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NORTHEAST JOURNAL

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NO-DIG SHOW 2025

Call for Abstracts

SUBMISSION DEADLINE: JUNE 30, 2024

The North American Society for Trenchless Technology (NASTT) is now accepting abstracts for its 2025 No-Dig Show in Denver, CO at the Colorado Convention Center March 30-April 3, 2025. Prospective authors are invited to submit a 250-word abstract outlining the scope of their paper and the principal points of benefit to the trenchless industry.

The abstracts must be submitted electronically by June 30, 2024 on the NASTT website:

nastt.org/no-dig-show

The No-Dig Show is owned by the North American Society for Trenchless Technology (NASTT), a not-for-profit educational and technical society established in 1990 to promote trenchless technology for the public benefit. For more information about NASTT, visit our website at nastt.org.

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Department of Water & Water Supply

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By: Mara Kilburn, Precision Trenchless LLC

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MESSAGE FROM NASTT-NE CHAIR

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

Welcome to the 16th edition of the ***Northeast Journal of Trenchless Technology Practices***! Thank you for taking the time to open this publication and check out the content that our Chapter has pulled together. A lot of hard work goes into putting these magazines together, and our Publisher does an amazing job of making our volunteers look good! I hope that you find the content in this publication to be forward-thinking and useful in your day-to-day work. As you take a read through this edition, please take note of the messaging portrayed throughout the articles and the importance of these topics to our industry. This magazine does a fantastic job at portraying the positive role that various trenchless technologies can play within our utility engineering world. The individuals who provided content for this edition are passionate about what they do and are committed to propelling the trenchless industry in a positive direction, consistent with industry goals.

2023 NASTT-NE Conference Recap

The NASTT Northeast Trenchless Conference was very well attended and received in Albany, New York. Our annual conference, held in November each year, continues to bring together the best minds and leaders in the Northeast trenchless community. There were over 100 attendees, multiple technical presentation tracks, 24 exhibitors, and interactive outdoor demonstrations. In addition, multiple gas industry-specific presentations were included in the program, and we will continue to expand gas-related content both in print publication and at future conferences.

Speaking of future conferences, it is never too early to start thinking about this years' conference, which will be held at the Sturbridge Host Hotel and Conference Center in Sturbridge, Massachusetts. More details will be forthcoming, so keep an eye out for emails and start getting excited for the conference! We are always looking for good content for the program, so please also watch out for our "Call for Papers" sometime in June or July.

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

2024 No-Dig Show – Providence, RI:

As you read this introductory message you may already be in Providence, Rhode Island attending the annual No-Dig Conference. We are pleased to welcome our national NASTT leaders and members to the Northeast for the very first time! Providence is a wonderful and unique city, and the conference venue is top-notch. We hope that the national trenchless community enjoys the show, and we will do our best here in the Northeast to promote the good work happening in our region and make sure it is a memorable conference for all.

Board Updates:

As we forge ahead in 2024, we have undergone a change in leadership at the Chapter level. After two years of dedicated and insightful stewardship, Eric Schuler has now become our "Past Chair", and I have assumed the reins as Chair of the Board. I am very much looking forward to the next two years of leadership and will work with all the esteemed members of our Board to continue to push forward the goals of increasing awareness, fostering interaction, and expanding trenchless market growth in the Northeast. To keep things fresh, we continue to stay committed to changing the Executive Committee and Board roles and responsibilities on a two-year cycle. As such, our former Treasurer Charlie Tripp has become our Vice Chair; John Altinyurek (former Secretary) is now Treasurer; and Tom Loyer will be keeping us all organized as Secretary. Please see the section of this publication that highlights the changes in the Executive Committee and Board of Directors for 2024.

Thank you for taking the time to read this publication. We are all very busy, but staying in touch with trends and topics relevant to the trenchless world is how we make ourselves better at our jobs and connects us with colleagues and friends in the industry to enhance the industry as a whole. Thank you for being a part of our Chapter's journey, have a great time at No-Dig, and hopefully I will see you in Sturbridge, MA this November.

Jonathan Kunay

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

MESSAGE FROM NASTT CHAIR

Matthew Wallin, PE, NASTT Chair

The 2024 No-Dig Show Arrives in the Northeast!

Hello Northeast Chapter Members & Associates! Welcome to Providence for the 2024 No-Dig Show April 14-18! After months of hard work and planning the moment has arrived as the 2024 No-Dig Show kicks off for the first time in NASTT's Northeast Region! We are so excited to have the 2024 No-Dig Show underway as it is in such a great central location within the heavily populated northeast corridor, readily accessible from Boston, Philadelphia, New York City, Hartford, and many other cities in between.

Our Show motto is ***Green Above, Green Below*** as it is important that our industry is a steward of our precious natural resources, so we welcome the opportunity to provide a forum for learning about the latest in innovative trenchless products and services that help us all accomplish that lofty goal. The annual NASTT No-Dig Show serves as a cornerstone for professionals within our industry to come together, exchange ideas, and explore the latest advancements in trenchless technology. Throughout the duration of the conference, attendees will have the opportunity to engage with industry leaders and experts through various forums, an exciting exhibit hall, and networking events.

In the coming months we have many additional events planned to bring the underground infrastructure community together. Our ever-popular NASTT Good Practices Courses are being held both virtually and in-person throughout the year.

> **"OUR VOLUNTEERS AND COMMITTEE MEMBERS ARE WHAT KEEP US MOVING IN THE RIGHT DIRECTION!"**

Visit **www.nastt.org/training/events** to find a course that fits your schedule.

If you have attended an NASTT event (national or regional) you probably left feeling excited and eager to get more involved. I ask that you consider getting engaged in one of the many NASTT committees that focus on a wide variety of topics. Some of our committees that are always looking for fresh ideas and new members are the Training and Publications Committee, the individual topic Good Practices Course Sub-Committees, the Educational Fund Auction Committee, the No-Dig Show and No-Dig North Planning Committees and Technical Program Committees. There are many opportunities for you to consider where your professional expertise can be put to use through networking with other motivated volunteers. With education as our goal and a strong drive to provide valuable, accessible learning tools to our community, we are proud of our continued growth as both an organization and as an industry. Our volunteers and committee members are what keep us moving in the right direction.

For more information on our organization, committees, and member benefits, visit our website at **www.nastt.org** and please feel free to contact us at **info@nastt.org**.

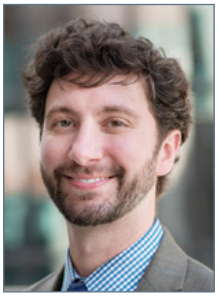
Thank you to all of the volunteers and members whose support and dedication to advancing the mission of NASTT allow us to continue to propel our industry forward. We look forward to seeing you at a future regional or national conference or training event soon!

Matthew Wallin

Matthew Wallin, PE
NASTT Chair

INTRODUCING THE NASTT-NE BOARD 2024-2025

JONATHAN KUNAY – CHAIR



Jonathan Kunay, PE, PMP is an Associate Engineer and Conveyance Discipline Leader for CDM Smith in Boston, MA. He has 21 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 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 17 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 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 Vice Chair of the WEFTEC Collection Systems Symposia.

CHARLES TRIPP – VICE CHAIR

Charles Tripp, P.E. is a Technical Manager focusing on Pipeline Rehabilitation Design and Condition Assessment for the New England Water Business Line at AECOM in Chelmsford, MA. He has 18 years of experience working as a design engineer and project manager on a variety of trenchless projects including pipeline rehabilitation, condition assessment, risk modeling, and general asset management. His varied design experience also includes collection systems design and peer review, wastewater treatment, water resources, and site-civil design to improve municipal infrastructure.

Charles was first introduced to trenchless technologies through his involvement in multiple sanitary sewer rehabilitation projects starting early in his career. 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.

Charles 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. He is also PACP/MACP certified by NASSCO.

As Vice Chair for the Northeast Chapter of NASTT, Charles continues to capitalize on his devotion to trenchless technologies and in advocating for its use in the local construction market. He continues to apply his experience in the management of the Executive Committee and in ensuring the organization meets its goals and obligations.

EXECUTIVE COMMITTEE

JOHN ALTINYUREK – TREASURER

John Altinyurek is a Project Engineer with the New York, NY, office of Delve Underground Engineering, PLLC. Over the course of his career in the underground industry, John has worked on major tunneling and trenchless projects in the New York City area, including his continued work on the Newtown Creek CSO Tunnel project for the New York City Department of Environmental Protection. He has also been involved in projects for clients such as the New York State Department of Environmental Conservation; NYC Department of Design and Construction; New York City MTA Transit; Port Authority of New York and New Jersey; Amtrak; and Nassau County.

For the past nine years, John has focused on underground construction management, design and construction of water and wastewater projects, and tunnel and conveyance design projects. He has worked on various pipeline projects utilizing tunneling, microtunneling, pipe jacking, horizontal directional drilling, and other tunnel rehabilitation methods.

John 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 John'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.

TOM LOYER – SECRETARY

Thomas Loyer is Vice President of Engineers Construction Inc. Trenchless Division, in Williston VT. He oversees all aspects of the operations pertaining to directional drilling, pipe ramming, auger boring, tunneling, and pipe bursting.

Tom's career has been focused on the underground construction industry for over 30 years. Prior to joining ECI, Tom owned and operated Trenchless Technologies of New England, Inc. During his nineteen years at TTNE he worked alongside his brother, Mike, to promote and develop the trenchless industry in New England. He studied business at Champlain College in Burlington, VT.

Tom has served on several boards, including The Associated General Contractors of Vermont, where he chaired the legislative committee, and volunteered with associations such as the Fraternal Order of Eagles Aerie #793, Shelburne Little League, CSB Youth Hockey, and the CVU Football Boosters Board.

For the last twelve years, he 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, and his wife, Lori, live in Shelburne, VT.

NASTT-NE BOARD 2024-2025 EXECUTIVE COMMITTEE

ERIC SCHULER – PAST CHAIR

Eric Schuler is a Deputy Commissioner for a public wastewater system serving a population of roughly 350,000 residents. In his leadership role, he oversees Capital Programming, Construction, Asset Management, Fleet, and Inventory Control. Mr. Schuler has nearly 15 years of experience in both the private and public sectors. He earned his Bachelor of Science in Civil Engineering degree from Clarkson University in Potsdam, NY and has primarily been involved in wastewater, drinking water, civil-site, and stormwater sectors. Eric is a licensed Professional Engineer in New York whose design, project management, and construction-related experiences have helped successfully execute many "trenchless"-focused projects.

Early in his engineering career he gained exposure to various trenchless technologies through utility evaluations and development of utility project design alternatives. He immediately started to envision great opportunities for communities plagued by utility deficiencies and construction constraints to utilize CIPP, HDD, among other trenchless technologies; and for them to be able to benefit from both social and economic perspectives. Eric has also stressed the importance for municipalities to incorporate asset management into utility system evaluations and system rehabilitation designs in order to aid development of capital projects and to determine the most suitable trenchless applications for implementation.

In addition to NASTT-NE, Eric is also on the NASTT Board, the President for the Central New York Branch of the American Public Works Association (APWA), and a Director of the Central New York Water Works Conference (CNYWCC). Eric continues to push for growth of trenchless technologies in upstate-New York and has trained utility owners on the use of hydraulic modeling methods for proper development of utility rehabilitation project design. He is an advocate for educating (designers & installers) of trenchless applications through proper training and increased accessibility of industry standards/guidelines to ensure successful project design and execution. The successful use and increased awareness of modern-day trenchless technologies that incorporate innovative equipment and materials are what Eric believes will continue to shape and drive the direction of the utility industry for the coming decades.

2024-2025 NASTT-NE BOARD OF DIRECTORS

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NASTT NORTHEAST REGIONAL CHAPTER

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Visit www.nenastt.org
for information on future conferences

NEW INSIGHTS TO TRENCHLESS TECHNOLOGY

UMass Lowell NASTT Student Chapter Report

UNIVERSITY OF MASSACHUSETTS LOWELL

By: Iverson Rodriguez, UMASS LOWELL Student Chapter

Last fall semester marked the culmination of yet another enriching journey to the annual regional chapter conference of the North American Society for Trenchless Technology (NASTT) in Albany, NY. As the president of the Umass Lowell student chapter, this event has become somewhat of a tradition, but each year brings new insights and experiences.

This year was particularly enlightening as it marked my third consecutive attendance at the conference. With each passing year, I find myself delving deeper into the intricacies of underground trenchless technology. The conference served as a platform for us to expand our understanding of this field, with a special focus on Horizontal Directional Drilling (HDD) machines.

One of the most valuable aspects of the conference was the opportunity to engage directly with industry professionals and company owners. Conversations with these seasoned individuals provided invaluable insights into the practical applications of trenchless technology and its significance in various sectors. What struck me the most was how these discussions highlighted the relevance of environmental engineering within the NASTT field.

Through conversations with company owners, I realized that there is indeed a significant place for environmental engineers in the realm of trenchless technology. Their emphasis on minimizing environmental impact and adopting sustainable practices underscored the crucial role that environmental considerations play in the implementation of trenchless techniques.

Meet Joshi (L), Chapter Vice-President and Iverson Rodriguez (R), President speak at the 7th Annual Northeast Trenchless Technology Conference in Albany NY

Attending this conference has deepened my understanding of underground trenchless technology and broadened my perspective on the industry. It has reaffirmed my passion for environmental engineering and its potential to intersect with innovative technologies for a more sustainable future.

> **"THERE IS INDEED A SIGNIFICANT PLACE FOR ENVIRONMENTAL ENGINEERS IN THE REALM OF TRENCHLESS TECHNOLOGY."**

As I reflect on the wealth of knowledge gained from this experience, I am filled with gratitude for the opportunities provided by NASTT and our university chapter. I eagerly anticipate applying these insights in both my academic pursuits and future career endeavors, as I continue to explore the dynamic field of trenchless technology.

ABOUT THE AUTHORS:

***Iverson Rodriguez** is a junior from Environmental Engineering and the President of NASTT Student Chapter at UMassLowell. He has been part of the Student Chapter since 2021 and is hoping to learn even more about the industry.*

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

Mr. Brian Dorwart, PE, PG is the only individual who will be honored with induction into the NASTT Hall of Fame during the NASTT 2024 No-Dig Show in Providence, RI. Brian's long distinguished career and dedication to all things trenchless make him a very worthy recipient of this year's honor.

Brian first got involved with NASTT in 1997 at the pivotal No-Dig Show in Seattle, and has been a mainstay, contributing his time and knowledge in the 27 years since. He is a current member of the No-Dig Show Program Committee, and has authored and presented numerous No-Dig papers along with being a Technical Session Leader several times.

Brian has had a very 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. Founded in 2004, the NTA was committed to the growth and future of the New England trenchless industry, and worked to increase awareness of the benefits of trenchless construction among owners and operators of utilities, contractors, engineers and the general public. Brian was one of the earliest members of the NTA, and was the first engineer to join, bringing his vast storehouse of knowledge to this dynamic forward-looking organization. He served as President of the NTA in 2011 and was recipient of the NTA Founders Award in 2013. Brian remembers the earliest meetings of the NTA were held at local Ditch Witch and Vermeer maintenance shops.

> **"BRIAN WAS THE FIRST ENGINEER MEMBER OF THE NORTHEAST TRENCHLESS ASSOCIATION (NTA)."**

In March 2016, as the next step forwards, the NTA was merged into the present-day NASTT-NE Chapter, which has effectively continued to expand the work originally done to increase understanding and acceptance of trenchless methods across the Northeast. Being a part of the NTA leadership Brian was at the forefront of these efforts. His involvement in the

Brian was first engineer member of the Northeast Trenchless Association, founded in 2004

Receiving the NTA Founder's Award from Matt Timberlake

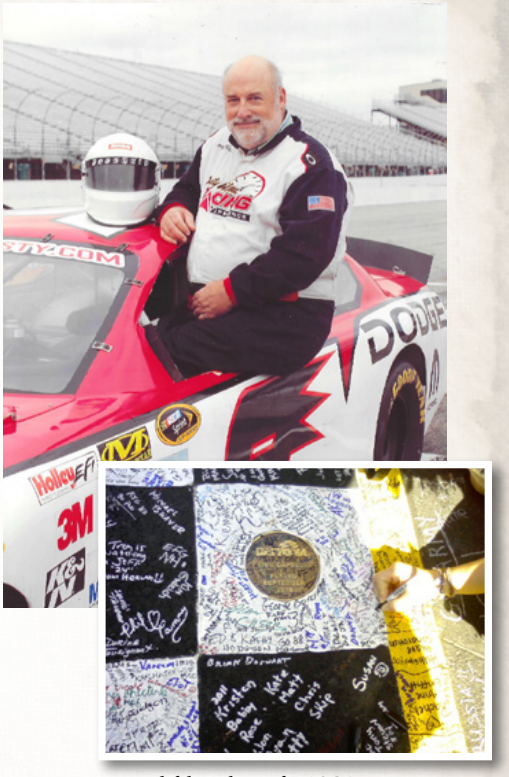
NASTT-NE Chapter continues to this day and Brian remains a regular participant at the annual NASTT-NE Trenchless Technology regional conferences and other Chapter events.

Throughout his career Brian has had extensive involvement in other Professional Associations including ASCE, AWWA and AREMA, delivering frequent presentations at ASCE Pipelines Conferences, and AWWA regional meetings. He has served on trenchless related ASCE committees that developed or updated Manuals of Practice for Auger Boring, Pipe Ramming, CIPP and reviewed the HDD manual. Similarly he worked on the groups updating the ASTM standards overseeing soil & rock, and the trenchless rehabilitation of sewer and water pipe line infrastructure. As Instructor at the Trenchless Technology Center in Ruston, and at invited speaker at Purdue and Louisiana Tech universities, Brian has substantially advanced the effort to disseminate greater understanding and awareness of various trenchless applications. He made a major presentation at the Florida AWWA Conference on the 54-inch HDPE HDD project in South Beach FL.

Brian's lengthy distinguished career began in 1972 as as a geologist, geotechnical exploration driller, and construction technician in Rochester, NY. He further broadened his expertise in underground construction, graduating in 1979 with a Masters' degree in Civil Engineering, then immediately started work with a geotechnical engineering firm. His engineering experience has included construction, technical analyses, and management of projects involving geology, geotechnical engineering, underground construction, and geotechnical instrumentation. He has provided expertise on projects ranging from heavy construction of pipelines, tunnels, dams, and highways, to light industrial buildings and dynamic machine foundations, but his area of specialization is the interaction of ground to excavation tools and/or natural environmental processes and ground modification for construction.

Brian resides in New Boston NH with Dana his wife of 45 years

Think tank meeting at Ditch Witch facility



Has a lifelong love of NASCAR motor sports

"BRIAN'S INVOLVEMENT IN THE NASTT-NE CHAPTER CONTINUES TO THIS DAY."

Over his career Brian has worked for numerous national firms, including Shannon and Wilson, GZA, Haley & Aldrich, and now Brierley Associates. His clients have included contractors, private industry, public agencies, owners, engineers, and other governmental agencies in numerous business sectors such as oil and gas pipelines, telecommunications, water and waste water, power transmission, rehabilitation of pipes and culverts, and transportation. Brian's focus on behalf of these clients has been on trenchless technology applications including directional drilling, small to large tunnels, soil/rock stability in shoreline protection systems, landslides, during permitting, design, and construction. In addition to this technical expertise, his management experience includes developing strategies for bid preparation, risk based design, conceptual design, research and development, construction engineering, forensic analyses, and consulting.

Having accumulated more than 40 years' experience in underground engineering and more than 25 years design and field experience with various types of horizontal directional drilling (HDD), Brian is presently a a registered Professional Engineer in 30 states and a Registered Professional

Past presidents dinner with the NASTT-NE Northeast Regional Chapter and the former Northeast Trenchless Association

Brian remains closely involved with NASTT-NE Chapter activities, and regularly makes presentations at the Northeast Trenchless Technology conferences

First train through Stampede Pass WA for BNSF after rebuilding the out of service line. Biggest BNSF project to date

Summers in his youth were spent in Algonquin Park working with hunting/fishing guides and learning how to build cedar strip canoes

Final pull 3,000 feet of 54-inch HDPE South Beach, FL

Geologist in 2 states. He has worked in all 50 states, throughout Canada, Central and South America, Puerto Rico, New Zealand and Nevis. He is also qualified as technical expert in Federal and State courts, a "Friend of the Court" in Canadian Provincial Courts supporting both contractors and owners in claim negotiation and remediation for geotechnical and geological matters associated with tunnels, directional drills, shoreline development, landslides, and forensic studies for geologic and geotechnical issues in jury trials, hearings, and before public boards.

Brian's fascination with geotechnical engineering and underground construction was spurred by his lifelong interest and deep love for outdoors pursuits. Growing up in Corning NY, he got into skiing early on the slopes just outside of Ithaca. Brian spent summers in Algonquin Park up in Ontario working at a boy's camp, working with hunting and fishing guides, and learning how to build cedar strip canoes. He also has a fondness for motor sports, and attended NASCAR races in Bristol and Daytona with Ralph Carpenter. He currently resides in New Boston NH, with Dana his wife of 45 years, and has four adult daughters.

On behalf of the NASTT-NE Chapter, and NASTT, thank you Brian for your devotion and substantial contributions towards the development of the trenchless technology industry in the Northeast and throughout North America. Congratulations on such a well-deserved honor and recognition from your colleagues and peers upon your induction into the NASTT Hall of Fame!

SURROUNDED BY HISTORY PART 1:

Warwick Reduces Infiltration with Bayside Sewer Construction Project While Navigating Around Cultural Artifacts

By: Hemlock Directional Boring

Bayside Sewer Project – Contract 86B

Project Timeline

Bid Date: 2/20/2020
Projected Start Date: September 2020
Projected Completion Date: December 2022

Actual Start Date: March 2022
Anticipated Completion Date: September 2024

Project Cost
$24 million

Project Description
- Open-cut:
  - 23,971 lf of 1 ½", 2", 3" 4", 6"
- Trenchless:
  - 29,763 lf of 2", 3", 4", 6", 8"
  - 67,189 lf of 1 ¼" Laterals to 540 homes.
- Total curb to curb overlay 53,734 lf

BACKGROUND

Located only 12 miles from downtown Providence, the historic City of Warwick has been working steadily to clean up the waterways and beach front throughout the older areas of the city. The reduction of infiltration of private septic systems into the public waterways has been a focus in this effort to reduce pollution from overflows. Approximately 30 years ago the City began research to install a sewer system in two major pollution areas, Bayside and Apponaug. Bayside is located in a section of Warwick known as Rocky Point. Because the City is situated in the main region of the historic Narragansett Indian settlements, extensive research was also done ahead of time to identify locate and protect as much of the settlement heritage, artifacts and culture. The history of continuous indigenous settlement in this area stretches back at least 400 years, with one of the largest historic populations ever recorded at nearly 300,000 people. This exploratory work was completed over a 12-14 year time period and the information was used to complete the design of the new low pressure combined sewer system and the ultimate location of the house connections.

The Bayside Sewer Project is in an area of significant historical importance

The long careful process of study and consultation resulted finally in the Bayside Sewer Project being tendered in February 2020 with a final start date of

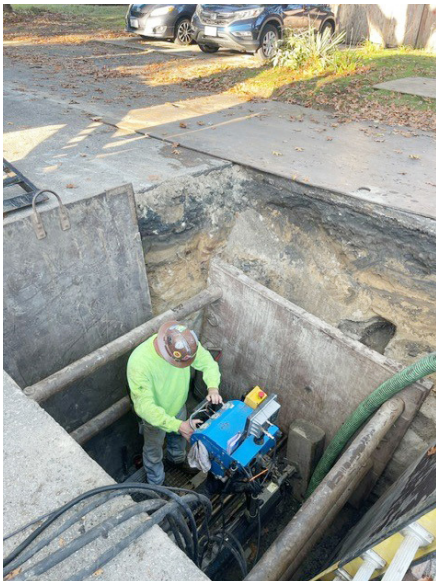
March 2022. The $24 million project was split into two separate trenchless and open cut sections, divided approximately 55/45 percent. The open-cut portion, designated as Areas 5-6, had a very limited presence of cultural artifacts while the trenchless section in Areas 1-4 had a dense concentration of historic relics. Trenchless technology was chosen for Areas 1-4 in order to reduce the potential for damage to the cultural resources inventoried in the pre-design archaeological studies, and also to minimize any traffic disturbance to residents and businesses. The trenchless technology application selected for this project was Horizontal Directional Drilling (HDD).

INSTALLATION

Overall, the project involved the construction of close to 54,000LF of new sewer main along with providing new service laterals and service connections to approximately 935 residential properties within the project area. This article will focus on the trenchless technology portion in Areas 1-4, where HDD was employed for the force main, collector mains and the house laterals. This section was designated as an area of significant archaeological importance requiring meticulous cultural preservation

Smaller and mobile HDD footprint was key to the efficiency of the installation

Project intended to clean up the beachfront around Rocky Point



Methodical, stop-and-go nature of the work has been challenging

and retrieval due to the with large amount of documented settlement activity. The City retained an archaeology firm and the local Narragansett Indian Tribal Historic Preservation Office (NITHPO) was engaged to work alongside the project crews to identify the best areas for the HDD bore paths as well as establishing the locations best suited to complete the lateral house connections.

The work in this area was restricted to pre-excavated and archeologically cleared work areas that were no more than 8- by 8 feet. All additional excavations, including house lateral terminations, were required to be completed in the presence of NITHPO and had to be conducted as archeological digs. These digs can take up to 4 days and many cannot be completed properly due to the heavy presence of cultural artifacts. If a required excavation was not cleared by NITHPO then an alternative location was attempted. Some locations have taken as many as 10 attempts to find a usable spot without damaging or infringing upon a cultural artifact. Findings so far have included a large concentration of seashells, food fragments and several hundred bodily remains. The stop-and-go nature of this work has proven to be very challenging, requiring careful coordination and cooperation amongst the various interested elements.

Lateral lengths were determined by ability of crews to access the property

FORCE MAIN BACKBONE

The new combined sewer system designed for Areas 1-4 has a larger diameter force main backbone running through Area 1 consisting of 6- and 8-inch HDPE pipe that was installed on Tidewater Drive with the use of an American Augers DD-6 60,000 lb Directional Drill. The soil types were predominately hard pan with large cobbles and boulders, sitting on an outcrop of shale rock. This backbone was installed at depths ranging from 7-12 feet to avoid the existing underground infrastructure.

"HISTORY OF CONTINUOUS INDIGENOUS SETTLEMENT IN THIS AREA STRETCHES BACK AT LEAST 400 YEARS."

The HDD pilot hole was entered into the archaeologically cleared excavations as a starter pit and then drilled to the adjacent cleared excavation which would be constructed as a full excavation with shoring. The pilot hole would then continue to the desired exit pit which would also be a complete excavation with shoring. The product pipe would then be pulled back from this exit pit to the entry pit, from fully excavated hole to fully excavated hole. When the product pipe reached the entry hole the reaming assembly would then be removed and the drill string pulled back to the starter pit. This careful process reduced the potential risk of damaging any cultural artifacts still in situ between the two pits. The next bore would be completed in the similar fashion with the exception being that the exit hole for the subsequent bores would be the already excavated entry hole for the prior bore. The bores were limited to one block at a time to allow for manageable traffic detours around the work.

COLLECTOR MAINS

The collector mains installed for the side streets are either of 2- or 3-inch HDPE pipe that were installed with a smaller drill rig Ditch Witch JT32 at depths from 6-8 feet. The soil types for these collector mains were similar to those encountered when installing the backbone pipe – generally hardpan with large cobbles and boulders and shale rock. The side streets were much narrower than the main roadway and most are dead ends. The smaller and

Careful coordination between the contractor, tribal elders and archaeologists to prevent damage to cultural artifacts

Geology was predominately hard pan with large cobbles and boulders, sitting on an outcrop of shale rock

mobile footprint of the JT32 was the key to the efficiency of the installation, minimizing the impact on cultural artifacts and maintaining traffic flow for the residents.

LATERALS

The trenchless technology section of the project has approximately 540 house laterals. The house lateral length was first determined by the property owners' agreement to allow access to their property. If a property owner refused access to the property then the lateral terminated at the street line, approximately 20 feet in length. If the property owner granted access to the property then the termination was determined by where the septic pipe leaves the house, generally 70 feet in length.

Trenchless technology was chosen in order to reduce the potential for damage to the cultural resources

All laterals are being installed with a TT Technologies GrundoPit directional drill. This machine fits into the cleared excavation and is set up at the desired elevation for the installation, which eliminates the need for a lead-in drill from a starter pit to the excavation. The lead-in bore was not possible as the directional drill would have to sit on an adjacent property owners land to complete each lateral. Use of the GrundoPit has thus eliminated messy and costly property access agreements. The pit launched drill will push a pilot hole from the cleared excavation to the cleared exit at the property line or the existing septic line depending on the property agreement. A small diameter, 1 ¼-inch HDPE pipe is pulled back from the exit pit to the pit where the collector main is located. The property end is fitted with a curb box and a shut off while the other end is connected to the collector main. Many of the house laterals are drilled from and connected to the collector main in the same cleared excavation. A priority of this work is to combine as many laterals in each excavation as possible in order to reduce the number of excavations that could impact the cultural artifacts.

SEPTEMBER 2024 COMPLETION

Work resumed in April on this project, after a short winter hiatus. Careful use of state-of-the-art HDD equipment will continue to provide the best daily production rates with the least amount of tool wear, and minimal impact on the embedded history surrounding the project site. After completion in September 2024, a full report on this project will be published in the Fall/2024 edition of the ***NASTT-NE Northeast Journal of Trenchless Technology Practices***.

ABOUT HEMLOCK DIRECTIONAL BORING:

Hemlock Directional Boring *was founded in 1994, and was one of the first companies in New England to use trenchless technology. Hemlock was the first company to successfully install ductile iron pipe via directional drilling, and has over 25 years of experience in water, sewer and underground utility installation.*

UV CIPP RENEWS STORMWATER DRAIN AFTER OTHERS FAIL

PPM PROGRESSIVE PIPELINE MANAGEMENT
THE INFRASTRUCTURE RENEWAL SPECIALISTS

By: Thomas Nestoras, Progressive Pipeline Management

After other methods failed, UV Cured-In-Place-Pipe (CIPP) proved an ideal solution to rehabilitate a leaking 36-inch storm drain under a heavily trafficked road at a manufacturing facility in New Jersey.

Project: 36-inch Stormwater Drain Renewal
Location: Middlesex County, New Jersey
Length: 70 feet
Client: Industrial Manufacturer
Contractor: Progressive Pipeline Management (PPM)
Method: UV Cured-in-Place-Pipe

In Middlesex County, New Jersey, a manufacturer had widened a roadway on its facility grounds to accommodate increased loading and traffic brought on by a plant expansion. Although the 36-inch storm drainpipe running under the roadway had been built with reinforced concrete pipe (RCP), the expansion material used was corrugated metal (CM). Over time, the joints between the CM and RCP weakened. When a major hurricane in 2022 created a stormwater surge of 15 feet, the joint seals and the pipe connections to the culvert at the inverts failed. Bottom line, the storm caused irreversible damage at the connections and at the culvert. Unwanted infiltration and sediment were leaking into and out of the end of the 36-inch pipe into the storm water system.

To protect the groundwater from unwanted sediment, the property owner needed to strengthen the 36-inch stormwater drain and remediate the unwanted infiltration that was straining the township's stormwater system. Their aim was to avoid tearing up the road to replace the pipe. Replacing the 70-foot length of pipe would have required a costly excavation and caused weeks of detours in and out of the facility. Delays would have impacted production at the plant.

Interestingly, the leaking stormwater drainpipe had been lined a few years prior. A 1-inch geopolymer liner had been installed in the storm drain by a different contractor. The thickness of the liner reduced the diameter of the 36-inch drainpipe and restricted flow-through capacity. Over time, and with changes in temperature and continuous heavy load conditions, the material started to weaken, contract, and shift, creating gaps between the host pipe and the liner. After the storm surge of 2022, chunks of the geopolymer liner were found floating in the culvert and the groundwater. It was determined that the previously lined infiltration points were leaking contaminants again.

Progressive Pipeline Management (PPM) was brought in to inspect the 70 feet of the 36-inch stormwater pipe and then identify an efficient and permanent way to strengthen the pipe to prevent further leakage without replacing the pipe. Any solution had to withstand the heavy weight loads and stop the previously lined stormwater pipe from leaking.

FIBERGLASS: THE CADILLAC OF MATERIAL FOR STRUCTURAL RENEWAL

PPM proposed a reinforced fiberglass, structurally sound, cured-in-place-pipe (CIPP) liner to be installed through the entire length of the 70-foot stormwater line. Reinforced fiberglass was proven to be strong enough to withstand the heavy traffic loads on the road because of its strength compared to other industry liner materials, without significant loss of flow or throughput. It is thinner (5.1mm) than other comparable geopolymer liners and is not susceptible to creeping over time from changes in temperature. The CIPP process uses a fiberglass liner mixed with a custom resin that is applied to the liner and cured with ultraviolet (UV) lights. Once cured, the fiberglass liner and host pipe would maintain shape and strength against the host pipe without any gaps. The cured liner has been tested for industry standards of 50 years of service life within the host pipe of reinforced concrete and corrugated metal.

> **"IN MOST INSTALLATIONS CIPP DOES NOT REQUIRE EXCAVATIONS."**

DESIGN & CALCULATIONS

Before the project was awarded, testing submittals and design calculations were required to confirm the CIPP could withstand the heavy loads it would be subjected to as well as flood risk. Depth of the pipe, HS-20 loading and DOT Highway and Safety Vehicular Loading were addressed by the design. Water levels, various types of storm and rain events, and propensity to flooding also were considered. Engineering calculations were done to determine the thickness requirement for the UV CIPP material used. The exact material to be used for the project was tested by an independent lab to confirm that it complied with the design specs.

Throughout the project design and execution, PPM worked with multiple stakeholders, decision makers and inspectors. Middlesex County officials had to approve the recommended solutions and submittals along with the manufacturing client.

Once approved, the UV CIPP project took just two days to execute. On Day One, PPM mobilized and prepared the pipeline. On Day Two, PPM prepped, placed, and cured the liner. As is true in most installations, CIPP does not require excavations. Only a small working area was needed for the open-ended culvert rehabilitation.

DAY ONE: CLEAN & PREPARE THE PIPE

The first step was to flush the line clean using a water propelled JetVac system. A powerful pressure nozzle cleared the pipe completely and pulled out any debris. Then, PPM's crew conducted a CCTV inspection of the cleaned stormwater drain. There was significant evidence of structural infiltration points; the corrugated metal pipe had corroded in many locations. In some areas, portions of the liner and host pipe were missing. The deteriorated corrugated metal voids were filled with a hydrophilic seal to reduce any annular space and future inflow & infiltration (I&I) leaks. Confined space entry procedures were followed when the crew entered the 36-inch pipe to fill the rotted voids.

The UV CIPP liner was dragged into place inside the drainpipe using rollers and a winch cable

The CCTV inspection confirmed the pipe was clear and ready for lining.

DAY TWO: LINING & CURING

After inspecting the previous day's void repairs and confirming they were satisfactory, the PPM crew installed a protective layer of sliding foil plastic inside

The end gate (blue) had a port on the side for pressurizing with compressed air to inflate the liner. The cable attached was used to pull the liner into place

> **"REINFORCED FIBERGLASS WAS PROVEN TO BE STRONG ENOUGH TO WITHSTAND THE HEAVY TRAFFIC LOADS ."**

the bottom of the pipe to prevent the CIPP liner from being damaged or ripped by the rotted corrugated metal during installation.

The heavy liner, already prepared for curing, had to be moved into place inside the pipe. A system of rollers with a winch cable was attached to the liner. Using the winch and cable, PPM pulled the liner into place through the 70-foot length of pipe.

The next step was to create a seal at the open ends of the line, so that compressed air could be used to inflate the UV CIPP liner. End gate fittings were attached at the two open ends of the uncured RFG material, creating a temporary seal at both endpoints. Using compressed air, the liner was inflated and pressed up against the host pipe's inner surface to create a watertight seal. This held the liner in place for curing.

Using a sluice at the end gate, the light chain with UV light bulbs was inserted inside the 36-inch liner. As each 1000-Watt UV light bulb ignited, the chemical reaction was initiated that transformed the soft, uncured fiberglass material that was coated with custom resin into a hard, bonded liner. The light chain specially designed for large diameter pipes acted like a series of train cars. Every 10 seconds one bulb was lit, until all 8 bulbs were ignited. Approximately 2.5 feet of the liner was cured per minute. The light chain was pulled through the 70 feet of the pipe at a mechanically regulated speed. Computer readings were recorded every 10 seconds and the light chain pulled back to where it was originally inserted. Curing was completed in less than an hour.

A significant advantage of UV fiberglass CIPP is that the process for curing is quick and simply done using compressed air. Felt and other liners use a styrene-based epoxy that is cured by introducing water or steam into the pipe, which then must be flushed. Water that encounters the liner, chemicals, and its surrounding fittings would have had to be treated and properly disposed. This would have added time, risk, and costs to the project.

After curing, the light chain was removed and the ends of the excess pieces of liner were cut off. A final step sealed the ends.

The light chain was pushed and pulled in a timed sequence to cure the inflated liner to the host pipe

Using confined space entry, the final cured liner was entered to re-instate the center manhole lateral connection

END SEALS TO FILL THE ANNULAR SPACE

Due to the deteriorated corrugated metal, the client was concerned about annular space forming at the ends over time. A hydrophilic ring-shaped gasket was installed between the outside of the pipe liner and the inside of the pipe at each end. End seals and grout filled in the annular space at the corroded sag points to prevent future infiltration into the system between the liner and the host pipe.

A final CCTV inspection showed the internal structure of the new liner to be clean, smooth, and flush with the host pipe.

After the CIPP was installed and cured, the crew had to open a manhole inside a channel to reinstate a lateral that took on stormwater flow. The lateral flowed into the stormwater drain system. This was done in collaboration with the municipality, as the manhole was owned by the township. A right-angle grinder was used to cut out the material.

LARGE EQUIPMENT & DIFFICULT TERRAIN

There were many challenges due to the location of the 36-inch pipe and culvert. The sloped sides of the culvert were lined with a special material that had sealers underneath it to prevent water from being absorbed into the ground. Due to the sloping terrain of the culvert and channel, there was no ready access for the necessary equipment at the exact location of the stormwater drain. The set-up and installation procedure had to be engineered to transport the liner and equipment down into the culvert with a steep grade on both sides. PPM's equipment was set up 25 feet away from the drain opening.

Before lining, the heavy liner had to be rolled into position at the opening of the drain without dragging or damaging it. A roller system was constructed and attached to a tail gate. Once the liner was situated at the opening, it was pulled through the 36-inch drain by a winch.

Confined space procedures were carefully followed when crew members were inside the pipe and later in the manhole. OSHA and HAZWOPER training certifications were required by the client for all the site personnel. All client and company health & safety and large equipment operator requirements were met.

RESULTS

After curing and the ends were finished, a sample of the cured liner was submitted for testing by a 3rd party to ensure it met design specifications. A second sample of the liner was provided to the client and the municipality to test the thickness and integrity.

Post lining testing ensured that the thickness, material, and curing process were done to specifications without any faults.

The UV CIPP technology selected was proven to be stronger and more sustainable that other liners. Additional testing and inspections confirmed to all parties that unwanted infiltration was not detected, and the new liner was structurally sound.

About Progressive Pipeline Management:

PPM is a full-service contractor and team of highly skilled infrastructure renewal specialists. For over twenty-one years, PPM has been improving the safety and longevity of pipeline infrastructure. PPM has a broad range of experience with underground infrastructure remediation and expertise with solutions for buildings, sewage, stormwater systems and utility pipelines. PPM is the exclusive licensee in North America for the Starline® Cured-in-place-lining technology. The team has specialized expertise including gas pipeline rehabilitation, restoration of damaged or leaking infrastructure, PIPES ACT compliance, facilities pipe renewal, and site services.

ABOUT THE AUTHOR:

PPM PROGRESSIVE PIPELINE MANAGEMENT
THE INFRASTRUCTURE RENEWAL SPECIALISTS

Thomas Nestoras
is the PPM Sr. Vice President of Operations, and has been specializing in innovative infrastructure renewal for over a decade. Tom has extensive knowledge of all phases of construction site management. His career in construction started from the ground up, giving him a unique perspective on the many facets of project management and diverse equipment used to recondition pipelines. From "job walk" assessments of projects to handing the finished product back to the client, Thomas demonstrates excellence in project management. He is constantly looking for the most effective process to get projects completed in a timely and cost-efficient way. Thomas is an integral part of keeping up with new innovations at PPM which often involve new technologies and installation processes.

TRENCHLESS TECHNOLOGY GROWTH IN ALBANY

A Perspective - Step Back Into Our Communities

By: Kaitlyn McKitrick P.E., Albany Department of Water & Water Supply

The City of Albany Department of Water & Water Supply (AWD) manages the water, sewer, and stormwater infrastructure for a population of approximately 100,000 people. AWD jurisdiction begins at the source water watershed and reservoir, through the treatment plant and water distribution infrastructure, and finishes at the end of the sewage collection and conveyance system where authority transfers to the county wastewater treatment plants.

AWD makes it a point to stay learning about advancements within the trenchless rehabilitation industry and consistently question department methods for repairs and new installations of water and sewer infrastructure. To date - the City budgets annually for cured-in-place pipe lining, has rehabilitated manholes and large-diameter trunk sewers with spray-lining products, has directionally drilled HDPE water and sewer force main, has completed micro-tunneling and traditional tunneling for a satellite treatment place, and has replaced hundreds of lead water services using trenchless methods. Less grandiose, AWD field crews use trenchless technology every day to assist in precise utility locations around the city.

Obviously, this is technical literature – and all of the above listed projects are very interesting from a technical perspective – design, constraints, successes, lessons learned. We can measure and quantify accomplishments in linear feet and dollar amounts and I&I reductions. We can describe our proudest directional drilling achievements adjacent to 3 major highway exit ramps with virtually zero impact on traffic, or show a map of 100,000 linear feet of lined sewer pipe in every neighborhood in Albany. Or, we can calculate cost savings from not having to perform massive excavations for our satellite treatment plant tunnels.

But because these are the quantifiable details we are all working within every day and what most technical case studies describe, we wanted to take a moment

Impact of Trenchless Technology is incredible, and often invisible to the community

to step back into the communities that we each work for or work in and remind ourselves to also measure success by the impact we have in those communities.

What did your last site visit look like or where was the last place your product was used? Can you picture it? Are there homes around? Schools? Businesses? Maybe just car traffic - People traveling to work or home or the grocery store? Maybe your trenchless work was beneath a highway or under a train track. Now what would it look like if that work couldn't be performed trenchlessly? Is it inconvenient, and who is it inconvenient for? A major detour? Or maybe it's not just inconvenient, maybe it's catastrophic? Dangerous even.

We can think about one small example in Albany, Central Avenue specifically where AWD just intalled a liner in an 18-inch clay sewer pipe. The pipe looked like Humpty Dumpty after he had a great fall, cracked all the way around for most of 400 feet.

This sewer is less than 10 feet from the face of the buildings and runs directly in front of a hair salon, a Halal grocery, and a Dominican restaurant among other businesses and housing. For some Albany neighbors, this is home, this is work, or this is where they scheduled their haircut or they plan to pick up groceries after work. A lining contractor can be in and out leaving a new pipe behind in about 6 hours. 2 or 3 trucks maybe taking up parking spaces during that time, but if we plan it right, we'll start the job in the early morning hours to be done before the businesses need their sewer service back. We were barely there.

"REMIND OURSELVES TO ALSO MEASURE SUCCESS BY THE IMPACT WE HAVE IN OUR COMMUNITIES."

The liner was installed less than 10 feet from the front of the buildings

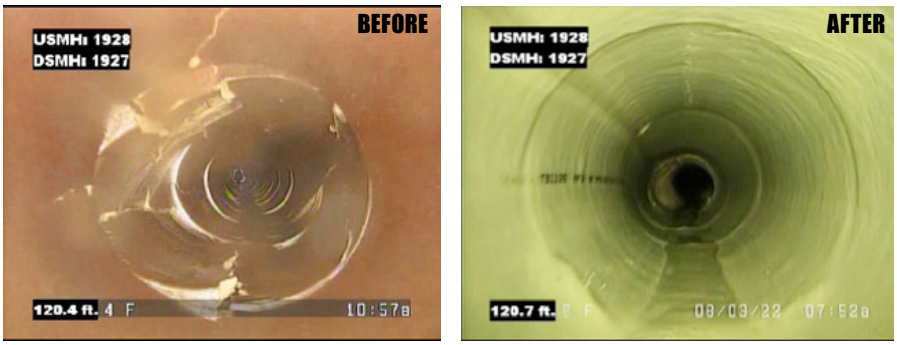
Six hours turnaround time compared to weeks of digging

If I imagine this scenario without trenchless technology and AWD has to dig this pipe up for a repair, we're first of all pinpointing the very worst of the pipe that can't wait and must be repaired. That timeframe for repair instead of 6 hours would be looking at maybe a week if we are lucky enough to find decent pipe to connect to or maybe a month if we are not as lucky.

It's an inconvenience for AWD for sure and more dangerous - we would be putting our own staff or a contractor in a deep hole with shoring right up against old buildings and in front of several businesses. Plus, it would likely be astronomically more expensive for a smaller piece of the pipe to be rehabilitated. Of course, it is inconvenient for pedestrians and those living nearby to deal with the construction. And for the grocer or the restaurant owner, maybe it isn't just inconvenient. Maybe it is a catastrophic impact for their businesses to be inaccessible.

Consider the relief one person would have if they knew the difference between the lining - the solution that was implemented – and the alternative. Consider how lucky they are that they never even have to know and never have to worry about that alternative. Then repeat this exercise, and multiply that person's relief 50 times, 100 times for one pipe, thousands of times for everywhere you' are able to utilize a less disruptive option.

That impact is incredible, and because it's often so discrete to the public, and because the alternatives don't always need to be presented, I think we can sometimes forget how meaningful this work can be for our communities.



Rehabilitated 18-inch clay sewer

"WHAT IMPACT DOES YOUR WORK HAVE? AND WHO DOES IT IMPACT."

As an engineer working for a municipality, enhancing quality of life for the people of Albany is my job description. I take the public servant title literally in that everything I do in my whole day should be working to make life better for people in Albany. So of course the trenchless solutions we have implemented are less expensive and more efficient, but don't forget to consider who those cost savings and efficiencies are for in your daily work.

As a representative of a city with a huge population in poverty and with neighborhoods that face historical environmental and financial inequities, trenchless technology is foundational to our ability to provide adequate service. This is true across the region, for each supplier, contractor, and or authority within the industry. You are some part of awesome feats of engineering, and there is endless data to represent that, but the more important success from my perspective to celebrate is the less quantifiable but more fundamental impact trenchless technology has on quality of life for the communities that utilize it like Albany. I would encourage you to take that message through to your teams at all levels and at all stages of sale, design, and implementation of technology.

What impact does your work have? And who does it impact.

ABOUT THE AUTHOR:

Kaitlyn McKitrick, P.E. *is currently an Engineer with the City of Albany's Department of Water & Water Supply where she oversees and assists with a variety of water, sewer, and stormwater infrastructure projects and programs. Katie is a graduate of The Ohio State University with a B.S. in Environmental Engineering and specialization in Sustainability, and she is currently a member of the Industry Advisory Board for the Trenchless Technology Center out of Louisiana Tech University.*

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NOTEWORTHY PRECISION TRENCHLESS APPLICATIONS

By: Mara Kilburn, Precision Trenchless LLC

Polyurea Technology an Outstanding Choice

Because time is money use of sprayed polyurea resulted in increased savings to the City of Kingston

> **"POLYUREA IS AN OUTSTANDING CHOICE FOR ALL WASTEWATER ENVIRONMENTS."**

Precision Trenchless was excited to use polyurea technology, manufactured by OBIC, a Bryan OH. based company, in a recent tank rehabilitation project for Kingston New York's WWTP. The Kingston WWTP is an open system of tanks located on the Hudson River and services a community with a population of approximately 25,000 inhabitants. You can see the OBIC coating- which is applied manually with a spray gun -clearly by its notable bright orange color. Orange is an excellent color for wastewater applications because it makes future inspections easy.

Polyurea is an outstanding choice for all wastewater environments, especially those subject to seasonal changes in temperature. Unlike other coatings comprised of either epoxy or cement, polyurea passes the freeze/thaw test and will not crack as a result of shifting temperatures. It is unique because it has nearly 400 percent elongation which enables it to expand, contract and endure loads without compromising its monolithic lining system. Other coating options are either subject to cracking because of their stiffness or cannot withstand the corrosive H_2S environments present in wastewater industry. This is one key reason Precision Trenchless proposed using OBIC polyurea technology as the coating system for Kingston's WWTP.

Also notable, is polyurea's rapid cure time. No twenty eight day cure here- it is tack free in under thirty seconds and the asset can be returned to service the same day and fully cured in 24 hours. For the Kingston WWTP this meant that the general contractor was able to work directly behind Precision Trenchless and resulted in shorter down times. It meant that the entire job could move along at a much swifter pace and because time is money it resulted in increased savings to the City of Kingston.

It should also be noted that you can apply polyurea during colder weather which was also a consideration for this job. As you can see from the photos this project took place in the fall and other coating options require warmer temperatures. This again,

Ability to apply polyurea during colder weather was a consideration for this job

"POLYUREA PASSES THE FREEZE/ THAW TEST AND WILL NOT CRACK."

resulted in the project moving along at a faster pace. Furthermore, polyurea, can be used to rehabilitate virtually any structure including manholes, pipes, food and potable water applications, all with a 10 year warranty and a fifty year design life. In Kingston, OBIC's polyurea technology installed by Precision Trenchless will result in an extended life for the tanks. The savings this creates for Kingston WWTP will extend far beyond the construction project timeframe.

ABOUT PRECISION TRENCHLESS LLC:

PRECISION Trenchless LLC

Precision Trenchless LLC *was founded in 2013, as part of the Precision Group three separate yet complementary companies that address distinctly unique environmental concerns. The company believes in utilizing new state-of-the-art technologies to preserve the environment and meet the needs of communities. Precision Trenchless uses expertly trained technicians and safe, strong, fast, predictable, flexible and environmentally friendly UV CIPP liners. They believe in protecting the environment, in challenging the status quo and thinking independently. Nothing is impossible!*

Orange is an excellent color for wastewater applications because it makes future inspections easy

Culvert Rehabilitation with UV-Cured CIPP

Precision Trenchless, a leader in UV-Cured CIPP with over 1,000,000 LF installed, is committed to ensuring the safety of our communities one culvert at a time. Culverts are important roadway features constructed to convey water and maintain the integrity of the road. As our seasons become more intense, coupled by the age of so many culverts, the integrity of these important conveyors is becoming a major concern. Regularly there are stories in the media displaying dramatic photographs of roads being washed away as a result of culvert failure.

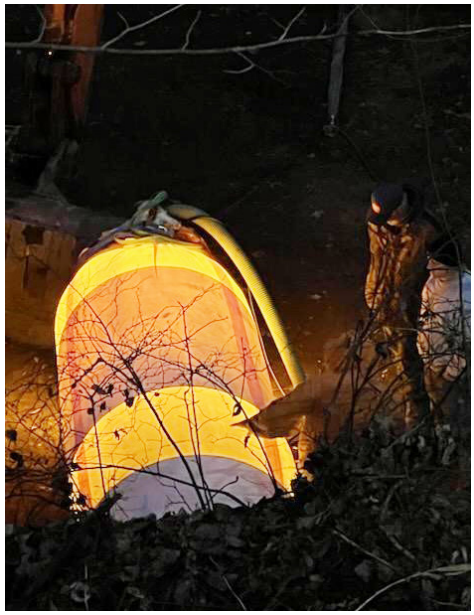
Preserving our infrastructure with the most precise technology and delivering it in the most environmentally conscientious method possible is why Precision Trenchless only uses UV cured CIPP for its rehabilitation endeavors. UV cured CIPP produces a uniform, precise, structural pipe once it's been cured. This is a result of its careful and exact construction which occurs inside an ISO 9001 American manufacturing facility. As depicted in the photos you can see for yourself the uniform thickness around the entire circumference of the pipe. This is produced by the styrene impregnated fiberglass liner that is protected by both an outer covering and an inner sleeve which ensure there is no migration of styrene in the fiberglass. The liner, which is pulled into place, takes the shape of the host structure and is then cured at a prescribed speed with a UV light train. This past year not only have we restored round and oval culverts but we have honed our skills by rehabilitating box culverts as displayed here.

> **"ENSURING THE SAFETY OF OUR COMMUNITIES ONE CULVERT AT A TIME."**

Like most culvert rehabilitation jobs these projects show culverts that have been restored in a single day. The photos illustrate a 48-inch diameter culvert and it was deep with over 25 feet of cover. This culvert was a major concern for the municipality as they had to close the road due to its poor condition and the safety concerns it posed. Sections of the original pipe had actually broken away and the extension of the pipe you

Pipe was extended by 30 feet because the original pipe broke away and the road had washed out

"THIS MUNICIPALITY WAS RELIEVED AND PLEASED WITH NO ENVIRONMENTAL IMPACT FROM THE CULVERT REHABILITATION."

Cured with safety sleeve to extend pipe to the desired length


Precison Trenchless has honed its skills rehabilitating culverts of different shapes and sizes up to 72 inches

see in the photo is due to the customer's request to extend the culvert 30 feet beyond its current state restoring the culvert to its original length. This extension is what enabled us to take these luminous photos depicting the new pipe being cured by the UV light. As you can see, there are no plumes of pollution being produced with this method of cure. This municipality was relieved and pleased with our ability to quickly and adeptly respond to their concerns. They were further pleased with the 'no environmental impact' in this area as this culvert's location was adjacent to a nature preserve.

It's important when selecting a method of rehabilitation to keep in mind the impact it will have on the community not only today but also into the future. We, at Precision Trenchless are excited to be a partner with municipalities as they embark on their journey to address these critical structures, culverts.

ABOUT THE AUTHOR:

Mara Kilburn *is Vice President of Precision Trenchless LLC. Her interests in the construction industry and environmental concerns merged when she learned about Ultra Violet Cured In Place Pipe lining. She enjoys meeting people and touting the benefits of safe and reliable methods to rehabilitate our aging pipe systems using environementally friendly methods. Mara loves the outdoors and is an avid recycler and protector of the Earth.*

NYC REGULATOR CHAMBER REPLACEMENT AND HOBAS NON-CIRCULAR SLIP LINING REHABILITATION

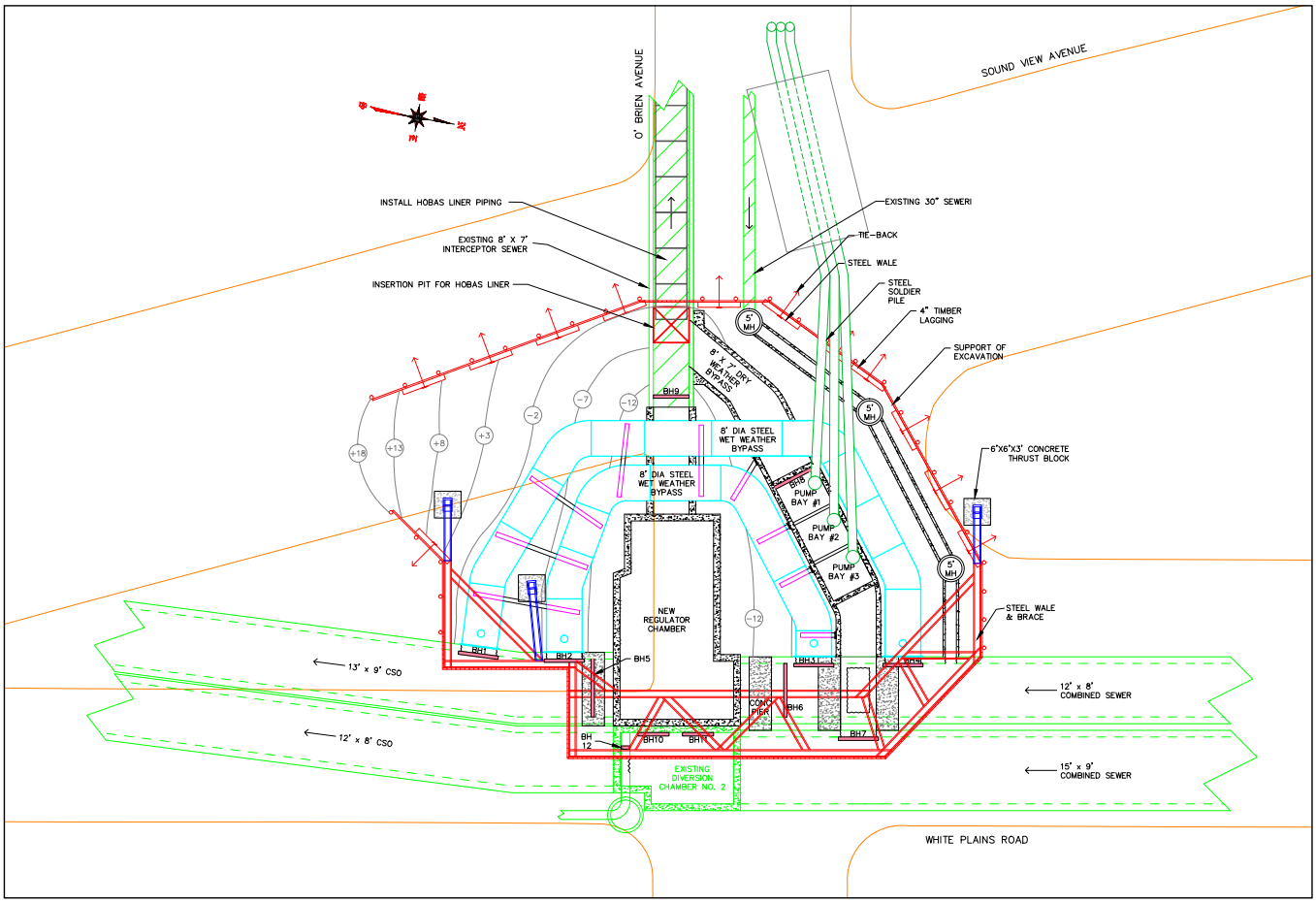
By: Sal Leopoldo, Halcyon Construction Corporation

HISTORY

Sewage Regulator Chamber HP06 is located within the Borough of Bronx, New York City. Regulator Chamber and Interceptor Sewer Piping were built in the 1940s for the City of New York Public Works as part of the Hunts Point Sewage Treatment Plant and Intercepting Sewer project. The Chamber is an underground, cast-in-place concrete structure approximately 28 feet wide x 46 feet long x 35 feet deep located under busy New York City Streets.

During normal dry weather conditions, the regulator directs up to 60MGD of flow to 700lf of cast-in-place 8 feet wide x 7 feet high interceptor sewer at depths up

> **"ALL WORK WAS TO BE PERFORMED WITH NO INTERRUPTION OF EXISTING FLOWS."**



Mass Excavation Plan

Mass Excavation – Installation of Wet & Dry Weather Gravity By-Pass

Existing 8 x 7-foot 1940s cast-in-place Interceptor Sewer to be HOBAS Slip-Lined

to 25 feet. Wet weather flow surges to over 600MGD and is discharged through twin 12 x 8 foot & 13 x 9 foot CSO sewers.

Upon various inspections, the owner NYCDEP & NYCDDC determined both Regulator Chamber HP06 and 700 feet of 8 feet wide x 7 feet high interceptor sewer was extensively structurally deteriorated due to high concentrations of Hydrogen Sulfide gas and age. In December 2021 Halcyon Construction Corporation was low bidder at $52,372,095.00 for NYCDDC contract REGHP06 to perform open cut replacement of Regulator HP06 and Slip-Line rehabilitation of this 700 foot section of interceptor sewer using HOBAS non-circular pipe.

COMMENCEMENT OF WORK

Site mobilization commenced in August 2022. Halcyon Construction combined construction phases and performed one 125 feet long x 100 feet wide x 25 to 35 feet deep mass excavation of approximately 12,000 cubic yards that would enable:

- Relocation of 30-inch RCP combined sewers.
- Demolition & Replacement of cast-in-place concrete Regulator Chamber HP06.
- Installation of temporary twin 8-foot steel welded wet weather flow gravity by-pass piping.
- Installation of temporary 8 x 7 foot cast-in-place concrete dry weather flow gravity by-pass piping.
- Expose and remove top roof slab of existing 8 x 7 foot interceptor sewer to enable access and insertion of HOBAS non-circular slip line pipe.

24-inch HDPE Bypass Piping


16-inch Submersible Sewage Bypass Pumps

Support of excavation (SOE) included 30 steel drilled piles with 4-inch thick wood lagging, 12 tiebacks along with 4-inch vertical wood sheeting over existing sewers supported by 14-inch steel welded truss walers & braces tied to 6 x 6 x 3 foot concrete thrust restraint blocks.


Insertion Pit with Pull Head

HOBAS NON-CIRCULAR SLIP-LINING

Contract work included Slip-Lining 700 feet of existing detoriated 8 feet wide x 7 feet high cast in place concrete interceptor sewer with 85.5 inches wide x 75.5 inches high x 8 foot long bell/spigot HOBAS non-circular fiberglass reinforced polymer mortar pipe.

All work was to be performed with no interruption of existing flows. Contract specifications allowed at contractor's option internal fluming or by-pass pumping. Due to high flow volume (60MGD dry weather) and velocity of flow (4>6 ft/s) Halcyon opted to completely by-pass existing flow and perform all work in the dry. The bypass system included three FLYGT 16-inch submersible pumps controlled by Variable Frequency Drives installed within a temporary cast-in-place 30 feet long x 10 feet wide x 18 feet high concrete wet well with slide gate. Each FLYGT pump-set had separate 800lf 24-inch HDPE fused joint discharge lines completely bypassing the existing 8 x 7-foot interceptor sewer.

"WORK COULD ONLY TAKE PLACE DURING NIGHTTIME HOURS."


TT Technologies 12-ton Constant Tension Winch at Pull Pit

First Liner pipe with access MH for winch

ACCESS POINTS

To facilitate HOBAS slip-lining Halcyon utilized three access pits:

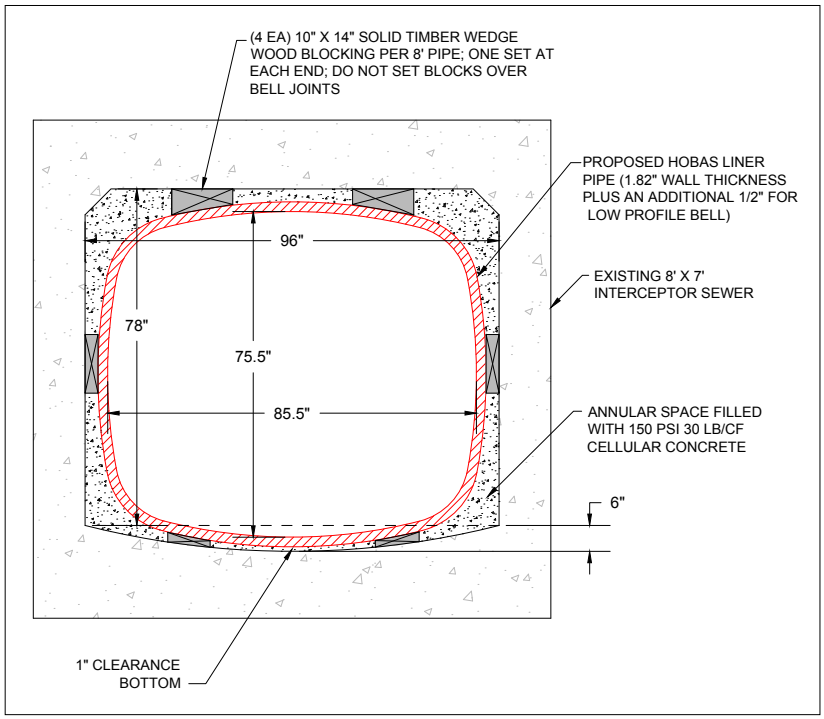
- Insertion pit within mass excavation at high end of 700-foot run. This pit was utilized for cleaning & proving existing 8 x 7-foot cast in place interceptor sewer, insertion of HOBAS liner pipes and pressure grouting annular space.
- Center ventilation pit, approximately 350 feet into run. Halcyon excavated a 12-foot long x 8-foot wide x 23-foot deep sheeted pit. The center pit was used for air release venting during grout operation and forced air ventilation/ safety emergency exit during manned entry.
- Winch pull pit at low end of 700-foot run. The winch pit was 15 feet long x 10 feet wide x 23 feet deep and utilized as an access point for pull winch, air release & drain point during annular space grouting, manned access and forced air ventilation.

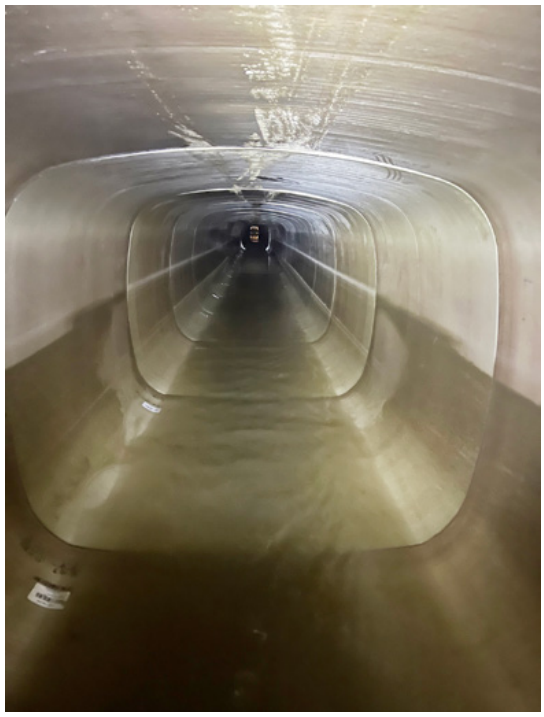
HOBAS SLIP LINE INSTALLATION

Halcyon could only perform Hobas slip line installation when interceptor flows were below the 45MGD capacity of our bypass pump system. This meant work could only take place during nighttime hours between 1am to 8am when no rain events were forecast. During non-work hours the bypass system was turned off, slide gate lifted in pump bay and flow resumed through existing 8 x 7-foot interceptor sewer.

To install each 8-foot long, 4,720lb section of HOBAS liner pipe Halcyon set up a winch cable pull system. At low end pull pit a TT Technologies 12ton Hydrostatic Constant-Tension winch was set up at street level with 20 feet of additional standoff boom to direct cable 26 feet down into pull pit. The winch cable was pulled 700 feet through interceptor sewer and connected byway of 4-part cable to a field fabricated pull head using a spigot section of HOBAS pipe.

A section of 8-foot HOBAS pipe was then placed into high end insertion pit, spigot end pull head connected to bell





Planned Cross Section & Installed HOBAS Liner

end of HOBAS pipe and pulled/winched into place. Each section of pipe was centered & wood blocked via manned entry; the bell-spigot joint was then pulled home via winch system. A second TT Technologies KW3000 3.3ton winch was set up at the high end insertion pit, connected to pull head to winch back and receive next section of pipe. Installation production ranged from 8 to 14 pipe segments per shift subject to existing sewer flows.

High Side Bulkhead with 4-inch Grout Ports

HOBAS tie in to new 8 x 7-foot Interceptor Sewer

BULKHEAD & ANNULAR SPACE GROUTING

Upon completion of HOBAS liner pipe installation annular space concrete bulkheads were installed at high and low ends. Bulkheads were a minimum of 3 feet thick and were installed using SIKA 211SSC self-leveling concrete to fill all voids and existing concrete wall irregularities.

Each bulkhead included four 4-inch diameter valved NPT pipe extended through the bulkhead to facilitate grout installation, air ventilation, and drain any trapped water within annular space.

Grout pumping was subcontracted to CJGEO Contractors from Williamsburg Virgina. CJGEO mobilized and pumped 380+ cubic yards of 30lb/cubic foot cellular concrete over a two-day period filling the complete 700lf annular space in one set-up. The grout pump was connected to a high-side bulkhead 4-inch grout port. As grout pumping continued, trapped air and water were released through seven other valved ports, as the pumped grout reached each port, valves were closed.

BRONX CONSTRUCTION TEAM

General Contractor: Halcyon Construction Corporation
Charles Casarella PE & Joseph Zuzzolo PE, Owners
Sal Leopoldo, Executive Vice President
Dave Yonelunas & Anthony Zuzzolo, Project Managers
Joesph Monte, Field Superintendent
Roland Harris, General Foreman
Steven Grobarcik & Sergio Veloso, Foreman

CONCLUSION

As of April 1, 2024, open cut replacement of Regulator HP06 and HOBAS slip-line rehabilitation of interceptor sewer is complete. Presently all bypass systems have been removed and dry & wet weather flows diverted back through existing system. The project will be fully complete including restoration of pavements and landscape by Fall of 2024, a full six months ahead of contract completion schedule.

ABOUT THE AUTHOR:

***Sal Leopoldo** has been with Halcyon Construction 38 years and is the Executive Vice President handling day to day operations. Halcyon Construction was incorporated in 1979 by owners Charles Casarella PE & Joseph Zuzzolo PE and is General Contractor specializing in Civil and Mechanical projects throughout the City of New York and surrounding areas .*

A CASE STUDY IN EVALUATING AN APPROXIMATELY 10 MILE NATURAL GAS PIPELINE ALIGNMENT IN SOUTHERN UTAH

By: John W. Diamond, PE, Terracon Consultants
Joe Fox, PE, Dominion Energy

1.0 ABSTRACT

A pipeline operator recently evaluated an approximately 10-mile new natural gas pipeline alignment near the city of St. George, Utah. The proposed project consists of a 20-inch diameter steel distribution pipe that will be installed using a combination of open trenching and trenchless methods to cross existing roadways and drainage features. Subsurface conditions along the proposed alignment were variable and consisted of loose to very dense silty sand underlain by weakly cemented sandstone bedrock, and hard basalt. There were several parts of the alignment where the sandstone and basalt bedrock were exposed at the ground surface.

The scope of work included an evaluation of depth to bedrock and rock rippability along the proposed alignment, which included subsurface exploration and sampling as well as the use of geophysical methods to evaluate the excavatability of the subsurface materials. The scope of work also included the design of five proposed trenchless crossings of existing roadways and drainage features. Four different trenchless crossing methods were selected based on the variability of the subsurface conditions that were encountered along the proposed alignment. This paper presents a summary of the methods that were used to evaluate excavatability along the proposed pipeline alignment as well as a discussion of the factors that were considered in selecting the trenchless methods at the proposed crossing locations.

Figure 1: Site Location Map

2.0 INTRODUCTION

The project consisted of the evaluation and design for installation of a 20-inch diameter, high pressure natural gas pipeline in Washington County, Utah. The majority of the pipeline will be installed using open trenching methods, but there are five locations where trenchless crossings of existing roadways and drainage features will be required. The proposed pipeline alignment is located north of St. George, Utah as shown on Figure 1.

The geologic materials that are exposed at the ground surface along the proposed alignment consist of unconsolidated silty sand as well as exposed sandstone and basalt bedrock. The project owner was aware that rock excavation would be required in some areas. However, the depth to bedrock beneath the unconsolidated deposits was not well documented resulting in excavation cost implications to the project if rock was encountered at shallow depths and rock excavation was necessary along substantial portions of the alignment.

In addition to the sections of the alignment to be installed using open trenching methods, there were five locations where trenchless crossings were required to install the pipeline under existing roadways and drainage features. Three of the proposed trenchless crossing locations had right-of-way (ROW) constraints that prevented the use of horizontal directional drilling (HDD) methods. Two of these locations were in areas where unconsolidated deposits extended to depths of 10 to 15 feet below existing ground surface and one proposed crossing location

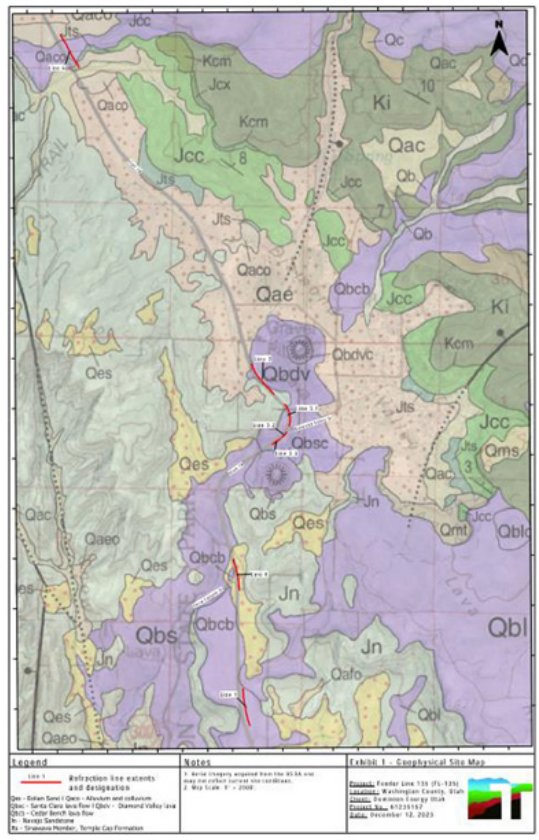


Figure 2: Site Geologic Map (Biek et. al., 2010)

was in an area where basalt bedrock was encountered within 5 feet of the ground surface.

The project scope included:

- Subsurface field exploration
- Seismic Refraction Survey
- Geologic Outcrop Mapping
- Laboratory testing
- Estimating depth to bedrock along the proposed open trench portions of the alignment
- Providing recommendations related to the feasibility of and type of trenchless method at each of the proposed crossing locations
- Providing Geotechnical recommendations regarding planning, design and construction of the proposed trenchless crossings including:
  - Development of construction plans for each of the proposed crossings
  - Providing recommendations for control of inadvertent fluid releases and related contingency planning for the proposed HDD crossings
- Providing recommendations for field engineering and observation during trenchless installation

3.0 GEOLOGY AND GEOTECHNICAL CONDITIONS

The proposed alignment is located north of the city of St. George in Washington County, Utah. The near surface geology along the proposed alignment consists of a combination of unconsolidated silty sand underlain by sandstone and basalt, and areas where consolidated sandstone and basalt bedrock are exposed at the ground surface as shown on Figure 2.

The subsurface conditions along the proposed alignment were explored by performing 14 subsurface explorations and by completing 5 seismic refraction lines as shown on Figure 3 below. 9 of the borings were completed at the proposed trenchless crossing locations and five additional borings were completed in the proposed open trench portions of the alignment. Representative soil and rock samples were obtained from the borings using a Standard Penetration Test (SPT) split spoon sampler and Modified California sampler (MCal). Samples of the underlying rock were collected at several of the exploration locations using rock coring methods. Soil and rock samples obtained from the borings were collected for laboratory testing. Laboratory tests were performed on selected samples to aid in classification and to evaluate the pertinent physical and engineering properties of the soil and rock along the proposed alignment.

"THE BORINGS WERE INTENTIONALLY OFFSET FROM THE PLANNED ALIGNMENTS TO REDUCE THE RISK OF INADVERTENT RETURNS."

Figure 3: Alignment Map

Depth to Rock	Estimated Length (ft)
<5 feet	7,100
5-10 feet	2,300
Deeper than 10 feet	44,200

Figure 4: Estimated Rock Depth and Associated Length

The boring locations were placed a close as possible to the proposed pipeline alignment with the exception of the borings that were drilled at the proposed HDD crossing locations. The borings at the proposed HDD crossing locations were intentionally offset from the planned alignments to reduce the risk of inadvertent returns during HDD drilling operations through preferential flow paths created by the exploration boreholes. Upon completion, the borings at the proposed HDD crossings were abandoned by placing a cement and bentonite grout mix from the bottom to the ground surface using a tremie to further reduce the risk of inadvertent returns through the exploration boreholes. The borings at the other trenchless crossing locations and in the open trench portions of the alignment were backfilled with auger cuttings.

4.0 DEPTH AND RIPPABILITY OF ROCK

The depth to rock was estimated along the proposed alignment using a combination of measuring the depth to rock encountered in our borings, interpretation from exposed rock outcrops, and from interpretation of the results of the seismic refraction survey. In general, the estimated depth to rock varied along the alignment from ground surface to more than 10 feet below ground surface (bgs). The estimated depth to rock was useful for the project owner and contractor for estimating quantities of rock excavation that would be required during pipeline installation. Based on the results of the field investigation, the estimated rock depth and associated length along the proposed alignment are summarized in Figure 4.

The data collected as part of the field investigation was used to provide a general indication of the anticipated difficulty of excavation along the proposed alignment. Excavatability is highly dependent on the equipment used and field testing with the planned excavation equipment is critical to confirm the estimates that are provided based on field investigation methods. The exposed rock encountered along the alignment consisted of sandstone and basalt. To provide information about the anticipated difficulty of trenching, a combination of Schmidt hammer readings and observation of the rock joint spacing were used. Rock strength values were estimated using the Schmidt hammer readings and by correlating rock strength to blows with a rock hammer (Katz, O, & et al, 2000). The sandstone outcrops observed adjacent to the proposed pipeline alignment were generally competent with a few small aperture fractures and minor weathering.

Based on the data collected using the Schmidt Hammer, the sandstone ranged from medium strong to strong, and the estimated unconfined compressive strength of the sandstone ranged from 2900 to 9000 Pounds per Square Inc (psi). The basalt outcrops that were observed at the ground surface along the alignment were generally highly fractured and

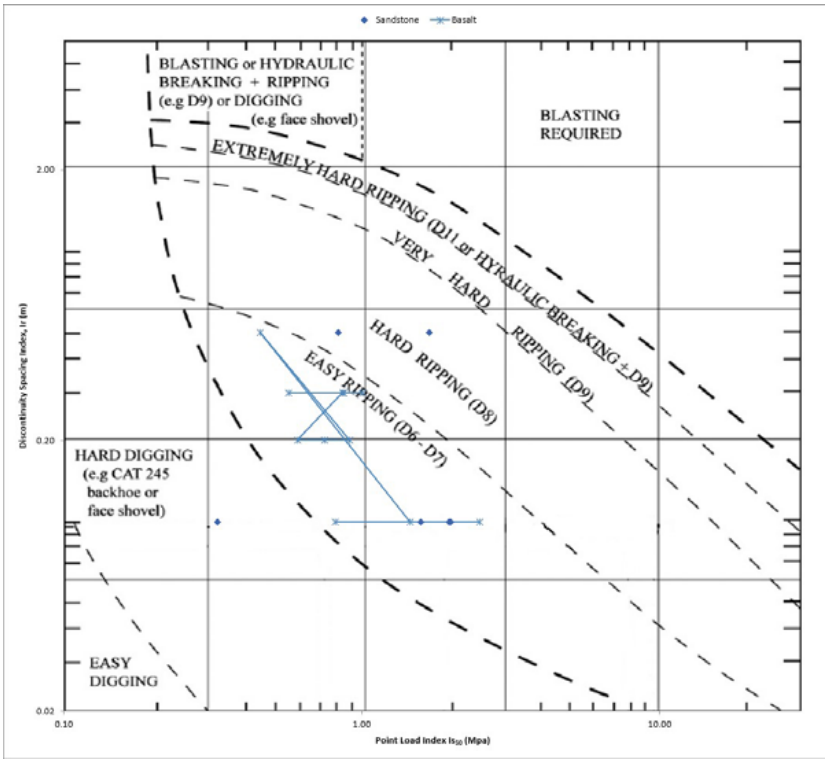


Figure 5: Rock Strength vs Excavatability (Tsiambaos, 2009)

rubbly. The exposed basalt ranged from medium strong to strong and the estimated unconfined compressive strength of the basalt ranged from 1100 to 6100 psi.

The Seismic Refraction Survey results indicate that seismic velocities (Vp) in the unconsolidated sediments near the surface range from 0 to approximately 3,000 feet per second (fps). The Vp of very dense cemented soils and/or weathered bedrock typically range from approximately 3,000 to 7,500 fps. The Vp of marginally rippable material ranges from approximately 7,500 to 8,500 fps. Materials with velocities higher than 8,500 fps are considered to be non-rippable. Based on the results of the Seismic Refraction Survey, the unconsolidated sediments near the surface are expected to be excavatable using conventional earthwork equipment but materials with Vp greater than 3,000 fps are expected to require heavy duty excavation equipment. In general, the results of the geophysical survey indicated that cemented soils and/or weathered sandstone may be encountered in some locations of the alignment near the ground surface and marginal to non-rippable rock is expected to be encountered in some portions of the alignment at depths between 5 and 10 feet below ground surface. It is likely that more competent, less weathered basalt with a higher unconfined compressive strength will be encountered at depth during open trench excavation and this material is anticipated to be marginally rippable to non-rippable. The average Point Load Index and joint spacing observed in the rock outcrops along the proposed alignment were plotted on the chart below to assist with correlating this information with rock excavatability (Tsiambaos, 2009).

> *"CRITICAL THAT GEOLOGY, GEOGRAPHY, AND GEOMETRY ARE ALL CONSIDERED IN ORDER TO SELECT THE APPROPRIATE TRENCHLESS METHOD."*

The feasibility and actual production rates for rock excavation is dependent on the equipment used, and the local degree of weathering, rock strength, and fracture spacing.

5.0 TRENCHLESS DESIGN & EQUIPMENT

Five potential trenchless crossings of existing roadways and drainage features were identified along the proposed alignment. The subsurface materials and depth to rock varied at each of the proposed trenchless crossing locations as summarized below:

- Crossing 1 – Silty Sand with gravel to 15 feet underlain by basalt
- Crossing 2 – Silty Sand with Gravel to 10 feet underlain by basalt
- Crossing 3 – Silty Sand with Gravel to 6 feet underlain by basalt
- Crossings 4 & 5 – Silty sand with gravel to 12 to 38 feet underlain by basalt and sandstone

Crossings 1, 2, and 3 all had geometric constraints due to the existing pipeline ROW that prevented HDD methods from being considered at these locations. The local transportation department required that trenchless crossings be a minimum of 5 feet below the bottom of the existing roadway pavement. At crossing 1 the presence of coarse gravel and the spatial constraints of the existing ROW made pipe ramming at a depth of approximately 10 feet below existing ground surface the most feasible trenchless method.

Crossing 2 consisted of a 2-inch lateral to provide gas service to an existing development. The subsurface conditions at the proposed crossing location consisted primarily of silty sand with gravel underlain by basalt. Due to the presence of coarse gravel and the small diameter of the proposed lateral, pilot tube was determined to be the most feasible method for this proposed crossing. Subsurface conditions at crossing 3 consisted of silty sands and gravels underlain by shallow basalt bedrock at depths less than 5 feet. Due to the presence of coarse gravel and the expectation that basalt would be encountered very difficult and expensive drilling conditions were anticipated at this crossing location. Because we anticipated that basalt would be encountered during drilling at this location, it was determined that a small-bore unit (SBU) with rock disc cutter head or similar drilling method would need to be used. This crossing was designed with the proposed borepath completely within the rock to avoid a mixed face condition.

As part of the trenchless design of crossings 1, 2, and 3, we performed settlement calculations to evaluate the potential for impacts to the existing roadway. Our settlement calculations were performed by considering a maximum bore diameter of 22 inches and a maximum overcut of one inch on the bore diameter for auger bore methods, a minimum embedment depth of 10 feet, and using the soil conditions encountered in the borings at each of the crossing locations. The unit volume of the resulting settlement trough at the ground surface was considered to be approximately equal to the volume of soil 'lost' during boring. The estimated settlement over the crown of the bore at the ground surface was estimated to be less than 0.5 inch at each of the crossing locations.

Results of the field investigation indicated that the subsurface conditions at crossings 4 & 5 consisted of medium dense to dense silty sand with varying amounts of clay and gravel underlain by basalt at crossing 4 and sandstone at crossing 5. The fine-grained sands that were encountered generally have less than 20 percent fines leading to possible borehole stability issues, and potential for loss of fluid circulation. Water was lost during the field investigation while coring in the sandstone and the use of loss of circulation materials are anticipated to maintain borehole stability and reduce fluid losses during HDD drilling operations.

Based on the soil profile at crossings 4 and 5, the potential for inadvertent returns was evaluated using a combination of cavity expansion theory and the Delft equation in conjunction with a qualitative assessment of the inadvertent return risk. The results of the preliminary analysis indicated that approximately 45 feet of cover would be required to provide an adequate factor of safety against inadvertent return during HDD drilling at the proposed crossings. Based on the existing topographical and ROW constraints at the proposed crossings, the final design geometry resulted in bottom tangent depths of approximately 45 and 65 feet below the existing ground surface.

6.0 CONCLUSIONS

The subsurface conditions that were encountered along the proposed alignment generally consisted of unconsolidated silty sand overlying sandstone and basalt bedrock. A combination of geotechnical borings, evaluation of exposed rock outcrops, and interpretation of the results of a seismic refraction survey were used to estimate the depth to rock and excavatability of the sandstone and basalt along the proposed pipeline alignment.

Five potential trenchless crossings of existing roadways and drainage features were identified along the proposed alignment as part of the evaluation. The appropriate trenchless method for each of the proposed crossings was selected by evaluating the geology, geography, and geometry at each location. 3 of the proposed crossings had geometric constraints due to the existing pipeline ROW that prevented HDD methods from being considered at these locations and pipe ramming, pilot tube, and a SBU with rock disc cutter head were determined to be the most feasible trenchless methods based on the existing subsurface conditions at each of the proposed crossing locations. Settlement calculations were performed for each of the proposed crossings in order to evaluate the potential for impacts to the existing roadway and less than 0.5 inches of settlement was estimated for each of the proposed crossings.

The subsurface conditions and available ROW at 2 of the proposed crossings made HDD methods feasible at these locations. Subsurface conditions at these locations consisted of medium dense to dense Silty Sand with varying amounts of clay and gravel underlain by basalt and sandstone. The fine-grained sands that

were encountered may result in borehole stability issues and potential for loss of fluid circulation during HDD drilling operations and loss of circulation materials are anticipated when drilling in the sandstone to reduce fluid losses.

The potential for inadvertent returns was evaluated at crossing 4 and 5 using a combination of cavity expansion theory and the Delft equation in conjunction with a qualitative assessment of the inadvertent return risk. The results of the preliminary analysis indicated that approximately 45 feet of cover would be required to provide an adequate factor of safety against inadvertent return during HDD drilling at the proposed crossings. The final design geometry resulted in bottom tangent depths of approximately 45 and 65 feet below the existing ground surface.

When evaluating the feasibility of a proposed trenchless crossing, it is critical that the geology, geography, and geometry at the site are all considered in order to select the appropriate trenchless method. There are many different methods that can be considered based on the natural and anthropogenic constraints at a site and not every method is appropriate for all site conditions. For this evaluation, multiple trenchless methods were considered in order to select the appropriate tools for the geologic, geometric, and geographic conditions that were encountered at each crossing location.

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ABOUT THE AUTHOR:

***John Diamond, PE**, is Assistant Geotechnical Service Line Director for Terracon's Western Operating Group. He has 22 years of experience with geotechnical design, geohazard investigations, feasibility evaluations, and alternatives analyses for open-cut and trenchless pipeline installation, electrical transmission lines, and power generation facilities. John received a B.S. Degree from Weber State University, a M.S. Degree from the University of Idaho, and an MBA from the University of Utah.*

UNDER RIVER HDPE PIPE PULL WINS FOR FORT WAYNE

Large Diameter HDD Project Provides Reliable Water Main for Utility

By: Steve Cooper, SCA Communications

Nearly 3,000 feet of HDPE pipe for the under-the-river crossing was fused into one monolithic leak-free line

One improvement to the Fort Wayne City Utilities' water supply required the use of high-density polyethylene (HDPE) pipe horizontally directionally drilled (HDD) under the Maumee River. Approximately 4,500 feet of 16-inch, HDPE PE4710 DR11 DIPS CC3 rated pipe was used to connect to the city's potable water supply on the north and south sides of the river. Going underground and not affixing the pipe to the nearby bridge was required due to the winter temperatures, which would cause the water in the HDPE pipe to freeze. The Maplecrest Road Feeder Main – Maumee River Crossing project was designed and supervised by Fort Wayne City Utilities.

"There's a bridge on Maplecrest Road that we basically laid the pipe parallel to, but installed it under the river," explained Connor Swain, project engineer for Midwest Mole (Greenfield, IN) who installed the pipe. "Our depth under the river was about 10 feet but

The bore was also under the Maplecrest Road trail which is part of Fort Wayne's award-winning trail system

> ***"ANYTIME YOU HAVE A RIVER CROSSING, THE COMPLEXITY OF CONSTRUCTION INCREASES SIGNIFICANTLY."***
>
> **– ANDREW SCHIPPER, P.E., WATER PROGRAM MANAGER, FORT WAYNE CITY UTILITIES**

there was an island between the banks and there we were about 30 feet deep. This part of the project was 2,490 feet total. We took it from a hydrant in the Fort Wayne Biosolids Handling Facility on the north side of the river, under the river up on the south side of the river. We had surveyor stakes every 50 feet and created a drilling path profile."

"This project provided another connection across the river to increase the reliability of our water system," said Andrew Schipper, P.E., water program manager for Fort Wayne City Utilities. "Fort Wayne has three rivers running through downtown providing separation of the water distribution system for significant parts of the city. Adding a transmission main connection nearly 4 miles from the confluence of those rivers significantly increased the reliability for areas on both the north and south side of the river on this side of town. Anytime you have a river crossing, the complexity of construction increases significantly due to unknowns under the river, the length of the crossing, and the need for significant bends in the main. The total cost for both phases of this project was $650,000."

The Midwest Mole three-man crew used a fluted reamer with a cutting rig which was able to bore a path through the clay and cobblestone

The HDPE pipe was installed 10 to 30 feet underground, parallel to the bridge on Maplecrest Road

> **"PE4710 COMPOUNDS OFFER AN EXCELLENT LEVEL OF PERFORMANCE FOR TRENCHLESS INSTALLATIONS."**
>
> **– CAMILLE GEORGE RUBEIZ, P.E., F. ASCE, PLASTICS PIPE INSTITUTE, INC. (PPI)**

Fort Wayne City Utilities is the largest municipally-owned utility in Indiana, with 1,430 miles of mains with some 106,000 services and providing water to more than 300,000 residents in three counties.

"Fort Wayne's capital program has been using HDPE for all new and replacement water mains." Schipper continued. The Maplecrest River crossing is the largest HDD installed transmission main under a river that we've ever done. I would only use HDPE pipe for that."

Jon Hall, P.E., Fort Wayne's project manager said, "At this river crossing it was nearly 600 feet from bank to bank. The bore was also under the Maplecrest road trail which needed to be maintained for public access during construction and is part of Fort Wayne's award-winning trail system. Another obstacle that was successfully located and drilled under was a 48-inch diameter reinforced concrete sanitary sewer main running parallel to the river. The length of the river crossing when including setbacks and items to cross to get back to grade made this a 1,000-foot bore. Midwest Mole was quite creative on this one. It was on the higher end of difficulty, probably a seven or an eight. We haven't done a 16-inch HDD river crossing before. It is a great relief to have such a successful project as this one completed."

According to the Plastics Pipe Institute, Inc. (PPI), the major North American trade association representing the plastics pipe industry, PE4710 is the highest performance classification of HDPE piping material for water applications. "PE4710 HDPE pipe is tough, durable and flexible, meeting AWWA C906 and ASTM F714 standards," stated Camille George Rubeiz, P. E., F. ASCE, senior director of engineering for the Municipal and Industrial Division of PPI and co-chair of the HDPE Municipal Advisory Board (MAB). "The MAB is fortunate to have the Fort Wayne Water Utility as an active member of the Board.

"PE4710 compounds offer an excellent level of performance for trenchless and open cut installations. This means PE4710

HDPE pipe can be used with increased flow capacities plus increased resistance to surge pressure, and fatigue. The ANSI/AWWA C906-21 standard includes PE4710 for sizes up to 65 inches and recognizes the increased durability and reliability of HDPE pressure pipe used in water systems."

"We used a Vermeer D80x100 directional drill rig to basically get our pilot path," Swain explained, "and hooked on a 16-inch reamer, pulling that all the way back to the drill, set up a 24-inch reamer, pulled that all the way back and put the 24-inch reamer on again. Then swab it, and once the crew finished that pass they went ahead and installed the product pipe, which was 16-inch in the 24-inch hole. We took off the reamer, threw it in the back of a truck, drove around and drilled back out. It was very hard consolidated clay under the river plus some cobble. We really had to work our way through it. It just took patience."

The Midwest Mole three-man crew used a fluted reamer with a cutting rig which was able to bore a path through the clay and cobblestone. Drilling fluids included Max Bore bentonite, Swaco platinum packet and also from Baroid.

"We had foreman, drill operator and a laborer," he continued, "reaming and running using 100 - 120 gallons of fluid a minute at a maximum pressure 125 psi or about 12,000 pounds of push pressure. We drilled out to the opposite end, then we put the reamer on the south side of the river and pulled it back to the drill on the north side of the river. The install under the river took about two weeks. We made good time."

The 50-foot lengths of the HDPE pipe were manufactured by WL Plastics (Ft. Worth, TX), provided by ISCO Industries (Louisville, KY) and were fused together using a McElroy Manufacturing, Inc. (Tulsa, OK) TracStar® 500. "For under the river we were able to fuse it all up in one run which was really nice. Each joint took about 30 minutes to fuse," Swain said. WL, ISCO and McElroy are member companies of PPI.

"The normal operating pressure is 100 psi at the river crossing bottom elevation of 710 feet above sea level," Schipper said. "We successfully pressurized the main to 165 psi to expand and stabilize the main before lowering to the test pressure of 155 psi for an hour. We were pleased to observed no leakage from the main on the first try."

Additional information can be found at **www.plasticpipe.org/MABpubs**.

ABOUT PPI:

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 and industry knowledge resource publishing data for use in the development and design of plastic pipe and conduit systems. Additionally, PPI collaborates with industry organizations that set standards for manufacturing practices and installation methods.*

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

Continuous Outreach & Upwards Progress in Central NY!

The Desmond Hotel in Albany New York was the site of the 7th Annual NASTT-NE Trenchless Technology Conference, November 13-14, 2023

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 13 – 14 at the spacious Crowne Plaza Albany Desmond Hotel. It was another worthwhile success reminding everyone once again of the value and productivity of live, in-person gatherings. Very well attended, the Conference cemented the presence of trenchless technology in upper state New York, already an industry stronghold.

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 the latest innovations and advancements, and continue the noble work of raising awareness of the many benefits and application of various trenchless methods across the Northeast.

More than 125 trenchless professionals, municipal attendees, industry exhibitors and students gathered together to enjoy a

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

"THE NASTT-NE CHAPTER BOARD OF DIRECTORS THANKS EVERYONE FOR THEIR PARTICIPATION IN A VERY SUCCESSFUL SEVENTH ANNUAL NASTT-NE NORTHEAST TRENCHLESS CONFERENCE. WE LOOK FORWARD TO SEEING YOU LATER THIS YEAR IN STURBRIDGE MA NOVEMBER 11-12!"

Rare opportunity to have four NASTT Hall of Fame Members attending the same regional conference. From l – r: George Ragula, Mike Willmets, Chris Macey, Dennis Doherty

Highlight was lunch-hour keynote address by Katie McKitrick, P.E., City of Albany Department of Water and Water Supply on the recent history of trenchless technology projects in the New York state capitol

Keynote speaker Katie McKitrick, P.E., City of Albany, receives plaque of appreciation from NASTT-NE Chair Eric Schuler P.E.(R) and Vice Chair Charles Trip P.E. (L)

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. There were also 15 informative trade exhibits showcasing a wide range of leading edge trenchless and condition assessment technologies, along with live outdoor field demonstrations of Manhole Lining (Precision Trenchless, LLC) and Pipe Bursting (Centerline Trenchless).

A highlight of the conference was a lunch-hour keynote address on the recent history and impact of trenchless technology projects in the New York state capitol by Katie McKitrick, P.E., from the City of Albany Department of Water and Water Supply. She challenged the delegates

to also measure success by the impact trenchless technogy has in our communities. As a public servant, Katie is motivated to

Networking and close personal access to industry expertise is an important aspect of the annual NASTT-NE Conference

Live field demos are a much anticipated regular conference highlight: Manhole Lining Demonstration – Precision Trenchless, LLC; Pipe Bursting Demonstration – Centerline Trenchless

Manhole Lining

implement infrastructure solutions that maintain or improve quality of life in Albany's urban environment, with trenchless technology playing a crucial role.

Following her speech, she was presented with a plaque of appreciation by NASTT-NE Chair, Eric Schuler P.E. and NASTT-NE Vice-Chair, Charles Tripp P.E.

The NASTT-NE Chapter Board of Directors thanks everyone for their participation in a very successful seventh annual 2023 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!

Pipe Bursting

For further details and updates please visit:

www.nenastt.org

We look forward to seeing everyone again November 11 – 12, 2024 in rustic Sturbridge MA for the Eighth Annual Northeast Trenchless Technology Conference!!!

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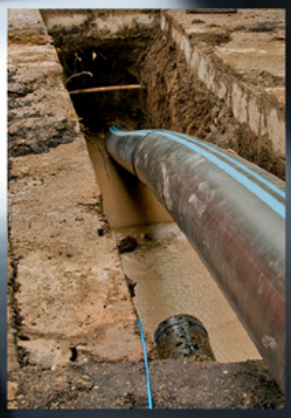

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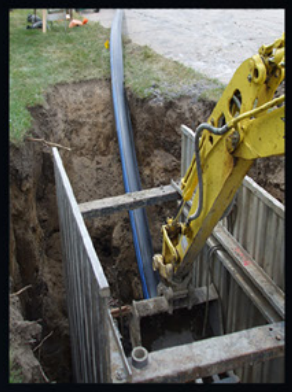

For more details, visit www.plasticpipe.org/MABpubs

HDPE MUNICIPAL ADVISORY BOARD

Find out more:

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