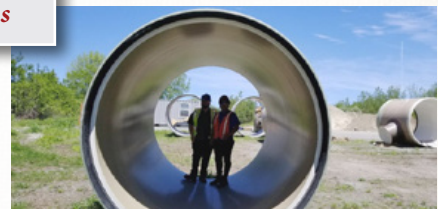
Dr. Raj Kumar Gondle, Lecturer in the CEE Department, will serve as faculty advisor to the UMass Lowell NASTT Student Chapter, providing oversight direction and assistance. Prior to joining the faculty, Raj worked as a research engineer at West Virginia University Research Corporation on several projects and taught civil engineering courses at West



In conjunction with the NASTT-NE Board, the UMASS Lowell Student Chapter members keep everything running efficiently – the students are an integral and important part of the annual NASTT-NE Conferences



Site visits are a key aspect of Student Chapter activities



SHAPING TOMORROW'S PIPES TODAY:

CIPP Lining of Elliptical HDPE

By: Baibhav K. Poudel, City of Omaha Public Works
Jonathan Kunay, PE, PMP, CDM Smith

ABSTRACT

The 6th and Leavenworth Grit Facility effluent sewer is a 40-inch diameter HDPE pipe constructed in 1977 that traverses 820 feet from the grit facility to a diversion structure near the banks of the Missouri River in Omaha, NE (see Figure 1). As part of a larger grit facility project, inspections of the effluent sewer were performed to evaluate the structural integrity of the pipe and identify necessary improvements. Inspections identified multiple defects including broken, buckling pipe in the invert and an ovality in some locations as much as 20 percent. The pipe makes multiple 90-degree bends, travels below many utilities, and runs adjacent to a large electrical substation, making open cut construction virtually impossible. To identify potential solutions to rehabilitate the pipe through trenchless technologies, the City of Omaha Public Works obtained Lidar scanning to properly assess the actual pipe shape. Scanning indicated that because of the significant ovality, in some locations the pipe was actually 28.8 inches tall by 43.2 inches wide. A variety of alternatives were evaluated to develop a cost-effective solution. Although the pipe makes multiple 90-degree bends and has limited upstream and downstream access due to the grit facility and diversion structure, respectively, a trenchless solution was preferred. This article will discuss field investigations performed, alternatives evaluated, cured-in-place pipe (CIPP) lining



Figure 1. 6th & Leavenworth Grit Facility

design calculations for an elliptical shaped pipe, rehabilitation work including installation of new manholes, spot replacement of sewer pipe, including challenges associated with connecting new round pipe with deformed existing pipe, and lining through multiple 90-degree bends, which was completed in 2024.

INTRODUCTION

The 6th and Leavenworth Grit Facility effluent sewer is a 40-inch diameter HDPE pipe constructed in 1977 that traverses 820 feet from the grit facility to a diversion structure near the banks of the Missouri River in Omaha, NE. The Grit Facility was constructed in 1977 and abandoned after construction of the Leavenworth Lift Station and Bypass Structure in 2014. Since the Grit Facility's abandonment, City staff have observed that without an effective means to remove grit, debris is accumulating behind the diversion structure weir and eventually overtopping

and accumulating in the downstream bypass structure and Leavenworth Lift Station wet well. To address these concerns, the Grit Facility was rehabilitated, improved, and returned to service in 2024. Improvements were also needed to the diversion structure by replacing the existing slide gate to prevent debris accumulation. In addition, structural repairs were needed for the 40-inch diameter effluent sewer to complete a comprehensive rehabilitation of the infrastructure. Record drawings showed that the effluent sewer pipe contained multiple bends, including a sweeping 90-degree bend, travels below many utilities, and runs adjacent to a large electrical substation as shown in Figure 2.

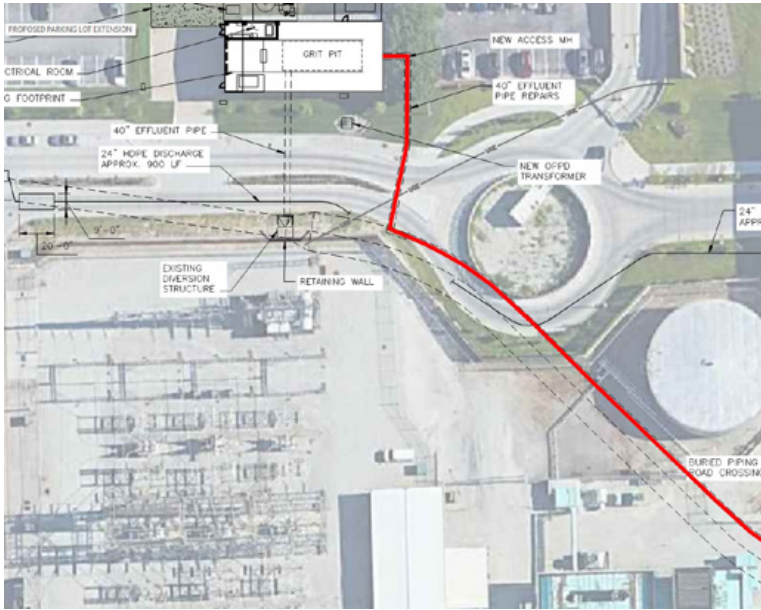


Figure 2. Effluent Sewer Alignment

PIPE CONDITION ASSESSMENT

Closed-Circuit Television (CCTV) Inspection

Inspections of the effluent sewer were performed to evaluate the structural integrity of the pipe and identify necessary improvements. The CCTV inspections indicated that the pipe is actually 36 inches in diameter, rather than 40 inches as shown in the record drawings. The inspections also identified multiple defects including broken, buckling pipe in the invert, leaking joints, and ovality in some locations (see Figure 3). Due to the ovality, additional investigation using Lidar scanning was recommended to properly assess the percentage of ovality.

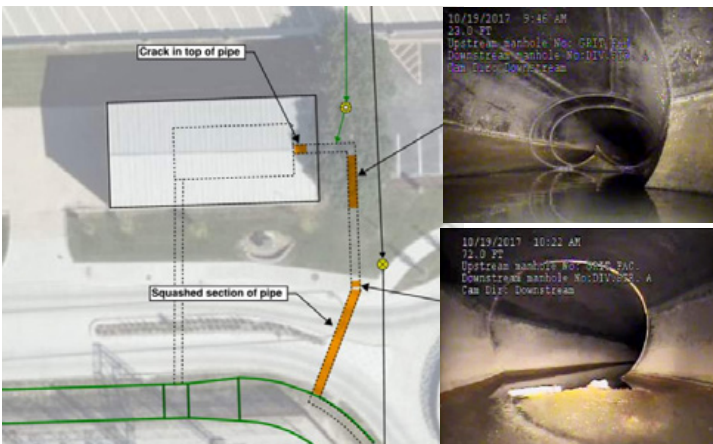


Figure 3. Condition Assessment Results

Lidar Scanning

The City of Omaha Public Works also obtained Lidar scanning to properly assess the actual pipe shape since initial CCTV inspection showed significant ovality in some locations. The detailed investigations again indicated that the pipe is actually

36 inches in diameter, rather than 40 inches as shown in the record drawings. The inspections also identified an ovality in some locations as much as 20 percent. Due to the dramatic ovality, the pipe dimensions were actually 28.8 inches tall by 43.2 inches wide in the portion of the pipe upstream of the sweeping 90-degree bend, as shown in Figure 4. Table 1 presents minimum, maximum and average measurements of the pipe throughout the entire length.

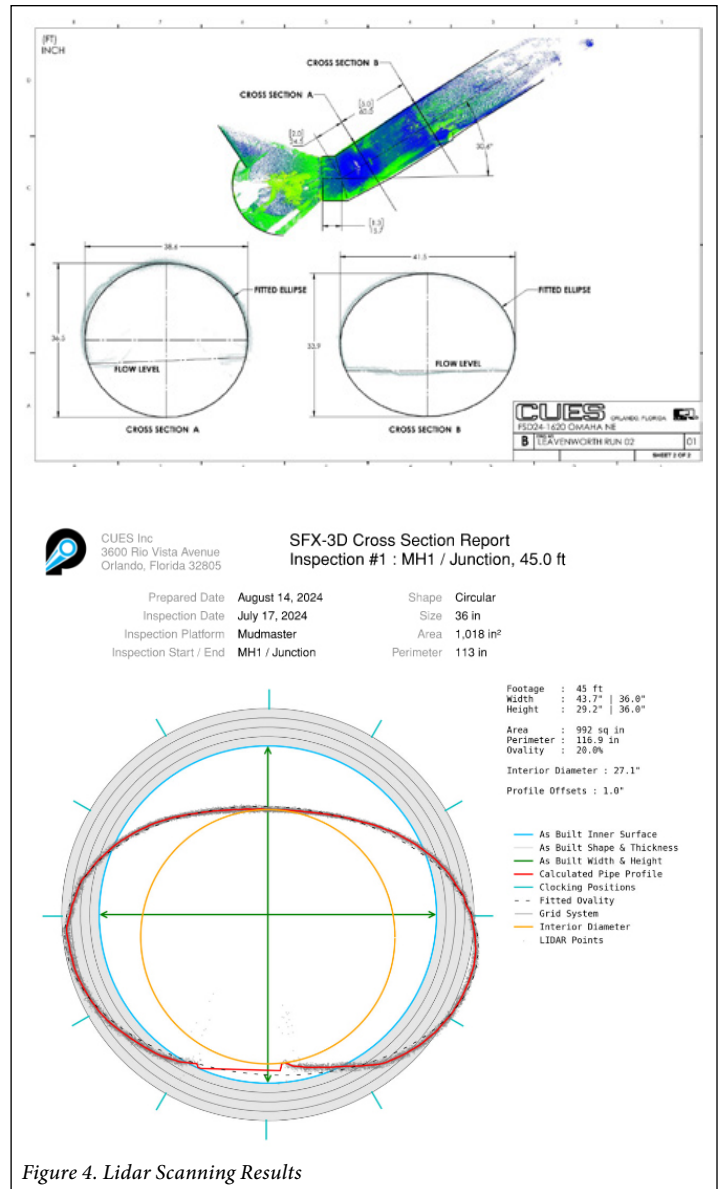


Figure 4. Lidar Scanning Results

Table 1. Pipe Metrics from Lidar Scanning

Metric	Minimum	Maximum	Average	Standard Deviation
Height	242 in	36.4 in	30.2 in	3.2 in
Width	36.1 in	46.0 in	42.1 in	2.8 in
Area	734 in ²	1,057 in ²	916 in ²	75 in ²
Perimeter	112.1 in	144.9 in	121.4 in	8.0 in
Ovality	0.5%	35.2%	19.6%	9.3%
Interior Diameter	18.2 in	35.6 in	25.2 in	4.5 in
Minimum Diameter	19.6 in	36.4 in	27.9 in	4.2 in
Maximum Diameter	36.3 in	48.0 in	43.0 in	3.2 in

EVALUATION OF ALTERNATIVES

A variety of alternatives were evaluated to develop a cost-effective solution including dig and replacement of the existing pipe, and trenchless options such as slip lining, CIPP lining, and sprayed-in-place pipe (SIPP) lining. Due to the pipe alignment under a busy roadway, and below an electrical substation and under multiple electric feeds dig and replacement was deemed infeasible. Although the pipe makes multiple 90-degree bends and has limited upstream and downstream access due to the grit facility and diversion structure, respectively, a trenchless solution was preferred.

The trenchless rehabilitation options were evaluated further to determine the most cost-effective solution. Slip lining was eliminated from consideration due to the pipe bends and inconsistent ovality throughout the pipeline. Ultimately, CIPP lining was the selected rehabilitation alternative. However, because the pipe had greater than 20 percent ovality in some locations, it was necessary to design the liner based on ASTM MOP 145, State III design guidelines, as discussed in the following section.

CIPP LINER DESIGN

The CIPP liner thickness could not be designed according to traditional ASTM F-1216 standards due to the ovality being greater than 10 percent. Instead, ASCE MOP 145, State III was used as the design criteria for CIPP lining design. This alternative design methodology, co-published in 2021, relies on rational mechanics with soil-liner interaction and assumes that the liner is subjected to all external load factors. This method also utilizes the Load and Resistance Factor Design (LRFD) design method, which focuses on the functional requirement of the liner. The calculations yielded a design thickness of 0.86 inches.

CONSTRUCTION ACTIVITIES

It was originally thought that the buckling pipe in the invert could be cut out manually and then lined through. However, excavation adjacent to this section of the pipe that was required to install a new 5-foot diameter manhole, as well as other work related to the grit facility rehabilitation, prompted the contractor to simply cut out this defective portion of pipe and replace it. Following this point repair the pipe was CIPP lined going upstream from the diversion structure, through the sweeping 90-degree bend and the 22.5-degree bend, through the new manhole and into the grit facility (see Figure 5). The diversion structure was accessed via an expanded access hatch over the existing above ground vault and weir structure. Manned entry was required from this access hatch to locate the intersection of the effluent sewer pipe, which was encased in concrete. The concrete encasement and flanges needed to be removed to expose the effluent pipe where it intersects with the north barrel connection so that insertion could be performed from this location.

CONCLUSION

In summary, the successful rehabilitation of a critical, oval, HDPE pipe was performed through detailed evaluation of pipe condition and geometry, innovative pipe inspection technologies including Lidar scanning. The installation of the liner was accomplished through careful consideration of access, bends and pipe deformities. Ultimately, a new 7-foot diameter manhole was installed and approximately 600 feet of CIPP lining was installed from the grit facility, through multiple bends and oval pipe, and into the diversion structure. The grit facility itself was fully replaced as shown in Figure 6.

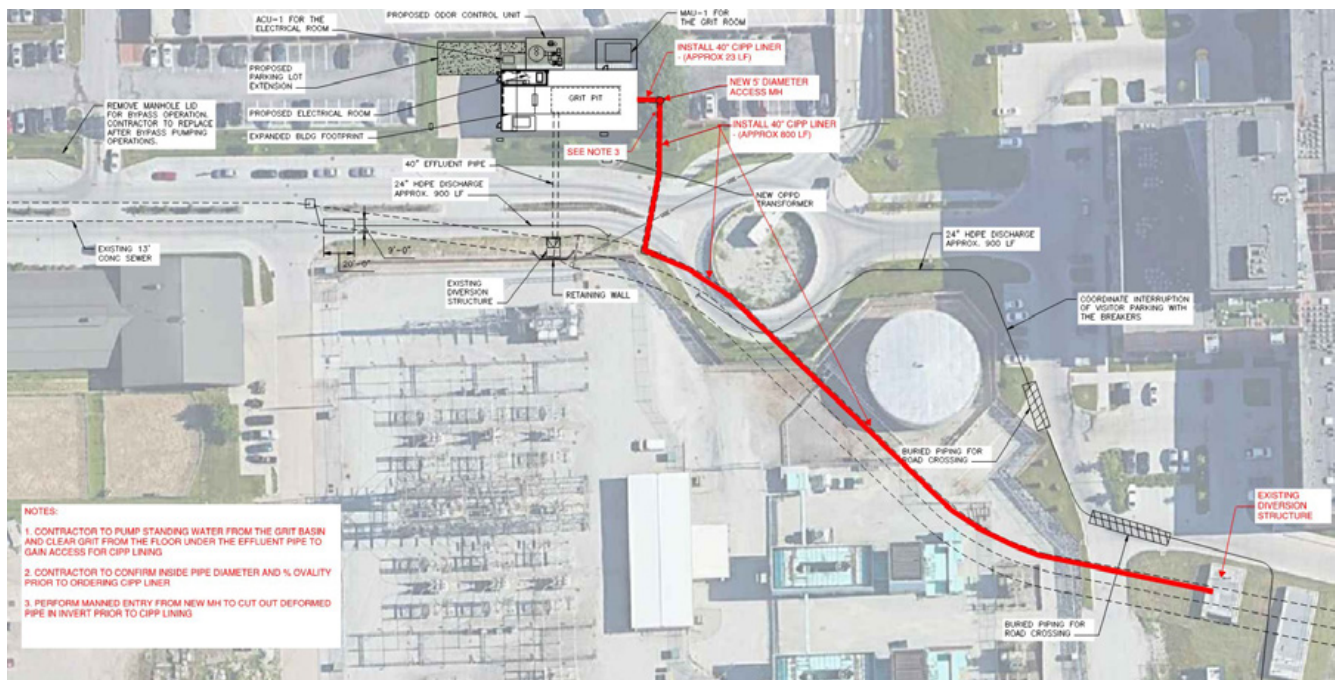


Figure 5. Effluent Sewer Rehabilitation

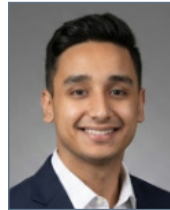


Figure 6. New Grit Facility

ABOUT THE AUTHORS:



Jonathan Kunay, PE, PMP is an Associate Engineer and Conveyance Discipline Leader for CDM Smith in Boston, MA. He has more than 23 years of experience working as a design engineer, project manager and technical specialist on a variety of trenchless projects including infrastructure assessment with traditional and state-of-the-art investigative techniques, rehabilitation using CIPP, CCCP, HDD, microtunneling and pipe bursting, facilities and master planning, leak detection of water distribution systems, enterprise asset management and risk/criticality studies. Jonathan is Past Chair of the NASTT-NE Chapter.



Baibhav K. Poudel has been a City Project Manager at the City of Omaha since May 2023. He manages multiple critical projects, both outside (Lift Stations, Grit Facilities) and inside the fence at the Missouri River Water Resource Recovery Facility (MRWRRF) and the Papillion Creek Water Resource Recovery Facility (PCWRRF). He is an active member of the Young Professional (YP) Committee group.

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TRENCHLESS REHABILITATION SOLUTION MITIGATES ENVIRONMENTAL CONCERNS



Primus Line Trenchless Rehabilitation of Oatka Creek 8-inch Potable Water Main, Town of Wheatland, New York

Minimally invasive trenchless rehabilitation solution was required due to creek crossing and old gypsum mine nearby

By: Ahmed Hassan, J. Fletcher Creamer & Son, Inc.

In late October 2025, the Monroe County Water Authority's engineer contacted J. Fletcher Creamer & Son Inc. to assess and evaluate the rehabilitation of a leaking 8-inch cast iron water main spanning approximately 400 linear feet across Oatka

Creek in the Town of Wheatland, New York.

Due to environmental concerns at the creek crossing and the presence of an old gypsum mine nearby, a minimally invasive trenchless rehabilitation solution was needed.

Additionally, available records on the pipeline installation were extremely limited. Aside from a profile drawing showing only the grade above the water main, with no reliable information as to how many bends existed within the



Cast iron water main was found to be encased within a 16 inch steel casing



Quick installation eliminated the need for a temporary bypass during construction



Primus Line® rehabilitation system was determined to be the most effective long-term solution

.....
“THE SUCCESS OF THIS REHABILITATION PROJECT REFLECTS STRONG COLLABORATION.”

affected segment or their locations, directions, and angles.

Another critical concern was persistent water ingress from the creek into the pipeline, which caused contamination during operation, and substantially

limited the range of possible rehabilitation methods.

Preceded by an earlier feasibility assessment by Primus Engineering and a comprehensive review by the Authority’s engineer and Creamer’s team, the Primus

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Available records on the pipeline installation were extremely limited



New fire hydrant, isolation valve and valve box installed



Another timely and successful critical rehabilitation completed

Line® rehabilitation system was determined to be the most effective long-term solution that addressed all project requirements. Additionally, its relatively quick installation eliminated the need for a temporary bypass

during construction, avoiding added costs and significant operational disruptions.

In late December 2025, the Authority awarded J. Fletcher Creamer & Son Inc. the contract to proceed with the project.

The scope of work included excavation, cleaning and CCTV inspection, liner installation, and pressure testing. Additional work included replacement of an existing fire hydrant, installing a new isolation valve and valve box, and completing site restoration.

Following a preconstruction coordination meeting with the Authority in early January, construction activities were scheduled to begin on January 26. However, due to heavy snow forecast during that period and continuing over the following weeks, mobilization of equipment and crews could not start until February 11.

Creamer crew began the morning of February 12th by plowing snow from the areas where access pits planned to be excavated, then proceeded with excavation of the first access pit on the south side of the bridge, also removing an existing fire hydrant that will be replaced as part of the project.

Over the next day and into Saturday, the crew excavated the second access pit on the north side of the bridge and began cutting the pipeline to provide access for cleaning and CCTV inspection. During this work, it was discovered that the water main at this location was encased within a 16 inch steel casing.

On Monday, the crew began by cleaning the water main, followed by a CCTV



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inspection. The inspection revealed two 45-degree bends near both ends of the affected segment, then completing the liner installation the following day.

Over the next two days, the crew conducted a successful pressure test of the installed Primus liner, installed a new fire hydrant along with the required isolation valve and valve box, and poured a concrete thrust block behind the branch “Tee” to properly restrain the piping network. Finally, all excavations were backfilled and the work area properly graded.

By mid-morning on February 20, the crew had completed site cleanup, loaded all equipment, and demobilized from the job site – marking another timely and successful critical rehabilitation that will extend the service life of the Oatka Creek Water Main for decades to come.

The success of this rehabilitation project reflects the strong collaboration between the Monroe County Water Authority staff, Primus Engineering, and the Creamer team and crew, and stands as a testament to their unwavering and shared commitment to excellence. ✦

ABOUT THE AUTHOR:



Ahmed Hassan has been the Trenchless Technology Lead at J. Fletcher Creamer & Son, Inc. since October 2022 in the areas of Spray-in-place Pipe (SIPP Epoxy and Cement lining), and Flexible Fabric

Reinforced Pipe (FFRP) modified slip-lining. He has over 25 years of experience in pumps and pumping systems, serving numerous water and wastewater markets and clients. Ahmed is a member of NASTT & NASCO.

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GEOPHYSICS CAN SAVE YOU MONEY

HDD Success depends on accurately understanding subsurface conditions

By: Travis Goracke, P.E., Terracon Consultants

INTRODUCTION

Horizontal directional drilling (HDD) has become a preferred method for installing utilities and pipelines beneath sensitive or congested areas; however, its success is highly dependent on an accurate understanding of subsurface conditions along the proposed bore path. Traditional geotechnical investigations, based primarily on exploratory borings and laboratory testing, provide critical site specific data but may not fully capture the subsurface variability, hidden obstructions, or geologic features that influence HDD constructability and risk. Integrating geophysical methods with conventional geotechnical investigations helps to fill in information about the subsurface conditions by bridging the gaps between boring locations, extending insight along the entire length of the geophysical survey.

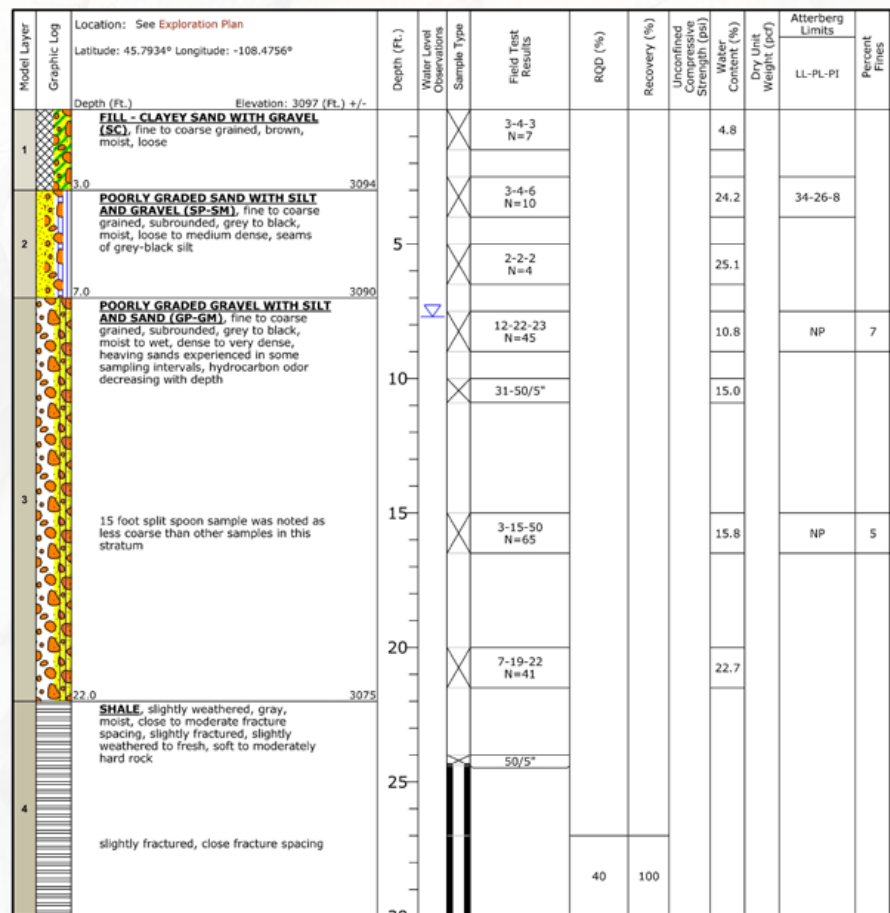
Geophysical surveys can identify subsurface obstructions, changes in stratigraphy, and geologic anomalies such as dissolution zones, voids, and fractured or isolated bedrock protrusions that pose elevated risks to HDD operations. When combined with geotechnical data, geophysical results support improved assessment of soil and rock parameters relevant to HDD profile design, including strength contrasts, groundwater conditions, potential dissolution zones, potential fluid loss or instability. This integrated approach enhances bore path optimization, reduces the likelihood of inadvertent returns and construction delays, and supports more defensible design decisions. As HDD projects extend into longer, deeper, and more geologically complex environments,

the coordinated use of geophysics and geotechnical investigation has become an increasingly valuable tool for managing subsurface uncertainty and project risk.

SUBSURFACE OBSTRUCTIONS

Recently, our company served as the geotechnical consultant on a project involving a new 8-inch diameter steel petroleum product pipeline being

proposed to replace the existing petroleum product pipeline, which crosses beneath an existing Interstate Highway, that was previously installed between a public park and the pipeline company's facility via cut and cover methods. The replacement pipeline was proposed to be installed below the existing Interstate using horizontal directional drilling (HDD) methodology, with the existing steel pipeline to be abandoned in place.



Boring Log B-1 - showing subsurface conditions just encountered

Subsurface conditions encountered in the exploratory borings included a relatively thin layer of existing sand and gravel fill underlain by native alluvial sand and gravel deposits. Shale bedrock was encountered within approximately 20 to 25 feet below existing grade and was the targeted stratum for the proposed horizontal directional drilling bore path design, crossing beneath the existing Interstate. Although SPT values recorded in the gravel stratum and feedback from the driller during the investigation did not suggest the presence of oversized cobbles and/or boulders in the exploratory borings, our opinion that oversized cobbles and/or boulders were not uncommon in the project area within the natural gravel stratum was included in the geotechnical report. The local client representatives were familiar with the subsurface conditions in the area, so our opinion regarding inclusion of cobbles and/or boulders in the gravel stratum was not unexpected. Plan and profile drawings, hydraulic fracture and inadvertent return (HFIR) analysis, and pullback stress analysis were submitted to the client as part of the geotechnical engineering report, documenting acceptable calculated factors of safety throughout the proposed alignment.

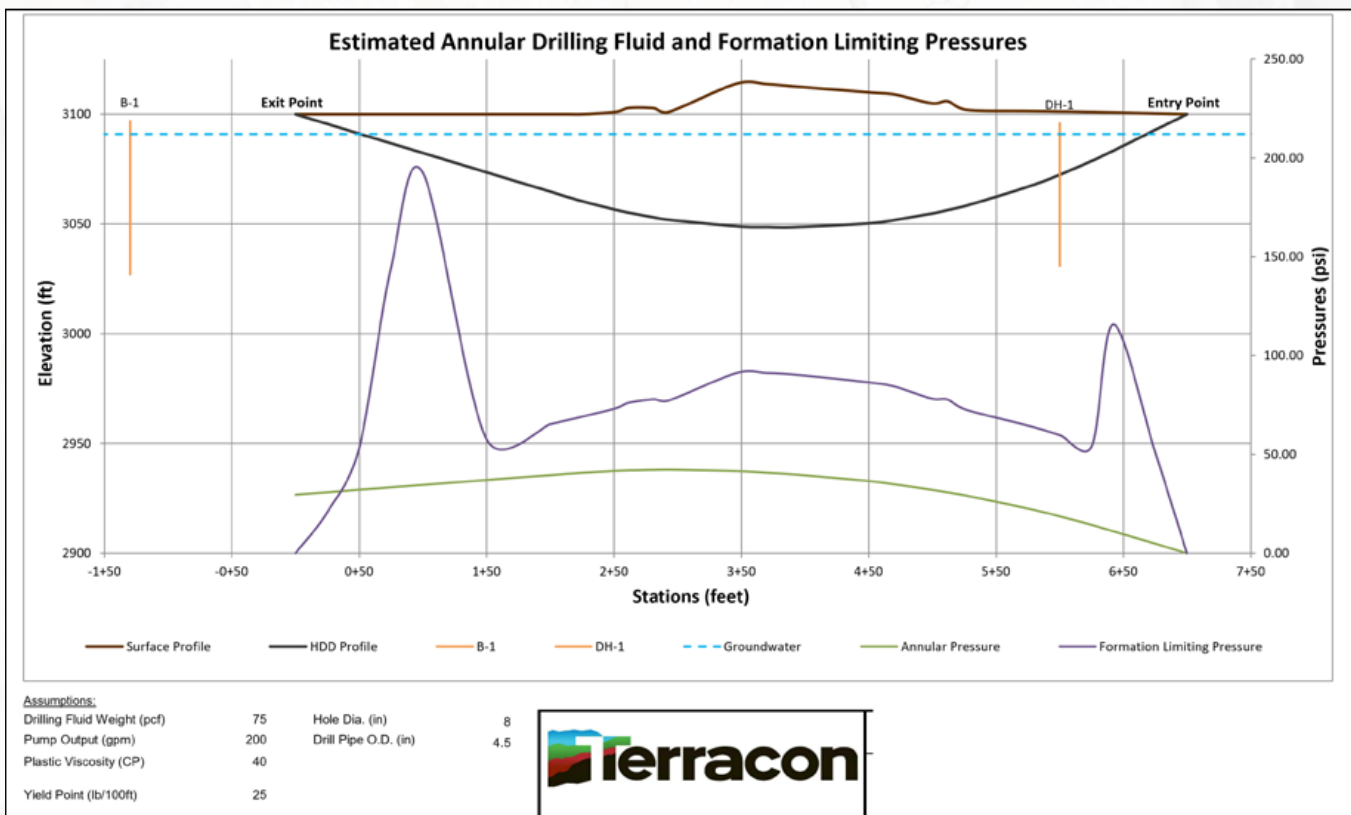
“GEOTECHNICAL INVESTIGATION HAS BECOME AN INCREASINGLY VALUABLE TOOL.”



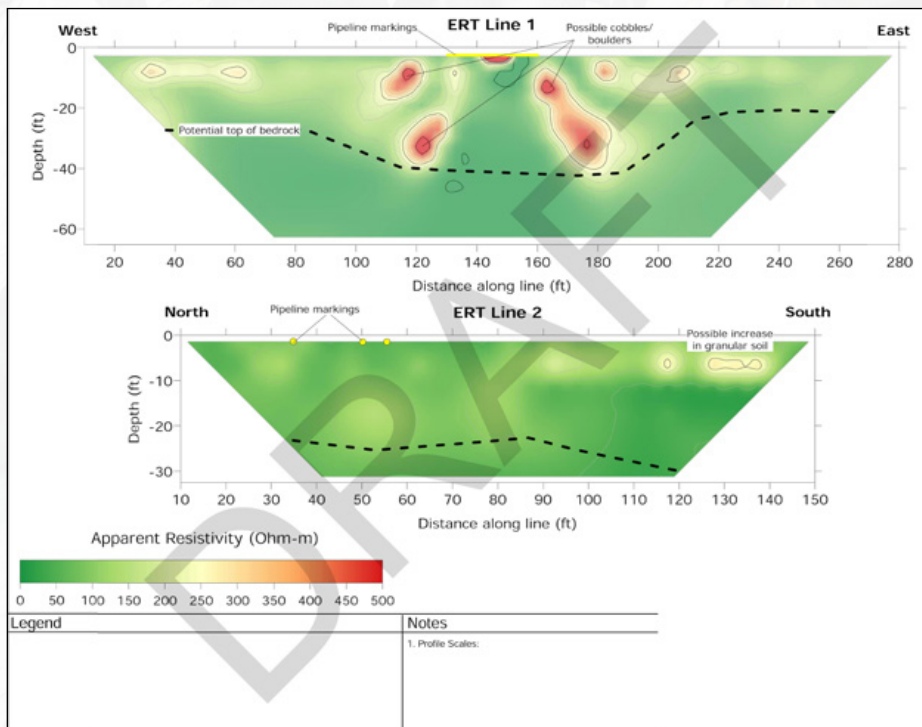
Drill rig set up at HDD entry

The project was put out for installation bids with construction beginning relatively shortly after delivery of the report. An HDD contractor was selected

and mobilized to the site to set up for installation. Shortly after the pilot hole drilling had begun, the contractor had expressed concerns they may have



Estimated Annular and Formation Limiting Pressures)



ERT results at area of concern)

encountered subsurface obstruction; they had noticed some scratching or scuffing on the drill string during operations. A meeting with the client and HDD contractor was attended where we reiterated our opinion, based on our knowledge of local geology and the fact that the exploratory borings did not encounter any fills deeper than relatively thin surficial fills, that the contractor was simply encountering some oversized cobbles and/or boulders common within the larger natural gravel stratum in the area; however, there was a documented historical landfill, operated by the City roughly between the 1940s and the 1970s, located south of the City park where the proposed HDD entry site was situated. The HDD contractor had expressed concerns that, due to its relative proximity to the HDD entry site and the time period in which it had operated, the historical landfill site extents weren't precisely documented and perhaps the obstructions or resistance they had been encountering within the entry side overburden soils was due to some larger landfill-related debris such as buried appliances, automobiles, or similar refuse. At the end of the meeting with the client

and HDD contractor, we were asked if there was any further testing that could be performed quickly to alleviate some of the HDD contractor's concerns.

After internal discussion with some of our company's geophysical professionals, the suggestion was made, and accepted by the client, to perform electrical resistivity tomography (ERT) to assess whether the obstruction or resistance the HDD contractor encountered was part of a larger debris fill in the historical landfill site. ERT is a geophysical imaging technique that helps HDD designers see changes in subsurface soil and rock layers, groundwater, and geologic hazards. The technique is well suited for locating and mapping fill zones, particularly where fills differ electrically from native soils. In this instance, we would expect to encounter widely variable resistivity responses throughout heterogeneous fills, such as those anticipated to be encountered within a landfill, compared to native clay or gravel strata, in which we would anticipate seeing more of a homogeneous, lower and higher resistivity response, respectively.

Based on the ERT results, our geophysicists concluded that the geophysical results indicated no evidence

to support the HDD contractor's concern they were encountering large fill zones as part of the nearby historical landfill; it appeared as though the pilot bore was encountering resistance in the form of cobbles and/or boulders nested within the native gravel stratum. The contractor resumed the advancement of the pilot bore, and installation of the steel petroleum product line was completed safely without incident.

RECOMMENDING GEOTECHNICAL SOIL PARAMETERS FOR USE BY OTHERS

Recently, our firm received an RFP for a utility installation project that included a portion of the alignment crossing a river. The portion of the alignment was being proposed for installation via horizontal directional drilling. As part of the RFP, the client had requested the geotechnical consultant provide a table of soil parameters for use in hydraulic fracture inadvertent returns analysis. The requested soil parameters included: dry and moist unit weight, internal friction angle, cohesion, Modulus of Elasticity, Poisson's Ratio, and Shear Modulus. The RFP included a request that seismic data be obtained to determine the shear wave (s-wave) and compression wave (p-wave) velocities. The interpolated s-wave and p-wave velocities and dynamic modulus calculations were requested to be included in the geotechnical report. As such, we included a geophysical study utilizing multichannel analysis of surface waves (MASW) paired with seismic refraction in our proposed scope.

MASW is a non intrusive geophysical method commonly used in geotechnical projects to derive shear wave (s-wave) velocities and evaluate the stiffness and stratification of near surface soils and weathered rock. The technique is based on measuring and analyzing surface (Rayleigh) waves generated at the ground surface, typically using an active source such as a sledgehammer striking a plate and an array of geophones. Because surface wave velocity is directly related

“GEOPHYSICAL TECHNIQUES SUCH AS MASW, SEISMIC REFRACTION, AND ELECTRICAL RESISTIVITY TOMOGRAPHY IMPROVE PROJECT RISK MANAGEMENT.”

to the elastic properties of the subsurface, MASW highlights how soil and rock stiffness change with depth.

Seismic refraction is another non-intrusive geophysical method used to investigate subsurface layering by measuring the travel times of compression (p wave) waves as they propagate through the ground. During the geophysical survey, a sledgehammer striking a plate is used to generate seismic waves that are recorded by an array of geophones placed along the ground surface. As the seismic waves encounter materials with increasing stiffness and density, their velocities increase and the waves refract along material boundaries before returning to the surface. By analyzing the arrival times of these refracted waves, geophysicists can estimate p-wave velocities and interpret the depth and geometry of subsurface layers or zones of saturated material.

Based on the information obtained during the geophysical study, we estimated small-strain elastic properties including Young's modulus, Poisson's ratio, and shear modulus, which typically represent upper-bound stiffness values applicable to very low strain (less than about 0.001 percent) levels; however, small-strain values are not representative of HDD construction conditions. For HDD hydraulic fracture analyses, the small-strain moduli are correlated to large-strain (about 0.1 percent) moduli using modulus reduction relationships. These values are appropriate for use in hydraulic fracture analyses.

BEYOND THE REQUESTED SCOPE

As part of a small group of geotechnical practitioners in our company that are experienced in trenchless construction methodologies and analyses, we are often called upon to internally consult on

proposal requests and/or projects received by one of our nationwide offices.

In one instance, our trenchless group was approached by an office located on the east coast who had received a request for proposal from a local civil firm to perform a geotechnical investigation and HFIR analysis of a client-provided preliminary HDD profile. As part of the proposal preparation, we reviewed nearby historical boring logs from past projects to get a rough idea of subsurface conditions we may encounter as well as other publicly available information. The historical boring log data in the area of the proposed HDD crossing indicated relatively low blow count overburden soil overlying limestone bedrock, encountered within about 20 to 30 feet of existing grades. The historical boring log information we reviewed just tagged the bedrock surface, terminating within 5 feet of encountering the bedrock transition and included no rock core information; therefore, our initial thought was that we anticipated a relatively strong bedrock stratum if the overburden soils didn't provide high enough values of p_{max} to achieve acceptable factors of safety. We then consulted publicly available information to assess whether karstic features were mapped locally. The results of our search indicated the project area at large was documented as prone to karstic features; the local documentation also included mapped subsidence areas that included areas in relatively close proximity to the proposed HDD crossing. We now had information introducing increased uncertainty and risk for both geotechnical performance and HFIR analysis, which were not addressed by the historical boring data.

As karst terrain is inherently variable, with subsurface conditions that can vary significantly over short distances, we incorporated a targeted geophysical

investigation, using electrical resistivity tomography (ERT), into our proposed scope to assess the presence of dissolution features, pinnacled bedrock, or fracture systems. We concluded this would be a prudent enhancement to the project scope to reduce overall project risk as karstic features such as dissolution features, voids, and open fractures typically exhibit large contrasts relative to intact, competent limestone.

CONCLUSION

Geophysical methods provide relatively fast, cost-effective, and non-destructive means to supplement the information obtained during a more traditional geotechnical investigation including exploratory borings or test pits and laboratory testing; this is particularly true for trenchless projects where borings are widely spaced, and subsurface conditions can vary widely between exploration locations. Geophysical techniques such as MASW, seismic refraction, and electrical resistivity tomography, among others, provide data that enhances interpretation of subsurface conditions, supports more defensible engineering decisions, and improves risk management on projects. ✦

ABOUT THE AUTHOR:



Travis Goracke, P.E., is a senior geotechnical engineer in Terracon's Billings, Montana office with more than 25 years of experience in geotechnical engineering and construction materials testing, providing technical analysis for hundreds of projects across a wide range of site and subsurface conditions, including a particular interest in trenchless construction. He holds a B.S. degree from Montana Tech of the University of Montana.

RELIABLE WATER SERVICE RETURNS TO WATERBURY CT

Multi-Phase Renewal Water Main Project Off to Successful Start Using 8,000 Feet of Large Diameter, Compressed HDPE Pipe to Handle High Pressure

By: Steve Cooper, SCA Communications



“Maintaining and modernizing Waterbury’s infrastructure is essential to the continued growth and safety of our community,” said Mayor Paul K. Pernerewski. “This project represents a smart investment in our future and ensures residents and businesses can count on safe, reliable water service for generations to come.”

- Mayor Paul K. Pernerewski, City of Waterbury CT



One of the most dramatic moments of the City of Waterbury’s aging drinking water system came when water from a pipe break was so forceful that it launched large rocks into the air, damaging a garage a hundred feet away when they came down. Other frequent near tragic events led to the fast-tracking of an improvement program. In September 2025, a break in a transmission line cut water along a 10-mile stretch of pipe to nearly one half of the city, caused its 24 schools to close, flooded homes and businesses, and triggered a boil water order to be issued. The City of Waterbury Water Company had to use a payloader’s bucket to flatten this geyser.

Now, this city of 125,000 has started a program that will use minimally intrusive technology and heavy-duty pipe to eventually replace nearly nine miles of its high pressure (200 psi) Third Water Supply Transmission Main installed in 1968. Critically important, it carries potable water from the city’s primary Water Treatment Plant through Thomaston into Waterbury.

“HDPE REMAINS FULLY ELASTIC THROUGHOUT THE REDUCTION AND INSTALLATION PROCESS.”

“The city was interested in analyzing the problems that they were having with the transmission main coming from their Wigwam treatment plant going down into Waterbury along the river,” explained Andrew Morosky, P.E., senior project manager, Tighe & Bond (Middletown, CT), the engineering design firm. “They had numerous breaks, at least two significant ones, and wanted to prevent future catastrophic failures, especially where the transmission main was in heavily congested urban settings. The city was concerned that the pipe was going to be an ongoing maintenance nightmare, and especially with the pressures down on Thomaston Avenue, which were in the neighborhood of 200 PSI. A main that large with that kind of pressure is a dangerous mix when the leak is involved.” Proof of that was found when a break in that pipe

created a geyser so strong that it propelled a cascade of garage-damaging rocks high into the air.

“Maintaining and modernizing Waterbury’s infrastructure is essential to the continued growth and safety of our community,” said Mayor Paul K. Pernerewski. “This project represents a smart investment in our future and ensures residents and businesses can count on safe, reliable water service for generations to come.”

The Waterbury Water Department supplies an average of 14 million gallons of drinking water a day to residents and businesses in Waterbury, Watertown, Prospect and Wolcott. There are nearly 400 miles of water main and more than 26,000 water service connections. The rehabilitation project, called the Third Water Supply Transmission Main, is being done in phases. The first and second phases were combined and completed in a few



The Waterbury water transmission line project used 42-inch SDR11 PE4710 HDPE IPS pipe manufactured by JM Eagle that has a wall thickness of 3.82 inches and is rated for 200 PSI working pressure

months during the summer and fall of 2025 that saw 1.5 miles of pipeline fitted with new high-density polyethylene (HDPE) PE4710 pipe from JM Eagle (Los Angeles, CA) between State Roads STA 337+54 and STA 420+95. This area was prioritized due to past failures and high-risk conditions.

With several major breaks during the past several years, the city was open

to suggestions for repairing the 42-inch prestressed concrete cylinder pipe (PCCP) system. Morosky and his team conducted an analysis that included traveling the route of the system from the treatment plant.

“As part of our study, we looked at rehabilitating the pipe in several ways, one of which would be open trench replacement of the concrete pipe, spray on lining, cured-in-

place, sliplining it with PVC or high-density polyethylene pipe. And we also included the CompressionFit™ method that uses the HDPE pipe. This was very appealing to the city because it would mean less intrusive construction projects, less disruption to the residents and the businesses nearby. We originally indicated there would have to be as many as 22 pits

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The 42-inch-diameter PE4710 HDPE is fed through the Murphy Pipeline compression die into the old 42-inch prestressed concrete cylinder pipe (PCCP)



This geyser caused by one of the breaks in Waterbury's 200 psi potable water transmission lines launched sizable buried rocks into the air, damaging a nearby garage

to cover about a mile and a half of main on Thomaston Avenue that was critical to them and they wanted to get done with this phase. What ended up happening is the contractor is now installing far fewer pits and they're doing longer runs anywhere from 500 to 1000 or more feet at once. And it's pretty amazing that they can lay out that much pipe on the side of a pretty busy state road and still maintain traffic."

Developed by Murphy Pipeline Contractors (Jacksonville, FL), the method pulls a new HDPE pipe that has been

'compressively fit' inside the existing host pipe. Governed by ASTM F3508, the CompressionFit™ HDPE pipe lining technology specifies an HDPE pipe with an outside diameter larger in size than the inside of the host pipe to be renewed. After the HDPE sections are fused together to correspond to the pull distance, the pipe is pulled through a reduction die immediately before entering the host pipe. This reduces the HDPE pipe temporarily below the inside diameter of the host pipe allowing it to be inserted.

While the towing load keeps the HDPE under tension during the pull, the pipe remains in its reduced size. The HDPE remains fully elastic throughout the reduction and installation process. After installation, the pulling load is removed. The HDPE pipe expands until it is halted by the inside diameter of the host pipe. The effectively natural 'tight' or 'compression fit' is accepted as exchanging an existing failing pipeline with a composite pipe in its place.

"Due to the high pressure required for the system, one of the thickest walled HDPE pipe was specified," explained Camille George Rubeiz, P.E., F. ASCE, co-chair, HDPE Municipal Advisory Board (MAB), and vice president for the Plastics Pipe Institute's (PPI) Municipal & Industrial Division. "This 42-inch DR11 pipe has nearly a four-inch wall thickness to provide a pressure rating of 200 psi. To be able to compress that heavy, thick pipe into a die that enables it to be pulled through the old pipe is possible only with HDPE pipe because of its inherent flexibility and ductility. These attributes also allow the pipe to return to its original diameter thereby maximizing the flow rate of the renewed pipeline."

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The thickness of the pipe wall was calculated using the pressure of the line. “We went down into a pressure relief valve chamber,” Morosky said, “and saw that the pressure gauges were, in fact very close to 200 PSI, which is significant pressure in this main. The SDR11 HDPE PE4710 pipe was selected based on its rated capacity or rated pressure rating for pipe that size. It is extremely thick. I put my hand next to it, and it was about the thickness of my hand going sideways.”

The pipe in 50-foot-long sections was fused together into one string and dropped into the pit and pulled back through the Murphy Pipeline die. Lengths varied from 700 to 900 feet using 205 tons of pull force. There were multiple downhole fusions, pull-through pits, butterfly valve installations, and emergency bypass operations to maintain uninterrupted service.

Once the new HDPE pipe is pulled into the existing PCCP pipe and released, it expands until it tightly conforms to the host pipe interior, creating a continuous, fully structural, leak-tight renewal pipeline. This tight fit eliminates annular voids, minimizes the need for grouting, and maintains nearly the full flow area of the original 42-inch main - an outcome not achievable with conventional sliplining.

According to Murphy, the use of CompressionFit™ technology delivered a strong balance of technical, financial, and community benefits.

“This method is capable of pulling up to 5,000 linear feet in a single installation,” stated Bill Fusser, P.E. director of technical projects for Murphy, “significantly reducing surface disruption where corridor conditions allow. For this project, actual pull lengths ranged from 500 to 900 linear feet, reflecting site-specific constraints in a challenging corridor that included narrow roadways, heavy traffic, dense underground utilities, and multiple stream crossings. Even with shorter pulls, this trenchless approach minimized environmental impacts, avoided continuous trenching, and mitigated disruptions to residential, commercial, and industrial stakeholders along Thomaston Avenue.”

In late 2025, a mile and a half of the old concrete transmission main was rehabilitated using CompressionFit™ with HDPE pipe downstream of the Naugatuck River crossing.

More information can be found at www.plasticpipe.org/MABpubs

ABOUT PPI:



The Plastics Pipe Institute, Inc. (PPI) is the major North American

trade association representing the plastic pipe industry and is dedicated to promoting plastic as the materials of choice for pipe and conduit applications. PPI is the premier technical, engineering

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AVAILABILITY AND DEMAND CONTINUE TO GROW IN THE NORTHEAST FOR HORIZONTAL HAMMER BORING (HHB)

Trusted to Get Through the Most Challenging Rock Formations

By: Richard Revolinsky, Geonex Inc, (GEO)

Whether maintaining, replacing or expanding the capacity of your utility system one thing is for sure, the trenchless methods deployed today have proven their viability through years of innovation, successful installations, and sharing the knowledge with designers and contractors alike. This collaboration has resulted in greater reliance and availability of these methods to accommodate the ever growing demand. Horizontal Hammer Boring (HHB), often referred to as Horizontal Down-The-Hole (DTH) Hammer Boring, while relatively new, is following suit, becoming a more readily available and trusted method among Northeast contractors and Engineers to get through the most challenging rock installations.

Horizontal Hammer Boring utilizes a pneumatic hammer at the leading edge of the installation to pulverize hard ground while simultaneously advancing the casing. While the use of DTH hammers is not entirely new to trenchless construction, the method has significantly advanced by standardized manufacturing of systems designed specifically to utilize modified DTH hammers in the horizontal position enabling precision control which have yielded impressive results. Successful installations have led the way to increased demand and greater investment in the technology ultimately resulting in greater

availability of equipment and contractors furthering the demand.

In July of 2020, Northeast Contractor Bortech Company Inc (Bortech) of Milton New York purchased their first GEONEX™ HHB system, an HZR610 capable of installing upwards of 300 feet of 24-inch casing through solid granite. Within several months of the same year, Bortech purchased a second GEONEX™ system, this time the HZR1200 and performed a 48-inch installation that winter. As only the second North American contractor to use the GEONEX™ system, Bortech gained a valuable advantage deploying the equipment in difficult ground conditions including cobbles, boulders and solid rock.

In 2024, Northeast Remsco Construction Inc of Wall Twp NJ purchased their first GEONEX™ system, and quickly completed eight 36-inch diameter installations. These were initially planned for soft ground micro-tunneling but later determined to be better

candidates for the HHB method when cobbles, an abandoned concrete duct-bank, and abandoned cast iron watermain were discovered along the bore path. Within 12 months Northeast Remsco expanded their resume of completed HHB installations to include several in New Jersey as well as in New York and Virginia with equipment to accommodate 36- and 48-inch installations.

Furthering the availability of professionally manufactured equipment, GEONEX™, the world leading manufacturer of complete systems specifically designed for utilizing DTH hammers, began offering manufacturer-direct leasing to accommodate the immediate needs of the North American Market. The leased equipment quickly began assisting contractors to complete projects that encountered obstacles when traditional auger boring systems were deployed. This leasing approach allowed designers and contractors to take the systems and methodology for a test-drive

“UTILITY COMPANIES LOVE THE RELIABILITY OF THE HHB METHOD.”

- MARILYN KMETZ, PRESIDENT, KMETZ INC.



Several projects in the Northeast have been specifically designed to utilize the HHB method

“A MORE READILY AVAILABLE AND TRUSTED METHOD AMONG NORTHEAST CONTRACTORS AND ENGINEERS.”

undertook a project in New Jersey which required in a variety of installations below Amtrak lines for the new Portal North Bridge project.

Following the success of Portal North, Kmetz began deploying their GEONEX™ equipment at nearly every project where they anticipated encountering rock, despite the accuracy, or lack of, a geological baseline report. “We’ve been doing HDD and Auger Bores all over New Jersey and into New York, Pennsylvania, and sometimes Delaware since 2000. We know what to expect, we know where the ground is hard. Instead of fighting it, we

and continues to provide the industry with a track record of successful installations in North America. This in turn has led to several projects specifically designed to utilize the method, further increasing demand.

After successfully completing one rental project which required parallel installation

of two 24-inch diameter steel casings through changing soil conditions from clay to sand to large cobbles, New Jersey based contractor KMETZ Inc. moved forward with purchasing their GEONEX™ HZR610 unit and tooling to accommodate 16-, 20-, 24- and 30-inch installations. Shortly after their purchase, Kmetz

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HHB utilizes a pneumatic hammer at rock face while simultaneously advancing the casing



Shown above, some of the site constraints of the Portal North Bridge Project. NJ based trenchless contractor Kmetz Inc utilized their HHB equipment on this project and now deploys it on nearly every project where rock is anticipated

.....
“ASSET OWNERS AND DESIGNERS CAN SAFELY PLAN TO UTILIZE THIS METHODOLOGY FOR THEIR FUTURE PROJECTS.”

just send our GEONEX equipment, get it done and move on to the next project,” commented Kevin Kmetz, Vice President of Kmetz Inc.

Nearly a year after receiving their equipment, Kmetz has completed more than 15 installations ranging from short distances of 80 feet to longer installations of 300+ feet. President of Kmetz Inc., Marilyn Kmetz shared her opinions on the equipment as well. “I used to get so stressed about the rock jobs. Typically we avoided them because there was always an issue with getting paid the rock price, the project taking too long, or the equipment struggling to cut the rock. Now I don’t even worry. Our crews have gotten a lot of experience already, and several of our clients like the utility companies love the reliability of the HHB method with several specifically requesting us to use it.”

In addition to the successes in New York and New Jersey, the HHB method was utilized in 2025 by Henniker Directional Drilling of Henniker NH for

KMETZ INC RECENTLY COMPLETED PROJECTS WITH HHB

- ROUTE 202 - 120LF of 20-inch**
- NJAW Washington Township Watermain Extension - 227LF of 24-inch**
- NJN Gas, Flanders, - 140LF of 16-inch**
- Franklin Watermain Extension - 120LF of 16-inch**
- Harlingen Pump Station, - 70LF of 20-inch**
- Golden Triangle, Walkill NY - 330LF of 24-inch**
- Portal North Bridge, AMTRAK**
 - 1. 140LF of 20-inch**
 - 2. 105LF of 30-inch**
 - 3. 85LF of 16-inch**
 - 4. 100LF of 24-inch**
 - 5. 100LF of 20-inch**
 - 6. 100LF of 16-inch**



HHB ensures precise line and grade control even in difficult hard rock crossings

American Trenchless Industry to evolve, adapt, and implement new techniques to overcome ever increasingly difficult crossings.

These examples further prove that; through professional manufacturing process, increased availability of equipment, increased availability of experienced contractors, and expanded resume of successful installations will increase the reliance and trust of designers and asset owners to deploy these methods for their projects. 🏗️

ABOUT THE AUTHOR:



Richard Revolinsky is the North American Operations Manager for Geonex Inc. He has served the trenchless industry for the past 15 years in several roles and differing stake-holder positions. He enjoys the innovation and creative problem solving of the Trenchless industry and the teamwork it embodies.

2 installations in Massachusetts which revealed an inability of traditional auger boring methods for installing small diameter 16-inch casings through the cobble ground.

In Pennsylvania, Pennoni Engineering selected the HHB method for 2 installations in Southampton Township that were required to be completed before a county bridge replacement. After evaluating the cost and feasibility based on site constraints of performing a 60-inch rock tunnel that would be required to utilize large diameter disc-cutters to overcome the gneiss present along the bore path, Pennoni designed the project with a 300-foot-long HHB installation of 24-inch casing for the watermain creek crossing, and a second unique design which would require telescoping of a smaller diameter casing inside a larger casing to reduce the risk of failure to abrasivity of the rock on the HHB tooling as well as allow for adjustment of slope to ensure the full 405-foot-long installation would achieve the shallow slope of the gravity sewer. The project which was awarded to a local general contractor and subcontracted to Bortech Company Inc of Milton NY was successfully completed within budget, on time, and with the utilization of their GEONEX HZR1200 drilling equipment.

The examples provided in this article represent the ability of the North



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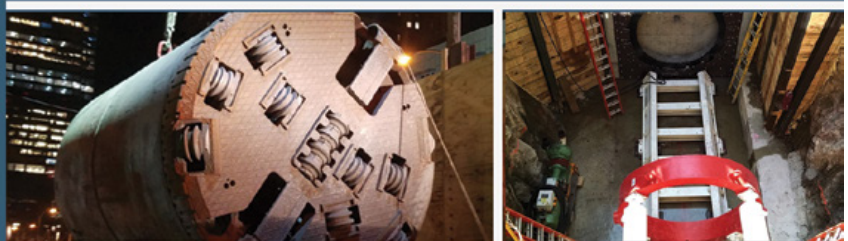
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