



# NASTT's 2011 No-Dig Show

Celebrate 20 Years of Trenchless Solutions

March 27-31, 2011

Gaylord National Hotel & Convention Center  
Washington, D.C.

CONFERENCE  
PREVIEW 1

Presented by the  
North American Society  
for Trenchless Technology  
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TRENCHLESS - THE SUSTAINABLE SOLUTION

# Welcome to the 2011 No-Dig Show!

Dear Trenchless Colleagues,

Washington, D.C. will host the 20th Annual NASTT No-Dig Show at the Gaylord National Hotel & Conference Center on the historic Potomac River, March 27-31, 2011. The last time the No-Dig Show was in D.C. was in 1992 with our parent organization the International Society for Trenchless Technology. At that time, NASTT was a fledgling organization with the mission of developing trenchless training applications and educating owners, operators and designers of the benefits associated with this new construction science.

Twenty years have passed and we are still growing. Our membership continues to push the envelope on the uses and benefits of a trenchless approach to resolving infrastructure problems in the United States, Canada and Mexico.

NASTT believes that it is appropriate that we return to our nation's capital as it is a central hub of the East Coast. This is where decisions are made that have significant impacts on our industry. What better place to showcase how trenchless technology has grown, the advantages that it offers and especially how it provides a green and sustainable solution to the deterioration of our aging infrastructure.

The theme for the 2011 conference – **Trenchless – The Sustainable Solution** – emphasizes our point. Trenchless is no longer the “experimental” technology of 20 years ago; it has been proven in our municipalities time and time again. No longer are we the last tool in the toolbox to be considered. Many agencies now insist on trenchless over other methods. NASTT will be 21 years old in 2011, and we continue to grow our ability to service our membership and our communities, plus provide the type of information and forum required to engage the industry.

The technical topics of the 2011 No-Dig Show will cover the complete span of the trenchless affect on the infrastructure industry. The Program Committee met at the Gaylord National in July to review submitted abstracts and select the ones to be included in the conference. It was a daunting task as there were many excellent abstracts. I am confident that attendees will hear presentations reflecting the up-to-the-minute status of our industry. Not only will we be learning about the latest technological advances, but also how proven technologies have been applied in innovative ways. We will hear why project problems occurred, how they were resolved, lessons were learned and how they can be applied to future projects.

Please plan to attend our 20th Annual No-Dig Show in Washington, D.C. You will have the opportunity to meet with your peers or to introduce yourself to our industry and the exciting technologies that it provides. I can assure you will see and hear the current status of our industry and the directions anticipated for future growth. For more information, visit our website at [www.nodigshow.com](http://www.nodigshow.com).

Sincerely,



Jack Burnam, 2011 Program Chair



The 2011 No-Dig Show is sponsored 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 web site at [www.nastt.org](http://www.nastt.org).

TRENCHLESS – THE SUSTAINABLE SOLUTION

# Schedule of Events

## SUNDAY, MARCH 27, 2011

- 8:00 AM - 5:00 PM.....Attendee & Exhibitor Registration
- 8:00 AM - 11:45 AM.....Trenchless Technology Short Course - New Construction & Rehabilitation
- 12:00 PM - 3:00 PM.....Student Orientation Meeting
- 2:30 PM - 5:30 PM.....NASTT Regional Chapter Meetings

## MONDAY, MARCH 28, 2011

- 7:00 AM - 5:00 PM.....Attendee & Exhibitor Registration
- 7:30 AM - 9:15 AM.....No-Dig Kick-off Breakfast & Entertainment
- 9:30 AM - 11:35 AM.....5-Track Tech Paper Sessions
- 11:45 AM - 3:45 PM.....Exhibit Hall Open
- 2:00 PM - 2:30 PM.....Student Poster Competition in Exhibit Hall
- 3:45 PM - 5:25 PM.....5-Track Tech Paper Session
- 5:30 PM - 6:15 PM.....Pre-Auction Reception
- 6:15 PM - 7:30 PM.....NASTT 10th Annual Educational Fund Auction

## TUESDAY, MARCH 29, 2011

- 7:00 AM - 5:00 PM.....Attendee & Exhibitor Registration
- 8:00 AM - 12:00 PM.....5-Track Tech Paper Sessions
- 12:00 PM - 3:30 PM.....Exhibit Hall Open
- 3:30 PM - 5:35 PM.....5-Track Tech Paper Sessions
- 6:00 PM - 7:00 PM.....Pre-Gala Awards Dinner Reception
- 7:00 PM - 11:00 PM.....NASTT No-Dig Gala Awards Dinner

## WEDNESDAY, MARCH 30, 2011

- 7:00 AM - 2:00 PM.....Attendee & Exhibitor Registration
- 8:00 AM - 10:05 AM.....5-Track Tech Paper Sessions
- 10:00 AM - 12:30 PM.....Exhibit Hall Open
- 12:30 PM - 2:00 PM.....No-Dig Closing Luncheon & Entertainment
- 2:30 PM - 5:30 PM.....NASTT Pipe Bursting Good Practices Course (Day 1)
- 2:30 PM - 5:30 PM.....NASTT Sewer Laterals Rehabilitation & Replacement Good Practices (Day 1)
- 2:30 PM - 5:30 PM.....NASTT Cured-In-Place Pipe (CIPP) Good Practices (Day 1)
- 2:30 PM - 5:30 PM.....NASTT New Installation Methods Good Practices Course – Application of Grade, Alignment Control and Guidance (Day 1)
- 2:30 PM - 5:30 PM.....HDD Consortium/NASTT Horizontal Directional Drilling (HDD) Good Practices Guidelines Course(Day 1)

## THURSDAY, MARCH 31, 2011

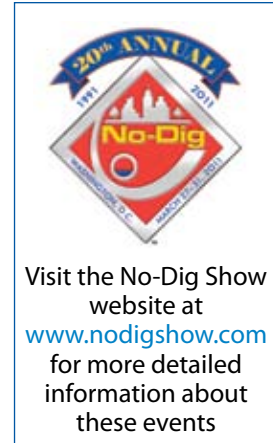
- 8:30 AM - 12:00 PM.....NASTT Pipe Bursting Good Practices Course (Day 2)
- 8:30 AM - 12:00 PM.....NASTT Sewer Laterals Rehabilitation & Replacement Good Practices (Day 2)
- 8:30 AM - 12:00 PM.....NASTT Cured-In-Place Pipe (CIPP) Good Practices (Day 2)
- 8:30 AM - 12:00 PM.....NASTT New Installation Methods Good Practices Course –Application of Grade, Alignment Control and Guidance (Day 2)
- 8:30 AM - 12:00 PM.....HDD Consortium/NASTT Horizontal Directional Drilling (HDD) Good Practices Guidelines Course (Day 2)
- 8:30 AM - 5:00 PM.....NASSCO Pipeline Assessment Certification Program (PACP) Trainer Re-Certification & Upgrade

## FRIDAY, APRIL 1, 2011

- 8:30 AM - 5:00 PM.....NASSCO Pipeline Assessment Certification Program (PACP)

## SATURDAY, APRIL 2, 2011

- 8:30 AM - 5:00 PM.....NASSCO Lateral (LACP) & Manhole (MACP) Assessment Certification Program



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# 2011 No-Dig Schedule At a Glance

W Water 
 W Wastewater 
 W Wastewater/Water 
 S Stormwater 
 E Electrical 
 G Gas 
 O Other

## Monday March 28, 2011 - AM Sessions

	Track 1 <b>HDD</b> Richard (Bo) Botteicher, Underground Solutions, Inc.	Track 2 <b>Microtunneling</b> Brenda Kingsmill, Regional Municipality of Halton	Track 3 <b>Condition Assessment &amp; Inspection</b> Ken Chua, City of Edmonton	Track 4 <b>Pipe Bursting</b> Jennifer Glynn, RMC Water and Environment	Track 5 <b>Sliplining</b> Joe Loiacono, Sanexen Aqua Pipe
9:30 am	<span style="color: green;">W</span> HDD Successfully Used to Construct Twin HDPE Pipelines for New Treatment Plant	<span style="color: grey;">O</span> Chemistry and Physics Behind Microtunnel Slurries	<span style="color: blue;">W</span> The Benefits of Long-term Monitoring Programs for Pipelines	<span style="color: green;">W</span> Accepting the Challenges of a Difficult and Risky Trunk Sewer Rehabilitation Project	<span style="color: green;">W</span> CCCC Rehabilitation of Corroded Sanitary Interceptor
9:55 am	<span style="color: blue;">W</span> Performance Testing of Segmental PVC for HDD Applications	<span style="color: green;">W</span> Quantifying the Effects of Lubrication on Jacking Forces	<span style="color: blue;">W</span> How RFTC Inspections Fit into the Complete Assessment Of a Watermain	<span style="color: green;">W</span> Large Diameter Fiberglass Reinforced Polymer Force Main Pipe Bursting Project	<span style="color: green;">W</span> Lining a Stormwater Box Culvert Through Contaminated Soil
10:20 am	<span style="color: blue;">W</span> Combining Two Trenchless Technologies into One to Cross New Hampshire's Largest River and a Railroad	<span style="color: green;">W</span> Weighing the Risks of Installing a Lake Tap with Microtunneling	<span style="color: green;">W</span> Measuring the Effectiveness of Infiltration/Inflow Removal after Collection System Rehabilitation	<span style="color: green;">W</span> Numerical Analysis of the Response of Adjacent Pipelines During Static Pipe Bursting	<span style="color: green;">W</span> Pulling, Not Pushing
10:45 am	<span style="color: yellow;">G</span> Natural Gas Pipelines and Unmarked Sewer Lines - A Damage Prevention Partnership	<span style="color: green;">W</span> The Use of GBRs on Open-cut and Trenchless Pipeline Installation for the Castleton Relief Sewer Project	<span style="color: green;">W</span> Uses and Limitations of Recent Advances in Sewer Inspection Technologies for Large Diameter Trenchless Rehabilitation Projects	<span style="color: blue;">W</span> Consolidated Mutual Water Company Employs Large Scale Pipe Bursting Program to Rehabilitate Potable Water	<span style="color: green;">W</span> Rehabilitation of the Long Wharf Sewer Force Main Using Sliplining Methodology in Newport, Rhode Island
11:10 am	<span style="color: green;">W</span> Environmental Considerations With Large Diameter Directional Drilling	<span style="color: grey;">O</span> Slurry Management for Microtunneling Projects	<span style="color: green;">W</span> The City of Raleigh Force Main Rehabilitation	<span style="color: blue;">W</span> Splitting 12-in. Steel Watermain in the Napa Valley	<span style="color: green;">W</span> Renewing The Nation's Capitol

## Monday March 28, 2011 - PM Sessions

	Track 1 <b>HDD</b> David Bennett, Bennett Trenchless Engineers	Track 2 <b>Auger Boring</b> Keith Hanks, City of Los Angeles	Track 3 <b>Condition Assessment</b> David Crowder, R.V. Anderson Associates Limited	Track 4 <b>Project Planning and Delivery</b> Dennis Doherty, Haley & Aldrich	Track 5 <b>CIPP Lining</b> Chris Schuler, Miller Pipeline Corp.
3:45 pm	<span style="color: yellow;">G</span> Innovation in HDD Construction and Engineering: An 8,850-ft., 32-in. Single Drill HDD	<span style="color: grey;">O</span> Auger Boring - A Historical Review of Techniques and Applications	<span style="color: green;">W</span> Locating Voids Behind Pipe Walls in Large Diameter Sewers Using Pipe Penetrating Radar (PPR)	<span style="color: green;">W</span> Recycled Water Backbone System - Adopting a Sustainable Approach to Pipeline Construction	<span style="color: green;">W</span> Purdue Pipeline Fix - Large-Diameter CIPP Solution
4:10 pm	<span style="color: red;">E</span> Large Diameter HDD Crossings in a Challenging New York City Setting	<span style="color: green;">W</span> Case History - Successful Trenchless Installation in the Piedmont Geology Using Small Boring Unit	<span style="color: green;">W</span> GPR Goes Underground - Pipe Penetrating Radar	<span style="color: green;">W</span> Let'em Fight It Out - Creating a Competitive Bidding Environment through Quality Performance-based Specifications	<span style="color: green;">W</span> North Dorchester Bay CSO Storage Tunnel in Boston
4:35 pm	TBD	<span style="color: green;">W</span> Innovative Installation of Long Gravity Sewer Tunnels using Hard Rock Auger Boring in an Environmentally Sensitive Area	<span style="color: blue;">W</span> Development and Implementation of a Comprehensive Condition Assessment Rating System for Prestressed Concrete Cylinder Pipelines	<span style="color: green;">W</span> Advantages of Unconventional Subsurface Investigation Methods	<span style="color: green;">W</span> 123-in. CIPP Combined Sanitary and Storm Sewer Installation
5:00 pm	<span style="color: yellow;">G</span> HDD in Turkmenistan: Beneath the Amu Darya River for a 56-in. High-pressure Gas Pipeline	<span style="color: grey;">O</span> Guided Bore Solves Difficult Multiple High Railway Embankment Crossing	<span style="color: blue;">W</span> The Silver Bullet - Accurate Structural Assessment of Metallic Pipes Without Taking Lines Out of Service	<span style="color: green;">W</span> Designing to Manage Risk	<span style="color: green;">W</span> Case Study - Rehabilitation of Severely Deteriorated 66-in. Concrete Sewer Line

## Tuesday March 29, 2011 - AM Sessions (1st Session)

	Track 1 <b>HDD</b> Matthew Pease, Staheli Trenchless Consultants	Track 2 <b>Geotechnical Baseline Reports</b> Kim Staheli, Staheli Trenchless Consultants	Track 3 <b>Condition Assessment</b> Dorian Modjeski, Cardno TBE	Track 4 <b>Pipe Bursting &amp; Pipe Ramming</b> Craig Camp, Jacobs Associates	Track 5 <b>CIPP Lining</b> Kaleel Rahaim, Interplastic Corp.s
8:00 am	<span style="color: green;">W</span> Parris Island Force Main Project Results in Record HDD Installation Length for Plastic Pipe	<span style="color: green;">W</span> An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	<span style="color: green;">W</span> Evaluating Sewer System Improvements with Triple Bottom Line Costs	<span style="color: green;">W</span> Clarification of Regulatory Restrictions on the Trenchless Replacement of Asbestos Cement Pipe	<span style="color: blue;">W</span> Water Rehabilitation as a Sustainable Solution
8:25 am	<span style="color: blue;">W</span> HDD Installs Deep Sea Water Intake Pipeline	<span style="color: green;">W</span> An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	<span style="color: green;">W</span> Prioritization of Asset Condition in Pittsburgh	<span style="color: green;">W</span> Planning for Success on Class C Pipe Bursting Project in Atlanta, Georgia	<span style="color: blue;">W</span> Utility Experience with Innovative Watermain Rehab Techniques
8:50 am	TBD	<span style="color: green;">W</span> An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	<span style="color: green;">W</span> Dealing with H2S Corrosion in the Gordon Trunk Sewer	<span style="color: grey;">O</span> Performance of an Instrumented Pipe Ramming Installation	<span style="color: blue;">W</span> New York City Uses Cured-in-Place Liner to Structurally Rehabilitate a 125-Year-Old Watermain
9:15 am	<span style="color: green;">W</span> Comparing the Design and Construction Aspects of the 24-in. Diameter Fusible Polyvinylchloride Pipe	<span style="color: green;">W</span> An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	<span style="color: green;">W</span> Comprehensive Wastewater Force Main Evaluation	<span style="color: green;">W</span> Consuming Storm Drains Using New Innovations of Pipe Ramming and Extraction Techniques	<span style="color: blue;">W</span> Omaha Municipal Utility District Solves Major Issues by Renewing Century Old Cast Iron Watermains in the Historic Old Market District
9:40 am	<span style="color: green;">W</span> Team Approach Leads to Success in Complicated HDD Installation	<span style="color: green;">W</span> An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	<span style="color: green;">W</span> Los Angeles County Project Delivery Methods for Sanitary Sewer Condition Assessment	<span style="color: grey;">O</span> Installation of Railbed Drainage Casings in Extreme Conditions Utilizing the Pipe Ramming Method	<span style="color: blue;">W</span> Performance of Fiber-Reinforced CIPP Liner at the Location of Ring Fractures When Subjected to Combined Complex Loading

**Tuesday March 29, 2011 – AM Sessions (2nd Session)**

	Track 1 <b>HDD</b> Jason Lueke, Arizona State University	Track 2 <b>Pilot Tube Microtunneling</b> Michelle Ramos, GeoEngineers, Inc.	Track 3 <b>Subsurface Utility Engineering (SUE) &amp; Condition Assessment</b> Richard Thomasson, Malcolm Pirnie	Track 4 <b>Large Diameter Tunneling Design</b> Don Del Nero, CH2M Hill	Track 5 <b>CIPP Lining</b> Mo Najafi, University of Texas at Arlington
10:20 am	Hydraulic Fracture and Inadvertent Returns Evaluation and HDD Construction - Rheology is Key	Trenchless Solution for a Highly Populated Area in Alexandria, V.A.	Determining the Applicability of SUE Means and Methods for Locating Buried Utility Assets	MWDB Replacement Storm Trunk Design Considerations	Reducing Project Uncertainty for Residential Sewer CIPP Projects
10:45 am	Everything You Wanted to Know About Shear Modulus But Were Afraid to Ask	Challenging Microtunnel Sewer Installation Under Active Light Rail and Street Car Tracks	Underground Utilities Mapping for new Metro lines in Dublin, Ireland	Deep Tunnels for Abu Dhabi's New Sustainable Used Water System	How to Achieve Infiltration/ Inflow Removal Goals with a Comprehensive Approach
11:10 am	Investigation of Buried Pipe Floation Behavior in HDD and Open-Cut Ins	City of Edmonton's Trenchless Tool Box	Development of Sustainable Underground Infrastructure Rating System (SUIRS)	One Pass Segment Liner Installation for Larger Diameter Sanitary Sewer Tunnels Using Combisegment Technology	Factors Affecting Post-cure CIPP Liner Thickness
11:35 am	Cost Comparison of Small Diameter HDD and Open-cut for PVC and HDD	Toledo Waterways Initiative - Lockwood/Devilbiss Sewer Separation in Berdan and Sylvania	Comprehensive CSO Regulator Inspection Program - Asset Management Answer to an EPA Order	Using Latest Technology for Navigation the TBM and Segment Installation in Toronto	Forensic Investigation of a Generation Old CIPP Liners

**Tuesday March 29, 2011 – PM Sessions**

	Track 1 <b>HDD</b> Matthew Wallin, Bennett Trenchless Engineers	Track 2 <b>Microtunneling</b> Glenn Boyce, Jacobs Associates	Track 3 <b>Condition Assessment</b> Ernie Ting, Town of Markham	Track 4 <b>Large Diameter Tunneling Construction</b> Dr. Alan Atalah, Bowling Green State University	Track 5 <b>CIPP Lining</b> George Kurz, Burge, Waggoner, Sumner & Cannon.
3:30 pm	Pushing the Limits - Tunneling Vs. HDD	Another Success for the City of Portland using Alternative Contracting Methods to Deliver the Balch Consolidation Conduit	The Weakest Link	20/20 Review of the Pre-qualification and Design Aspects of the City of Calgary 15 Street Siphon Sanitary Sewer Tunnel Project	Revolutionizing CIPP with Energy Efficient Green Technology
3:55 pm	Large Diameter Steel Pipe Stress Analysis When Installed by Means of HDD	Construction of the Balch Consolidation Conduit Project - Successful Microtunneling in Very Challenging Conditions	Deterioration Modeling of PCCP Water Pipes	Soil Freezing for Effective Stabilization at 200-ft. Deep TBM Shaft Portal	Styrene - Design and Construction Considerations
4:20 pm	PPI-BoreAid - A New Polyethylene Pipeline HDD Design and QA/QC Application	Trenchless Technology for CSO Control in the Nation's Capital	Development of Condition Assessment Selection Tool (CAST) for Water and Wastewater Pipelines	Novel Installation of Seven Mixed Ground Sewer Tunnels Using a 72-in. Diameter Shielded TBM	Establishing Objective Standards for Evaluating and Quantifying I/I Reduction at Pipe to Pipe Connections
4:45 pm	Training in Proper Usage of Drilling Fluids Significantly Reduces Installation Problems	Case History - Successful Microtunneling in Challenging Ground Conditions	The Structural Integrity Expertises of Sewer Mains with the Results Different Than Expected	Reused of Conditioned Soil from Earth Pressure Balanced Tunnel Projects	Monitoring the CIPP Lining Process Using Underground Sensors
5:10 pm	Increasing System Capacity in Environmentally Sensitive Areas using the Pipe Bursting Method	Trenchless Technologies at the LAX Modernization Project to Install Utilities Under an Active Airport	Condition Assessment of In-Service Force Mains - Lessons Learned	HDD for the Detroit Upper Rouge Tunnel	Trenchless Rehabilitation of 2-in. to 16-in. Cast Iron Natural Gas River Crossings Utilizing a CIP Liner

**Wednesday, March 30, 2011 – AM Sessions**

	Track 1 <b>HDD</b> Cindy Preuss, Harris & Associates	Track 2 <b>Microtunneling</b> Jim Murphy, Worley Parsons	Track 3 <b>Condition Assessment</b> Ari Selvakumar, USEPA	Track 4 <b>Laterals Rehabilitation</b> Isabel Tardif, CERIU	Track 5 <b>Rehabilitation</b> Kevin Nagle, TT Technologies
8:00 am	Is Your "Small" HDD Simple or Not?	Folsom Lake Intake Design Challenges	City of Casper, Wyoming's Approach to Assessing a Large Diameter Sewer Interceptor	No-Dig Structural Renovation for Laterals and Mainlines	Vista Flume Rehabilitation Pilot Project
8:25 am	Field Evaluations on Accuracy of Photogrammetric Methods for Trenchless Construction	The Applications of GRP Pipes for the Pipe Roofing Technology - Case Study and Future Perspectives	More Bang for Your Buck! Recognizing Value by Integrating GIS Technology into CCTV Pipeline Inspection	City of London Lateral Lining Program	San Diego Pipeline Rehabilitation - Landing a 747 on a Sewer Trunk Main
8:50 am	Trying to Mix Oil and Water - Integrating Trenchless Advances from the Oil and Gas Industry into Municipalities	The First Planned Curved Microtunnel in the United States	MUD 109: Identifying Risk Factors for Proactive Preventive Maintenance	CIP Service Lateral Rehabilitation - Managing the Variables, Minimizing the Risk	Predicting Lifecycles of Carbon Fiber Liners For Pipeline Renewal
9:15 am	Three-Dimensional Study of the Effect of Soil Erosion on Rigid Pipes	Trenchless Considerations in Flood-protected Areas	Leak Detection of Natural Gas Pipelines	Creative Bidding Strategy Delivers Interesting Market-based Results	Evaluation of AWWA Class IV CIPP for Water Pipeline Process and Pipe Bursting in Comparison
9:40 am	Contingency Planning for High-risk HDD Construction	MTBM Retraction Using Pipe Ram Assist	Processing Combined Laser, Sonar and HD Imaging for Better Evaluation Decisions	Chemical Grouts and Grouting Methods	Upgrading Pressure Capabilities of a Force Main on the Spanish Coast

**Monday, March 28 – AM Sessions**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 1: HDD</b> Session Leader: Richard (Bo) Botteicher, Underground Solutions, Inc.					
9:30 AM	A-1-01	Wastewater	HDD Successfully Used to Construct Twin HDPE Pipelines for New Treatment Plant	Glenn Duyvestyn, Hatch Mott MacDonald; John Yarnall, Westech Engineering; and Dan Mello, Netarts Oceanside Sanitary District	This paper describes the design and construction challenges of constructing twin parallel 3,000-ft. long HDPE pipelines with an elevation difference of 350 ft. through clay and sand using HDD construction methods.
9:55 AM	A-1-02	Water	Performance Testing of Segmental PVC for HDD Applications	Craig Fisher, S&B Technical Products; Abhay Jain, Jwala Raj Sharma and Mohammed Najafi, University of Texas at Arlington/CIURE	This paper describes the performance testing of segmental PVC pipe that utilizes Bulldog Restraint System (BRS) for HDD applications.
10:20 AM	A-1-03	Water	Combining Two Trenchless Technologies into One to Cross New Hampshire's Largest River and a Railroad	Timothy Stinson, P.E., Kleinfelder/SEA; Guy Chabot, P.E., Manchester Water Works; and Robert McCoy, P.E., Kleinfelder/SEA	This paper describes the construction of nearly 5,000 ft. of 20-in. watermain crossing the Merrimack River and a railroad line utilizing a single HDD in an environmentally sensitive area.
10:45 AM	A-1-04	Gas	Natural Gas Pipelines and Unmarked Sewer Lines - A Damage Prevention Partnership	AGA's DC&M Committee	This paper provides insights into how natural gas utilities can collaborate with stakeholders to mark sewer lines and find ways to effectively deal with existing sewer lines.
11:10 AM	A-1-05	Water/Wastewater	Environmental Considerations With Large Diameter Directional Drilling	John Currey and Gene Woodbridge, Earth Boring Co. Ltd.	This paper reviews major environmental considerations required for large diameter directional drilling and the development of regulations and responsible HDD environmental practices.
<b>Track 2: Microtunneling</b> Session Leader: Brenda Kingsmill, Regional Municipality of Halton					
9:30 AM	A-2-01	Other	Chemistry and Physics Behind Microtunnel Slurries	Glenn Boyce and Craig Camp, Jacobs Associates; Rick Zavitz, Akkerman	This paper describes the benefits of using slurry in slurry microtunneling.
9:55 AM	A-2-02	Water/Wastewater	Quantifying the Effects of Lubrication on Jacking Forces	Laura Wetter and Kimberlie Staheli, Staheli Trenchless Consultants	This paper compares detailed lubrication and jacking force records on multiple drives of a recent 84-in. microtunneling project.
10:20 AM	A-2-03	Wastewater	Weighing the Risks of Installing a Lake Tap with Microtunneling	Christy Sanders-Meena, Vanir Construction Management, Inc.; Matthew Pease, Staheli Trenchless Consultants; and Anne Tonella-Howe, City of Mercer Island	This paper presents on the comprehensive risk evaluation performed by the City of Mercer Island of microtunneling vs. open-cut of a 60-in. casing into Lake Washington.
10:45 AM	A-2-04	Water/Wastewater	The Use of GBRs on Open-cut and Trenchless Pipeline Installation for the Castleton Relief Sewer Project	Stephen O'Connell, Paul Headland and James McKelvey, Black & Veatch; and Bill Grout, Indianapolis DPW	This paper discusses the design of the Castleton Relief Sewer in Indianapolis and the process of utilizing separate stand-alone Geotechnical Baseline Reports for the open-cut and microtunnel portions of the project.
11:10 AM	A-2-05	Other	Slurry Management for Microtunneling Projects	Craig Camp and Glenn Boyce, Jacobs Associates; Rick Zavitz, Akkerman; Barry Sorteberg, Clean Slurry Technology	This paper examines slurry management in microtunneling projects.
<b>Track 3: Condition Assessment &amp; Inspection</b> Session Leader: Ken Chua, City of Edmonton					
9:30 AM	A-3-01	Water	The Benefits of Long-term Monitoring Programs for Pipelines	Roberto Mascarenhas, the Pressure Pipe Inspection Company	This paper discusses the proactive repair and rehabilitation of water pipelines by combining long-term monitoring with periodic baseline assessments that allows utilities to avoid the cost and disruption of unexpected failures and unplanned repairs.
9:55 AM	A-3-02	Water	How RFTC Inspections Fit into the Complete Assessment Of a Watermain	Kevin Bainbridge and Michael Zantling, City of Hamilton	This paper discusses how a RFTC inspection can be utilized to assess critically buried watermain.
10:20 AM	A-3-03	Wastewater	Measuring the Effectiveness of Infiltration/Inflow Removal after Collection System Rehabilitation	Richard Nelson, CH2M Hill	This paper reviews reported methods to evaluate pre- and post-rehabilitation flow data and provides a comparison of the pros and cons of each method.
10:45 AM	A-3-04	Wastewater	Uses and Limitations of Recent Advances in Sewer Inspection Technologies for Large Diameter Trenchless Rehabilitation Projects	Daniel Buonadonna and Mark Wade CH2M Hill; Rob McKim, Louisiana Tech University	This paper reviews specialty pipeline inspection technologies currently being used on large diameter gravity sewers to examine the uses and limitations of this data specifically for design aspects of trenchless rehabilitation projects.
11:10 AM	A-3-05	Wastewater	The City of Raleigh Force Main Rehabilitation	M. Brent Johnson, Hazen & Sawyer and Whit Wheeler, City of Raleigh	This paper describes the important considerations of pressure pipe rehabilitation design and the lessons learned when bypassing force mains using mechanical line stops.
<b>Track 4: Pipe Bursting</b> Session Leader: Jennifer Glynn, RMC Water and Environment					
9:30 AM	A-4-01	Wastewater	Accepting the Challenges of a Difficult and Risky Trunk Sewer Rehabilitation Project	Eric Granholm, P.E., CDM; James J. Paluch, Joint Meeting of Essex & Union Counties; and Robert A. Pennington, P.E., BCEE, CDM	This paper discusses the challenges encountered, as well as the solutions that led to the successful installation of a 30-lf manhole, 300-lf of CIPP liner and 457-lf 24-in. HDPE pipe utilizing pipe bursting in Essex and Union Counties, N.J.
9:55 AM	A-4-02	Water/Wastewater	Large Diameter Fiberglass Reinforced Polymer Force Main Pipe Bursting Project	Eddie Ward, TT Technologies, Inc. and Michael Woodcock, Portland Utilities Construction LLC	This paper presents the project from concept to design completion with special attention given to problems encountered and solutions developed in replacing a large diameter fiberglass force main using pneumatic pipe bursting.
10:20 AM	A-4-03	Water/Wastewater	Numerical Analysis of the Response of Adjacent Pipelines During Static Pipe Bursting	Kazi M. Rahman, Ian D. Moore and Richard W.I. Brachman, GeoEngineering Centre at Queen's - RMC	This paper describes the three dimensional finite element analysis used to calculate the response of PVC and cast iron water pipes in the vicinity of gravity flow sewers replaced by pipe bursting.
10:45 AM	A-4-04	Water	Consolidated Mutual Water Company Employs Large Scale Pipe Bursting Program to Rehabilitate Potable Water	Richard (Bo) Botteicher, UGSI; Michael Queen, CMWC; and Dave Holcomb, TT Technologies, Inc.	This paper reviews the current, ongoing potable water pipe bursting rehabilitation program undertaken by Consolidated Mutual Water Company in the Denver Metro area, including realized successes, challenges and lessons learned.
11:10 AM	A-4-05	Water	Splitting 12-in. Steel Watermain in the Napa Valley	Collins Orton, TT Technologies, Inc.; John Draper, City of St. Helena; and Glen Ghilotti, Team Ghilotti	This paper describes the replacement of 1,900 ft. of 12-in. steel watermain joined by Steel Dresser Couplings with Fusible C-900 PVC using pipe bursting/splitting.
<b>Track 5: Sliplining</b> Session Leader: Joe Loiacono, Sanexen Aqua Pipe					
9:30 AM	A-5-01	Wastewater	CCCP Rehabilitation of Corroded Sanitary Interceptor	James J. Smolik, City of Westlake and Robert P. Kelly, City of Westlake	This paper describes how the City of Westlake was able to rehabilitate more pipe for the money and have both a structural and protective coating installed for the areas of corrosion.
9:30 AM	A-5-01	Wastewater	CCCP Rehabilitation of Corroded Sanitary Interceptor	Michael I. Spero, P.E., Danby, LLC and Datta Shirodkar, P.E., Boyer, Inc.	This paper presents a case study of lining a 90-year-old 7-ft. by 11-ft. stormwater box culvert in Maryland, adjacent to a former oil refinery.
10:20 AM	A-5-03	Wastewater	Pulling, Not Pushing	Jon M. Haskett, Rafael Solorzano and Harshad B. Shah, City of Los Angeles	This paper describes the emergency rehabilitation of the North Outfall Sewer at Trinity and 23rd Streets Project and the restoration of 1,000 ft. of large diameter semi-elliptical brick sewer after the sewer suffered a 50-ft. collapse due to prolonged hydrogen sulfide exposure.

**Monday, March 28 – AM Sessions**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 5: Sliplining</b> Session Leader: Joe Loiacono, Sanexen Aqua Pipe					
10:45 AM	A-5-04	Wastewater	Rehabilitation of the Long Wharf Sewer Force Main Using Sliplining Methodology in Newport, Rhode Island	Thomas Simbro, Wright-Pierce and Richard (Bo) Botteicher, UGSI	This paper presents the trenchless rehabilitation of the Long Wharf Sewer Force Main using the sliplining method.
11:10 AM	A-5-05	Wastewater	Renewing The Nation's Capitol	David Howell, Midwest Mole, Inc.	This paper discusses the selection of a methodology to rehabilitate an aging 54-in. sewer located in an environmentally sensitive area in northeast Washington, D.C.

**Monday, March 28 – PM Sessions**

<b>Track 1: HDD</b> Session Leader: David Bennett, Bennett Trenchless Engineers					
3:45 PM	B-1-01	Gas	Innovation in HDD Construction and Engineering: An 8,850-ft., 32-in. Single Drill HDD	Christopher Price and Mathew Pease, Staheli Trenchless Consultants	This paper presents an 8,850-ft. HDD crossing of the Rio Grande River in Bolivia utilizing a single drill and discusses specific challenges and the innovative solutions devised to ensure a successful and timely installation of an HDD spanning over one and half mile.
4:10 PM	B-1-02	Electrical	Large Diameter HDD Crossings in a Challenging New York City Setting	Hiren Shah, Mueser Rutledge Consulting Engineers; Jeff Scholl, J.D. Hair and Associates; and Orville Cocking, Consolidated Edison of NY	This paper discusses the four 1,000-ft., 42-in. diameter HDD crossings installed across the Harlem River.
4:35 PM	B-1-03		TBD		
5:00 PM	B-1-04	Gas	HDD in Turkmenistan: Beneath the Amu Darya River for a 56-in. High-pressure Gas Pipeline	Michael Lubberger, Herrenknecht	This paper discusses the installation of a long-distance gas pipeline under a river in Karabekaul, Turkmenistan.

<b>Track 2: Auger Boring</b> Session Leader: Keith Hanks, City of Los Angeles					
3:45 PM	B-2-01	Other	Auger Boring - A Historical Review of Techniques and Applications	Robert Martin, CH2M Hill and Bart Grolewski, CH2M Hill	This paper provides an overview of auger boring methods, case histories and accepted practices and recommendations.
4:10 PM	B-2-02	Wastewater	Case History - Successful Trenchless Installation in the Piedmont Geology Using Small Boring Unit	Emad Farouz, CH2M Hill	The paper discusses the suitability of SBU for piedmont geology and presents the selection process of trenchless installation during design and experience during construction.
4:35 PM	B-2-03	Wastewater	Innovative Installation of Long Gravity Sewer Tunnels using Hard Rock Auger Boring in an Environmentally Sensitive Area	Chris Sivesind, The Robbins Company; Tom Lawler, Clean Water Services; and Jim Gonzales, Gonzales Boring	This paper describes a record-breaking auger bore in Tigard, Ore. using a specialized disc cutterhead and ABM in an urban and environmentally sensitive area.
5:00 PM	B-2-04	Other	Guided Bore Solves Difficult Multiple High Railway Embankment Crossing	James Murphy, WorleyParsons and Juan Morera, TransCanada Pipelines	This paper discusses how guided boring technology solved technical difficulties for seven tightly spaced (5-ft. to 10-ft.) pipeline/casing crossings of a high railway embankment.

<b>Track 3: Condition Assessment</b> Session Leader: David Crowder, R.V. Anderson Associates Limited					
3:45 PM	B-3-01	Wastewater	Locating Voids Behind Pipe Walls in Large Diameter Sewers Using Pipe Penetrating Radar (PPR)	David Crowder and Gerald Bauer, R.V. Anderson Associates Ltd.; and Kevin Bainbridge, City of Hamilton	This paper reviews the man-entry walk through PPR trials that were undertaken in a 28-m deep, high flowing 1,524-mm combined sewer, and the design, development, and construction and successful live trials of a three channel multi-array PPR inspection tool.
4:10 PM	B-3-02	Wastewater	GPR Goes Underground - Pipe Penetrating Radar	Dr. Csaba Ekcs, Terraprobe Geoscience and Gordon Henrich, SewerVUE Technology Corp.	This paper discusses PPR using recent project examples to illustrate the technology and its applications.
4:35 PM	B-3-03	Water	Development and Implementation of a Comprehensive Condition Assessment Rating System for Prestressed Concrete Cylinder Pipelines	Travis B. Wagner, Pure Technologies and Michael Woodcock, Washington Suburban Sanitary Commission	This paper discusses the development and implementation of a PCCP condition assessment rating system including case studies for large utilities in the United States.
5:00 PM	B-3-04	Water	The Silver Bullet - Accurate Structural Assessment of Metallic Pipes Without Taking Lines Out of Service	Ben Jacobs, City of Atlanta and Kevin Bainbridge, City of Hamilton	This paper reviews the use of a reengineered pig system for water pipelines within Canada and the United States and compares the data to that collected by other inspection methods.

<b>Track 4: Project Planning and Delivery</b> Session Leader: Dennis Doherty, Haley & Aldrich					
3:45 PM	B-4-01	Water/Wastewater	Recycled Water Backbone System - Adopting a Sustainable Approach to Pipeline Construction	Andrew Stanton, P.E. and Kevin Tran, P.E. Black & Veatch; Lou Balderrama, P.E., City of Oxnard; Thien Ng, City of Oxnard	This paper describes how sustainability concepts can be incorporated throughout a pipeline project lifecycle from initial concept through construction through the use of multiple trenchless installation techniques.
4:10 PM	B-4-02	Wastewater	Let 'em Fight It Out - Creating a Competitive Bidding Environment through Quality Performance-based Specifications	Mike Fisher, P.E., Water Works Engineers; Mark Cocke, P.E., City of Woodland; Derrick Williams, P.E., Kimley-Horn and Associates; and John Abshier, City of Redding	This paper describes how bidding multiple rehabilitation technologies against one another using performance-based specifications can result in significant cost-savings.
4:35 PM	B-4-03	Water/Wastewater	Advantages of Unconventional Subsurface Investigation Methods	Tracy Lyman, Lyman Henn, a division of Brierley Associates, LLC and Alan Howard, Brierley Associates	This paper discusses the limitations of conventional boring and geophysical tools for subsurface investigations for tunnel/trenchless projects.
5:00 PM	B-4-04	Water/Wastewater	Designing to Manage Risk	Dennis J. Doherty, Haley & Aldrich	This paper discusses the management of risk through proper planning, design techniques and special conditions to alleviate risk encountered during construction.

<b>Track 5: CIPP Lining</b> Session Leader: Chris Schuler, Miller Pipeline Corp.					
3:45 PM	B-5-01	Wastewater	Purdue Pipeline Fix - Large-Diameter CIPP Solution	Jay Ferguson and Alex Sharpe, Insituform Technologies, Inc.; and Sanjay Patel, VS Engineering	This paper details a large diameter pipeline rehabilitation project conducted on the campus of Purdue University.
4:10 PM	B-5-02	Wastewater	North Dorchester Bay CSO Storage Tunnel in Boston	Scott Williamson, Parsons Brinckerhoff, Inc.	This paper discusses the installation of 1,800 ft. of CIPP to protect conduits during construction and to maintain their structural and hydraulic capacity in the years to come.
4:35 PM	B-5-03	Wastewater	123-in. CIPP Combined Sanitary and Storm Sewer Installation	Joseph Westervelt and Gerhardt Rodenberger, Spiniello Companies	This paper describes the in-place rehabilitation of 360 lf of arch brick combined sanitary and storm sewer using CIPP in Newark, N.J.
5:00 PM	B-5-04	Wastewater	Case Study - Rehabilitation of Severely Deteriorated 66-in. Concrete Sewer Line	Charles H. Call, Jr., P.E., SLC Public Utilities and Mark Wade, CH2M Hill	This paper presents on the rehabilitation of severely deteriorated 66-in. concrete sewer line, the pre-design evaluation, design and bidding and construction issues associated with this project.

**Tuesday, March 29 – AM Sessions (1st Session)**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 1: HDD</b> Session Leader: Matthew Pease, Staheli Trenchless Consultants					
8:00 AM	C-1-01	Water/Wastewater	Parris Island Force Main Project Results in Record HDD Installation Length for Plastic Pipe	Ed Saxon, BJWSA; Neil Smith, Mears Group; and Richard (Bo) Botteicher, UGSI	This paper discusses all aspects of the challenging Parris Island 6,400-lf record-breaking HDD crossing, including bore completion, staging and installation and working within the restrictive requirements of the military base.
8:25 AM	C-1-02	Water	HDD Installs Deep Sea Water Intake Pipeline	Glenn Duyvestyn and John Leonard, Hatch Mott MacDonald	This paper describes the design and construction challenges of constructing a deep sea water intake pipeline using HDD construction methods.
8:50 AM	C-1-03		TBD		
9:15 AM	C-1-04	Water/Wastewater	Comparing the Design and Construction Aspects of the 24-in. Diameter Fusible Polyvinylchloride Pipe	Kapila Pathirage, Ph.D., P.E., Gary Shaughnessy, P.G. and David J. Tanzi, P.E., BCEE, CDM; and G. Christian Andreasen Jr., P.E., Middlesex Water Company	This paper discusses the design process and compares pulling forces predicted by the design with the actual pulling forces recorded during the pipe installation.
9:40 AM	C-1-05	Wastewater	Team Approach Leads to Success in Complicated HDD Installation	Nick Strater, Brian Dorwart and Tom Pullen Brierley Associates, LLC; Bob Fenoff, Bore Tech; Erin Nielsen, CLD Associates; Bob Hoffman, Daman Construction Group; and John Bristow, Onsite HDD	This paper provides details of a technically difficult HDD installation and the teaming methods used to facilitate project success.
<b>Track 2: Geotechnical Baseline Reports</b> Session Leader: Kim Staheli, Staheli Trenchless Consultants					
8:00 AM - 10:05 AM	C-2	Water/Wastewater	An In-depth Discussion on Geotechnical Baseline Reports and Legal Issues	John Parnass, Davis Wright Tremaine; Dan Dobbels, Jacobs Associates; Steve Hunt, CH2M Hill; Mark Hutchinson, City of Portland; and John Fowler, JW Fowler, Inc.	A legal perspective of Geotechnical Baseline Reports (GBRs) and how courts view baselines. GBR topics are presented by designers, owners and contractors. The legal perspective is presented by an attorney who specializes in trenchless claims, presenting typical court standings on baselines and providing recommendations on developing baselines.
<b>Track 3: Condition Assessment</b> Session Leader: Dorian Modjeski, Cardno TBE					
8:00 AM	C-3-01	Wastewater	Evaluating Sewer System Improvements with Triple Bottom Line Costs	Marc A. Lehmann, P.E. and John P. Schroeder, P.E., BCEE, CDM; and Tim Fallara, P.E., City of Columbus Division of Sewerage and Drainage	This paper focuses on accurately representing expected water-in-basement complaints over a 30-year life-cycle. The analysis has proven to be a powerful way to illustrate to a business case for implementing a proactive asset management program to decision-makers.
8:25 AM	C-3-02	Wastewater	Prioritization of Asset Condition in Pittsburgh	Richard Thomasson, Virginia Tech University and Bob Hutton, Pittsburgh Water Sewer Agency	This paper discusses the work that developed a heuristic model for determination of prioritization of sewer segments for R&R for the City of Pittsburgh.
8:50 AM	C-3-03	Wastewater	Dealing with H2S Corrosion in the Gordon Trunk Sewer	Ashley Rammeloo, City of London	This paper describes the steps taken by the City of London to preserve a vital piece of infrastructure that was seriously deteriorated via hydrogen sulphide corrosion.
9:15 AM	C-3-04	Wastewater	Comprehensive Wastewater Force Main Evaluation	Andrew Clothier, AECOM and Andrew Kubek, City of Virginia Beach	This paper describes a wastewater force main evaluation program including the methodology and approach, selection and deployment of appropriate inspection technologies, identification of site specific challenges and mitigation, inspection results, data analysis and lessons learned.
9:40 AM	C-3-05	Wastewater	Los Angeles County Project Delivery Methods for Sanitary Sewer Condition Assessment	Robert Swartz, Fernando Villaluna and Kari Eskridge, Los Angeles County Department of Public Works	This paper highlights the importance of comprehensive specifications, detailed submittal requirements, a complete system of project delivery methods and extensive review and analysis of data required for a successful condition assessment program.
<b>Track 4: Pipe Bursting &amp; Pipe Ramming</b> Session Leader: Craig Camp, Jacobs Associates					
8:00 AM	C-4-01	Water/Wastewater	Clarification of Regulatory Restrictions on the Trenchless Replacement of Asbestos Cement Pipe	Kent Von Asperm, HDR	This paper clarifies confusing regulations regarding the rehabilitation, replacement and disposal of asbestos cement pipe to help public agencies, engineers and contractors avoid unknown risks.
8:25 AM	C-4-02	Wastewater	Planning for Success on Class C Pipe Bursting Project in Atlanta, Georgia	Alan Goodman, HammerHead Trenchless Equipment and Brent Scarborough, Brent Scarborough & Company	This paper details the dramatic upsizing of an aging 18-in. sewer pipe that has been partially exposed due to erosion to 28-in. HDPE pipe in the City of Atlanta.
8:50 AM	C-4-03	Other	Performance of an Instrumented Pipe Ramming Installation	Tadesse Meskele, Oregon State University and Armin Stuedlein, Oregon State University	This paper discusses the instrumentation program and observed performance of a rammed pipe, including the installation stresses, soil resistance distribution along the pipe shaft and ground movements.
9:15 AM	C-4-04	Water/Wastewater	Consuming Storm Drains Using New Innovations of Pipe Ramming and Extraction Techniques	George C. Mallakis, TT Technologies, Inc. and Hassan Mustafa, P.E., PMP, Pave Tech, Inc.	This paper discusses new applications of pipe ramming to replace existing Corrugated Metal Pipe (CMP) and Reinforced Concrete Pipe (RCP) by driving new steel casing over and "consuming" the existing pipeline, then extracting the old pipe for sizes between 12 to 36-in. diameter.
9:40 AM	C-4-05	Other	Installation of Railbed Drainage Casings in Extreme Conditions Utilizing the Pipe Ramming Method	Alan Goodman, HammerHead Trenchless Equipment; Brian Kenkle, Hurk Underground Technologies, Inc; and Author TBD, Burlington Northern Santa Fe Railway	This paper discusses the pipe ramming process and challenges related to the installation or replacement of culvert drainage pipes under railroad beds with a special focus on the project completed in Ardmore, Okla. for the Burlington Northern Santa Fe Railway Company.
<b>Track 5: CIPP Lining</b> Session Leader: Kaleel Rahaim, Interplastic Corp.					
8:00 AM	C-5-01	Water	Water Rehabilitation as a Sustainable Solution	Jeffrey Wing, Kimley Horn and Associates	This paper describes that water rehabilitation using trenchless technologies is a sustainable solution that has global impacts.
8:25 AM	C-5-02	Water	Utility Experience with Innovative Watermain Rehab Techniques	David Hughes, American Water and Wendy Conduit, Battelle	This paper describes the utility perspective of EPA demonstration projects for watermain pipe rehabilitation, a spray-applied, semi-structural lining for small pipe and a CIP fully structural lining for larger pipe.
8:50 AM	C-5-03	Water	New York City Uses Cured-in-Place Liner to Structurally Rehabilitate a 125-Year-Old Watermain	Joseph Loiacono, Sanexen Aqua Pipe and Ng (Dino) Yun Poy, NYC Dept. of Design and Construction	This paper presents the Madison Avenue case study including the decision making process to select the CIPP solution, as well as specific technical issues, construction details and the technical and economic benefits of the CIPP solution.
9:15 AM	C-5-04	Water	Omaha Municipal Utility District Solves Major Issues by Renewing Century Old Cast Iron Watermains in the Historic Old Market District	Jeff Schovane, Metropolitan Utilities District NE and Benoit Coté, Sanexen Environmental Services	This paper presents on the important technical and social issues and the resulting solutions associated with the renewal of century-old cast iron watermains in the Old Market District.
9:40 AM	C-5-05	Water	Performance of Fiber-Reinforced CIPP Liner at the Location of Ring Fractures When Subjected to Combined Complex Loading	Shaurav Alam, Louisiana Tech University and Erez Allouche, Trenchless Technology Center, Louisiana Tech University	This paper presents the results of an experimental study undertaken to quantify the mechanical performance of a CIPP liner at the location of ring fracture in the host pipe when subjected to combined complex loading (internal pressure, local bending and hoop stress).
<b>Tuesday, March 29 – AM Sessions (2nd Session)</b>					
<b>Track 1: HDD</b> Session Leader: Jason Lueke, Arizona State University					
10:20 AM	D-1-01	Other	Hydraulic Fracture and Inadvertent Returns Evaluation and HDD Construction - Rheology is Key	Andrew E. Sparks, P.E. and D. Paul Bearden, Jr., GeoEngineers, Inc.	This paper explores how drilling fluid management during HDD construction influences the reliability of hydraulic fracture and inadvertent returns evaluation.
10:45 AM	D-1-02	Other	Everything You Wanted to Know About Shear Modulus But Were Afraid to Ask	Mary Asperger and Kathryn Wallin, Bennett Trenchless Engineers	This paper explores the shear moduli of soils and how to estimate appropriate values.

**Tuesday, March 29 – AM Sessions (2nd Session)**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 1: HDD</b> Session Leader: Jason Lueke, Arizona State University					
11:10 AM	D-1-03	Other	Investigation of Buried Pipe Floatation Behavior in HDD and Open-Cut Ins	Jinsung Cho, Brad D. Carey, Jason S. Lueke and Samuel T. Ariaratnam, Arizona State University	This paper examines the differences in how plastic pipe installed by HDD and traditional open-cut techniques behave when installed in saturated submerged soil conditions typical of river crossings, by conducting real-scale laboratory experiments.
11:35 AM	D-1-04	Water	Cost Comparison of Small Diameter HDD and Open-cut for PVC and HDPE	Trupti Anil Kulkarni, Mustafa Kanchwala and Mohammad Najafi, The University of Texas at Arlington; and Craig Fisher, S&B Technical Products	This paper presents a cost comparison of HDD with traditional open-cut installation method using PVC and HDPE pipes.
<b>Track 2: Pilot Tube Microtunneling</b> Session Leader: Michelle Ramos, GeoEngineers, Inc.					
10:20 AM	D-2-01	Wastewater	Trenchless Solution for a Highly Populated Area in Alexandria, VA.	David Howell, Midwest Mole, Inc. and John Milligan, Vermeer Corp.	This paper discusses the selection of a methodology to install approximately 900 ft. of 12-in. sewer in Alexandria, VA., 20-ft. deep down the center of a road and across US Route 1. The method chosen was the Vermeer AXIS System.
10:45 AM	D-2-02	Water/Wastewater	Challenging Microtunnel Sewer Installation Under Active Light Rail and Street Car Tracks	Joe Dvorak and Don Poletski, City of Portland Bureau of Environmental Services	This paper describes a challenging installation of 12-in. diameter sewer pipe using pilot tube microtunneling in a congested urban setting.
11:10 AM	D-2-03	Wastewater	City of Edmonton's Trenchless Tool Box	Junhao Zou, City of Edmonton, Siri Fernando, Arbind Mainali and Frank Policicchio, City of Edmonton, AMPW, Design and Construction	This paper presents a recent application of TBM tunneling, hand tunneling, pipe ramming, unguided auger boring, pilot tube microtunneling and ground freezing in one storm servicing project.
11:35 AM	D-2-04	Wastewater	Toledo Waterways Initiative - Lockwood/Devilbiss Sewer Separation in Berdan and Sylvania	Dr. Alan Atalah, Bowling Green State University	This paper discusses the pilot tube microtunneling portion on Overland Parkway where three rescue shafts were needed within one drive.
<b>Track 3: Subsurface Utility Engineering (SUE) &amp; Condition Assessment</b> Session Leader: Richard Thomasson, Malcolm Pirnie					
10:20 AM	D-3-01	Other	Determining the Applicability of SUE Means and Methods for Locating Buried Utility Assets	Lewis A. Hutchins, Naval Facilities Engineering Command and Sunil K. Sinha, Virginia Polytechnic Institute & State University	This paper describes current research to develop an application to aid utility engineers, consultants and contractors in selecting an appropriate method for locating buried utility assets based on environmental conditions and the utilities' properties.
10:45 AM	D-3-02	Other	Underground Utilities Mapping for new Metro lines in Dublin, Ireland	Carlo Pilia, TST Engineering Group and Enrico Boi, TST Engineering Group	This paper describes the important benefits achieved in Ireland with six years of no-dig utility mapping activity on railway projects.
11:10 AM	D-3-03	Water/Wastewater	Development of Sustainable Underground Infrastructure Rating System (SUIRS)	Dae Hyun (Dan) Koo, IUPUI and Jeffrey J. Wing, P.E., LEED, AP	This paper describes the framework of the sustainable underground infrastructure rating system and illustrates a credit rating methodology for an underground infrastructure project development.
11:35 AM	D-3-04	Wastewater	Comprehensive CSO Regulator Inspection Program - Asset Management Answer to an EPA Order	Joseph Strauch, Gannett Fleming, Inc.	This paper presents a case study of a wastewater agency utilizing asset management principles and innovative technology in order to respond to an EPA Order for Compliance.
<b>Track 4: Large Diameter Tunneling Design</b> Session Leader: Don Del Nero, CH2M Hill					
10:20 AM	D-4-01	Wastewater	MWDB Replacement Storm Trunk Design Considerations	Dan Willems, Stantec Consulting Ltd.; Dave Krywiak, Stantec Consulting Ltd.; and Wayne Pelz, City of Edmonton	This paper discusses the tunneling design considerations for the MWDB Replacement Storm Trunk and the alignment selection, shaft siting, land issues and the design of various complicated diversion connections.
10:45 AM	D-4-02	Wastewater	Deep Tunnels for Abu Dhabi's New Sustainable Used Water System	Shahzad Orakzai and Omar Al Hashimi, Abu Dhabi Sewerage Services Company; Stephen Hill and Robert Marshall, CH2M Hill International; and Anna Najda, CH2M Hill	This paper describes the issues and challenges in the development and delivery of a maintenance-free centralized odor extraction sewerage tunnel system.
11:35 AM	D-4-03	Wastewater	One Pass Segment Liner Installation for Larger Diameter Sanitary Sewer Tunnels Using Combisegment Technology	Dr. Gerhard Lang, Herrenknecht	The paper discusses different design aspects of a sanitary sewer tunnel and provides an overview of the available installation methods and material alternatives.
11:10 AM	D-4-04	Water/Wastewater	Using Latest Technology for Navigation the TBM and Segment Installation in Toronto	Mike Ghassemi and Derek Zoldy, AECOM; and Adrian Coombs, Water and Wastewater Branch, Transportation and Works Department	This paper describes the practical tips for the design of the tunnel alignment and segments and the challenges associated with the navigation of the TBM and segment installation at 19th Avenue Tunnel in Toronto.
<b>Track 5: CIPP Lining</b> Session Leader: Mo Najafi, University of Texas at Arlington					
10:20 AM	D-5-01	Wastewater	Reducing Project Uncertainty for Residential Sewer CIPP Projects	Erik Waligorski, P.E., Roth Hill, LLC and Ron Hall, Southwest Suburban Sewer District	This paper reviews project delivery methods used to reduce overall project uncertainty for residential sewer CIPP projects and illustrates the cost benefits with a case study of the rehabilitation of 60,000 ft. of sewer mains in Burien, WA.
10:45 AM	D-5-02	Wastewater	How to Achieve Infiltration/Inflow Removal Goals with a Comprehensive Approach	Jonathan Kunay, CDM and Paul E. Ross, CDM	This paper details the effectiveness of a comprehensive rehabilitation program and rehabilitation techniques, costs, private inflow removal, product warranty inspections and results from pre- and post-construction metering to determine percentages of I/I removed.
11:10 AM	D-5-03	Wastewater	Factors Affecting Post-cure CIPP Liner Thickness	Richard Harada, Wilson Okamoto Corp.; Ian Doherty, Trenchless Design Engineering, Ltd.; Denise McClanahan, Reynolds Inliner, LLC; Lynn Osborn, Insituform Technologies, Inc.; and Steve Leffler, Sekisui NordiTube	The paper discusses the various factors that affect the post-cure thickness of CIPP liners.
11:35 AM	D-5-04	Wastewater	Forensic Investigation of a Generation Old CIPP Liners	Erez Allouche, Shaurav Alam and Ray Sterling, Trenchless Technology Center; and Wendy Condit, Battelle	This paper describes the results of an extensive forensic investigation performed on CIPP liner specimens exhumed from 8-in. and 30-in. wastewater pipelines in the cities of Denver and Columbus, which were lined five to 27 years ago.
<b>Tuesday, March 29 – PM Sessions</b>					
<b>Track 1: HDD</b> Session Leader: Matthew Wallin, Bennett Trenchless Engineers					
3:30 PM	E-1-01	Water	Pushing the Limits - Tunneling Vs. HDD	Andrew Hunt, P.E., and Rafael Ortega, P.E., Lockwood, Andrews & Newnam, Inc.	This paper discusses the challenges faced in a recent design analysis for installing almost 2.5 miles of a 48-in. water transmission main through a highly restricted area while considering microtunneling and the latest HDD methods. The prime HDD alternative would break the existing world record.
3:55 PM	E-1-02	Water/Wastewater	Large Diameter Steel Pipe Stress Analysis When Installed by Means of HDD	René Albert, Vermeer Corp.	This paper provides an overview on the different stresses (supported by formulas) and provide tips on jobsite requirements that need to be considered during the preparation stage of a large pipeline installation.
4:20 PM	E-1-03	Water/Wastewater	PPI-BoreAid - A New Polyethylene Pipeline HDD Design and QA/QC Application	Alireza Bayat, University of Alberta, Dept. of Civil Engineering; Karl Lawrence, eTrenchless Ltd.; Mark Knight, University of Waterloo, Dept of Civil and Environmental Engineering; and Camile Rubeiz, Plastics Pipe Institute	This paper discusses PPI-BoreAid, a new online and desktop HDD polyethylene pipe application developed and released by the Plastics Pipe Institute (PPI).

**Tuesday, March 29 – PM Sessions**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 1: HDD</b> Session Leader: Matthew Wallin, Bennett Trenchless Engineers					
4:45 PM	E-1-04	Gas	Training in Proper Usage of Drilling Fluids Significantly Reduces Installation Problems	Tom Tibor, Baroid Industrial Drilling Products	This paper addresses the benefits of proper usage of drilling fluids in completing a successful HDD installation, while avoiding surface damages and undesirable fluid escapeage.
5:10 PM	E-1-05	Wastewater	Increasing System Capacity in Environmentally Sensitive Areas using the Pipe Bursting Method	Alan Goodman, HammerHead Trenchless Equipment; Larry Sawyer, Davila Underground Emergency Services, Inc; Author TBD, San Antonio River Authority	This paper focuses on the process and challenges of a Class C pipe bursting project within an environmentally sensitive area.
<b>Track 2: Microtunneling</b> Session Leader: Glenn Boyce, Jacobs Associates					
3:30 PM	E-2-01	Water/Wastewater	Another Success for the City of Portland using Alternative Contracting Methods to Deliver the Balch Consolidation Conduit	Brad Moore, Kennedy Jenks; Rob Cozzi, City of Portland; and Robert Jossis, Jossis Consulting	This paper describes the Balch Consolidation Conduit Project including 8,000 ft. of 84- and 54-in. microtunneling. The unique project delivery system included choosing the contractor at the 60 percent design level.
3:55 PM	E-2-02	Water/Wastewater	Construction of the Balch Consolidation Conduit Project – Successful Microtunneling in Very Challenging Conditions	Kimberlie Staheli, Staheli Trenchless Consultants; Scott Clement and Mark Hutchinson, City of Portland; John Fowler, JW Fowler Company	This paper discusses the construction challenges and lessons learned on the Balch Consolidation Conduit Project. CSM shafts were constructed to a depth of 85-ft. and CSM panels used for ground improvement for microtunneling – the first time CSM has ever been used for this application.
4:20 PM	E-2-03	Water	Trenchless Technology for CSO Control in the Nation's Capital	Carlton Ray and Ron Bizzari, DC Water; Justin Carl, Greeley & Hansen; Mark Kroncke and Dan Dobbels, Jacobs Associates	This paper summarizes the trenchless components of the District of Columbia Water and Sewer Authority (DC Water) in implementing its Long-Term Control Plan for the District's combined sewer system.
4:45 PM	E-2-04	Water	Case History - Successful Microtunneling in Challenging Ground Conditions	Emad Farouz and Emmanuel Carrasco, CH2M Hill	The paper presents the microtunnel design and construction aspects of microtunnel installation in challenging ground conditions.
5:10 PM	E-2-05	Other	Trenchless Technologies at the LAX Modernization Project to Install Utilities Under an Active Airport	Rory P.A. Ball, Hatch Mott MacDonald; Bernie Recio, Walsh Austin Joint Venture; and Hal Emery, CH2M Hill	This paper presents project experience from nearly a dozen 18-in. and 78-in. trenchless installations at the Los Angeles International Airport (LAX) Modernization Project using auger boring, guided auger boring and open-shield pipe jacking in sands above the water table.
<b>Track 3: Condition Assessment</b> Session Leader: Ernie Ting, Town of Markham					
3:30 PM	E-3-01	Water	The Weakest Link	Gregory J. Henry, Lockwood, Andrews & Newnam, Inc. and Jonathan Prevot, City of Houston	This paper discusses Houston's large diameter waterline asset management and assessment procedures and presents a case study where assessment discovered some unexpected problems that were repaired with trenchless methods.
3:55 PM	E-3-02	Water/Wastewater	Deterioration Modeling of PCCP Water Pipes	Shaoqing Ge, Virginia Tech University and Sunil K. Sinha, Virginia Polytechnic Institute & State University	This paper proposes a finite element model to evaluate the structural integrity of Pre-stressed Concrete Cylinder Pipe (PCCP). Based on the results of NDT technologies, the number and location of broken wires, the simulation results can provide reference for asset management of the PCCP water pipes.
4:20 PM	E-3-03	Water/Wastewater	Development of Condition Assessment Selection Tool (CAST) for Water and Wastewater Pipelines	Manu Agarwal, Virginia Tech University and Sunil K. Sinha, Virginia Polytechnic Institute & State University	This paper presents on the proposed Condition Assessment Selection Tool (CAST) that will assist the utility managers to select the most suitable condition assessment technology for their water and wastewater pipelines.
4:45 PM	E-3-04	Wastewater	The Structural Integrity Expertises of Sewer Mains with the Results Different Than Expected	Andrzej Kuliczowski, Emilia Kuliczowska and Anna Parka, Kielce University of Technology	This paper presents non-intrusive research methods and makes expert recommendations based on detailed analyses.
5:10 PM	E-3-05	Wastewater	Condition Assessment of In-Service Force Mains - Lessons Learned	David May, P.E., Malcolm Pirnie, Inc.	This paper presents lesson learned in the condition assessment of a wastewater force main system.
<b>Track 4: Large Diameter Tunneling Construction</b> Session Leader: Dr. Alan Atalah, Bowling Green State University					
3:30 PM	E-4-01	Wastewater	20/20 Review of the Pre-qualification and Design Aspects of the City of Calgary 15 Street Siphon Sanitary Sewer Tunnel Project	Duane Strayer, Associated Engineering	This paper examines with the benefit of hindsight, the outcome of select pre-qualification and design decisions incorporated in the 15 Street Sanitary Sewer Tunnel Project. Twin 2.4-m diameter, 300-m long tunnels were constructed in weak bedrock.
3:55 PM	E-4-02	Water/Wastewater	Soil Freezing for Effective Stabilization at 200-ft. Deep TBM Shaft Portal	Daniel Mageau and Larry Applegate, Soilfreeze, Inc.	This paper provides an overview of design and construction of two frozen soil stabilizations outside a 200-ft. deep TBM shaft.
4:20 PM	E-4-03	Wastewater	Novel Installation of Seven Mixed Ground Sewer Tunnels Using a 72-in. Diameter Shielded TBM	Kenny Clever, The Robbins Company and Steve Abernathy, Midwest Mole	This paper details the unique design and planning for a series of seven gravity sewer tunnels in Clermont County, Ohio. The long tunnels, ranging from 816 to 2,014 ft., require the use of a 72-in. diameter double shield TBM with interchangeable cutterheads for mixed ground conditions.
4:45 PM	E-4-04	Other	Reused of Conditioned Soil from Earth Pressure Balanced Tunnel Projects	Gil Garcia, Hatch Mott MacDonald	This paper presents the results of three case history projects and their corresponding preliminary design, permitting, construction requirements, as well as the results of a long-term study of a disposal site.
5:10 PM	E-4-05	Wastewater	HDD for the Detroit Upper Rouge Tunnel	Jean Habimana, Parsons Brinckerhoff	This paper describes the use of HDD to characterize a geologic feature that was originally depicted as being vuggy and susceptible of bringing significant groundwater inflows during construction.
<b>Track 5: CIPP Lining</b> Session Leader: George Kurz, Burge, Waggoner, Sumner & Cannon					
3:30 PM	E-5-01	Water/Wastewater	Revolutionizing CIPP with Energy Efficient Green Technology	Joanne Hughes, RS Technik and Rajesh Turakhia, Dow Chemical Company	This paper presents the results of an objective analysis of CIPP systems available in the market today, the health and safety characteristics, performance capabilities and delivery mechanisms and offers insight into green and energy-efficient improvements.
3:55 PM	E-5-02	Wastewater	Styrene - Design and Construction Considerations	J.S. Brown, P.E., Olver-CHA	This paper provides designers, owners and inspectors with an understanding of the hazards with styrene in CIPP and the measures to ensure safety while providing economical, effective rehabilitation of sewers.
4:20 PM	E-5-03	Water/Wastewater	Establishing Objective Standards for Evaluating and Quantifying I/I Reduction at Pipe to Pipe Connections	Rick Gage and Brad Kampbell, LMK Technologies, Inc.	This paper identifies the fundamental engineering practices and objective criteria by which pipe-to-pipe connections shall be evaluated in order to assist the buyers and balance the claims that are provided through marketing collateral.
4:45 PM	E-5-04	Water/Wastewater	Monitoring the CIPP Lining Process Using Underground Sensors	Larry J. Rapp and Gary L. Rapp, Zia Systems, LLC	This paper describes the process of monitoring the temperature and cure process throughout the pipe while being rehabilitated, remotely, through the placement of temperature sensors between the host pipe and the liner throughout the pipe.
5:10 PM	E-5-05	Gas	Trenchless Rehabilitation of 2-in. to 16-in. Cast Iron Natural Gas River Crossings Utilizing a CIP Liner	Frederick (Jack) Morrow III, Washington Gas	This paper focuses on the benefits of the Starline-2000 product, materials and installation practices, the cost analysis benefits and challenges.

**Wednesday, March 30 – AM Sessions**

<b>Track 1: HDD</b> Session Leader: Cindy Preuss, Harris & Associates					
8:00 AM	F-1-01	Other	Is Your "Small" HDD Simple or Not?	Brian Dorwart, Brierley Associates, LLC	This paper presents a means for assessing what data is reasonable for specific drills and provides a means of subjectively rating an HDD project difficulty such that an owner can make a more informed decision regarding the amount of data collection and design that would be appropriate for a project.

**Wednesday, March 30 – AM Sessions**

Time	Paper ID	Industry Segment	Paper Title	Author(s)	Description
<b>Track 1: HDD</b> Session Leader: Cindy Preuss, Harris & Associates					
8:25 AM	F-1-02	Other	Field Evaluations on Accuracy of Photogrammetric Methods for Trenchless Construction	Jason S. Lueke, Samuel T. Ariaratnam, Brad D. Carey, and Siddharth Banerjee, Arizona State University	This paper focuses on the accuracy of photogrammetry in measuring ground movement on HDD, pipe bursting and augured installations by comparing photogrammetric results with those obtained via rod and level.
8:50 AM	F-1-03	Water/Wastewater	Trying to Mix Oil and Water - Integrating Trenchless Advances from the Oil and Gas Industry into Municipalities	Michelle L. Ramos and Adam Alderman, GeoEngineers	This paper presents similarities and differences in trenchless design approach between the private and public sectors.
9:15 AM	F-1-04	Wastewater	Three-Dimensional Study of the Effect of Soil Erosion on Rigid Pipes	Sherif Kamel and Mohamed Meguid, McGill University	This paper discusses the results of a three-dimensional numerical analysis studying the effects of void locations and dimensions on the changes in the radial earth pressure acting on a rigid pipe and the pipe wall stresses.
9:40 AM	F-1-05	Water	Contingency Planning for High-risk HDD Construction	David J. Tanzi, P.E., BCEE, CDM and G. Christian Andreasen Jr., P.E., Middlesex Water Company	This paper describes various contingency elements that were considered during the planning, design, and construction phase of a high-risk project consisting of a 5,365 lf of 24-in. FPVCP watermain installed using HDD techniques across the Raritan River, N.J.
<b>Track 2: Microtunneling</b> Session Leader: Jim Murphy, Worley Parsons					
8:00 AM	F-2-01	Water	Folsom Lake Intake Design Challenges	David Bennett, Ph.D., P.E., Bennett Trenchless Engineers and Author TBD	This paper describes the Folsom Lake Intake for El Dorado Irrigation District including a 20-ft diameter by 200-ft. deep shaft and three tunnels of 72-in. diameter extending 300 to 550 ft. through hard rock.
8:25 AM	F-2-02	Other	The Applications of GRP Pipes for the Pipe Roofing Technology - Case Study and Future Perspectives	Cezary Madryas, Wroclaw University of Technology; Guido Meier, Implemia Bau AG, Switzerland; Lech Skomorowski, Hobas Polska, Poland; and Ulrich Wallmann, Hobas Rohre GmbH, Germany	This paper presents selected issues related to the application of GRP pipes in the pipe roofing technology based on the application of such pipes in tunnel construction in Zurich, Switzerland, as well as future plans to construct a new tunnel under the existing car tunnel in Warsaw, Poland, using GRP pipes.
8:50 AM	F-2-03	Water/Wastewater	The First Planned Curved Microtunnel in the United States	Richard Palmer, P.E., Northeast Remco Construction, Inc.	This paper describes the design and construction challenges associated with the first planned curved microtunneling project to be constructed in the United States.
9:15 AM	F-2-04	Water/Wastewater	Trenchless Considerations in Flood-protected Areas	Matthew Wallin, Kathryn Wallin and David Bennett, Bennett Trenchless Engineers	This paper discusses the challenges of designing microtunnel and HDD crossings in flood-protected areas.
9:40 AM	F-2-05	Other	MTBM Retraction Using Pipe Ram Assist	Rachel Martin and Robert Henry, Contra Costa Water District; Norm Joyal and Craig Camp, Jacobs Associates	This paper examines the use of pipe ramming to assist in the partial retrieval of a MTBM.
<b>Track 3: Condition Assessment</b> Session Leader: Ari Selvakumar, USEPA					
8:00 AM	F-3-01	Wastewater	City of Casper, Wyoming's Approach to Assessing a Large Diameter Sewer Interceptor	David Hill and Zulima Lopez, City of Casper; Dan Buonadonna and Mark Wade, CH2M Hill	This paper describes a cost-saving, step-wise condition assessment approach to evaluating a 30-year-old large diameter reinforced concrete pipe sewer interceptor in a municipal collection system.
8:25 AM	F-3-02	Wastewater	More Bang for Your Buck! Recognizing Value by Integrating GIS Technology into CCTV Pipeline Inspection	John M. Langhans, P.E., MSA Professional Services, Inc.	This paper discusses the efficiencies and value recognized by integrating a GIS mapping component into standard CCTV inspections and illustrates how this benefits condition assessment programs by providing expedited pipeline assessment and condition rating data delivery in a mapping format.
8:50 AM	F-3-03	Wastewater	MUD 109: Identifying Risk Factors for Proactive Preventive Maintenance	Jerry Brown, Insituform Technologies, Inc.	This paper details the proactive asset management, solution selection and rehabilitation process for 5,000 of pressurized force main.
9:15 AM	F-3-04	Gas	Leak Detection of Natural Gas Pipelines	Samuel Ariaratnam, Arizona State University and Muthu Chandrasekaran, Pure Technologies Ltd.	This paper describes the development application of a free-swimming acoustic tool for detecting leak in natural gas pipelines.
9:40 AM	F-3-05	Water/Wastewater	Processing Combined Laser, Sonar and HD Imaging for Better Evaluation Decisions	Jeffrey Griffiths and Jeffrey Graham, Hydromax USA	This paper describes significant advances in pipeline inspection technology and illustrates the features and benefits of integrating multi-sensor technologies.
<b>Track 4: Laterals Rehabilitation</b> Session Leader: Isabel Tardif, CERIU					
8:00 AM	F-4-01	Wastewater	No-Dig Structural Renovation for Laterals and Mainlines	Jon Manners, Pipeline Renewal Technologies	This paper discusses advancements in materials and processes for structural lateral rehabilitation and mainline point repair.
8:25 AM	F-4-02	Wastewater	City of London Lateral Lining Program	Ashley Rammeloo and Rick Pedlow, City of London	This paper discusses the social and financial benefits the City of London has realized through the use of an in-house lateral lining program.
8:50 AM	F-4-03	Wastewater	CIP Service Lateral Rehabilitation - Managing the Variables, Minimizing the Risk	Andy Sherwin, LMK Enterprises	This paper discusses the risks involved in the CIPP renewal of lateral service pipes.
9:15 AM	F-4-04	Wastewater	Creative Bidding Strategy Delivers Interesting Market-based Results	John M. Langhans, P.E., MSA Professional Services, Inc.	This paper describes the multiple bid options, structure and alternates used to maximize value for an 11,000-lf sewer main and lateral rehabilitation project and analyzes the bid results, providing a market-based, direct comparison of trenchless and open-cut construction pricing in the Midwest.
9:40 AM	F-4-05	Water/Wastewater	Chemical Grouts and Grouting Methods	Jim Gentry, Avanti International and Daniel Magill, Avanti International	This paper discusses the use of chemical grouting to control water intrusion in a large excavation project.
<b>Track 5: Rehabilitation</b> Session Leader: Kevin Nagle, TT Technologies					
8:00 AM	F-5-01	Water	Vista Flume Rehabilitation Pilot Project	Kathy Haynes, Kennedy Jenks Consultants and Brian Smith, Vista Irrigation District	This paper describes the rehabilitation of a rectangular concrete gravity water supply flume with a 42-in. OD SDR 26 HDPE pipeline.
8:25 AM	F-5-02	Wastewater	San Diego Pipeline Rehabilitation - Landing a 747 on a Sewer Trunk Main	Lynn Osborn, Insituform Technologies, Inc.	This paper highlights both the materials and construction of the fiber-reinforced CIPP product and provides detailed installation information of the airport rehabilitation project, the largest and longest-ever project of its kind.
8:50 AM	F-5-03	Water	Predicting Lifecycles of Carbon Fiber Liners For Pipeline Renewal	Heath Carr, Fyfe Company, LLC and Anis Somani, Fibwrap Construction, LP	This paper describes the lifecycle of CRFP liners and the critical role that proper materials and design play in ensuring the pipeline renewal will perform for the intended lifespan.
9:15 AM	F-5-04	Water/Wastewater	Evaluation of AWWA Class IV CIPP for Water Pipeline Process and Pipe Bursting in Comparison	Behnam Hashemi, IUPUI; Tom Iseley, IUPUI/WASIR; and Jim Raulston, WASIR	This paper compares AWWA Class IV CIPP and pipe bursting in areas of cost, ability, carbon print and productivity.
9:40 AM	F-5-05	Wastewater	Upgrading Pressure Capabilities of a Force Main on the Spanish Coast	Andrew Fulford, Insituform Technologies, Inc.	This paper discusses the structure and physical properties of the structural CIPP system and provides detailed installation descriptions of the Garuccha project in Spain.

# Pre- and Post-Conference Seminars

## NASTT Pre-Conference Seminar

Sunday, March 27

### NASTT's Introduction to Trenchless Technology Short Course

**Description:** This introductory short course is ideally suited for both newcomers to the industry and for anyone who is interested in seeking a refresher course on trenchless technology methods. The first session covers new construction techniques – microtunneling, HDD, pipe jacking, auger boring and pipe ramming. The rehabilitation session provides an overview of the methods available to public works and sewer agencies to rehabilitate water and sewer systems without the need for excavation.

**Cost to attend:** \$100 (member), \$150 (non-member) early/\$150 (member), \$200 (non-member) regular. Includes attendance to the course, course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

## NASTT Post-Conference Seminars

Wednesday, March 30 – Thursday, March 31

### NASTT's Cured-In-Place Pipe Good Practices Course

**Description:** Cured-In-Place Pipe (CIPP) technology is an effective trenchless pipeline rehabilitation method that may help to address many of your city's water and wastewater problems. CIPP is one of the most widely used and accepted pipeline rehabilitation methods. It significantly reduces infiltration and ex-filtration. CIPP is cost-effective and increases flow capacity. And because it is trenchless, traffic congestion and site disruption are significantly reduced.

**Cost to attend:** \$300/early and \$400/regular. Includes attendance to the course, course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

### NASTT's Laterals Good Practices Course

**Description:** Millions of sewer laterals – the portion of sewer networks that connect individual properties to the public sewer network – exist throughout the United States and elsewhere. Many laterals have not been maintained and as a result, allow a significant amount of inflow and infiltration (I/I) into sewer systems, which can lead to sanitary sewer overflows, increased costs and damage. Consequently, there is a compelling need to solve I/I problems of sewer laterals.

**NEW Course Material!** The course material has been recently updated to include new technology developments and utility experience in terms of managing the legal and financial issues associated with private lateral sewer programs. Information on the actual savings in I/I reduction being realized through lateral rehabilitation programs will also be presented.

**Cost to attend:** \$300/early and \$400/regular. Includes attendance to the course, course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

### HDD Consortium Horizontal Directional Drilling Good Practices Guidelines Course

**Description:** If you have horizontal directional drilling questions or concerns, then we have the answers for you! The HDD Good Practices Guidelines Course presents a unique opportunity for you to learn the key elements of a successful HDD project from planning to job completion, as well as to meet with a number of HDD specialists in the field who can help answer your questions and concerns not outlined in the course agenda.

**Cost to attend:** \$300/early and \$400/regular. Includes attendance to the course, complimentary copy of the HDD Good Practices Guidelines Manual course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

### NASTT's Pipe Bursting Good Practices

**Description:** Pipe bursting is the perfect no-dig process to replace an existing line with a completely new, larger pipe – without excavating. This construction technique is recognized as one of the only methods of trenchless rehabilitation that replaces an existing line with a completely new pipe, providing a total pipe replacement and allows for the replacement of an existing pipe with a new line of equal or larger diameter – to maintain or increase flow capabilities.

**Cost to attend:** \$300/early and \$400/regular. Includes attendance to the course, complimentary copy of the NASTT Pipe Bursting Good Practices Manual, course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

### NASTT's New Installation Methods Good Practices: Application of Grade, Alignment Control, Guidance

**Course objective:** The New Installation Methods Course addresses trenchless methods commonly used to install new pipe and casing. These methods include: (1) auger boring; (2) pipe ramming; (3) pipe jacking; and (4) the pilot tube method. Examples and case studies will be presented to assist attendees in determining which method is preferable to use under various project conditions and requirements.

**Cost to attend:** \$300/early and \$400/regular. Includes attendance to the course, course handouts and a Continuing Education Unit certificate issued by Louisiana Tech University.

## NASSCO Post-Conference Seminars

Thursday, March 31

### NASSCO PACP Trainer Recertification

This class is for current PACP trainers who have not met the requirements to be automatically recertified. This one-day class will ensure the trainer is able to correctly arrange for, conduct and complete PACP classes. Registration for this course is not a guarantee until you receive approval from NASSCO. **Cost to attend: no charge.**

### NASSCO PACP Trainer Upgrade

This class is for PACP users who have been certified for at least 6 months. This one-day class will prepare the student to arrange, conduct and complete PACP classes. Registration for this course is not a guarantee until you receive approval from NASSCO. **Cost to attend: \$500.**

Thursday, March 31 – Saturday, April 2

### NASSCO Pipeline Assessment and Certification Program – Including Manholes & Laterals

This three-day, comprehensive training program will demonstrate to municipalities, engineers and contractors the benefits and impact of PACP, which provides standardization for the inspection industry. The training and certification of operators, technicians and engineers on understanding and implementing the PACP coding system is critical to the standardization process. **Cost to attend PACP: \$750. Cost to attend LACP/MACP: \$150 (PACP is a prerequisite).**

To register for the NASSCO courses, contact Heather Myers at [heather@nassco.org](mailto:heather@nassco.org) or call 410-486-3500.

Visit [www.nodigshow.com](http://www.nodigshow.com) for detailed course agendas. Please note there is a separate registration fee to attend the above courses.

## Program Committee

### 2011 No-Dig Program Chairman

Jack Burnam ..... CH2MHill

### 2011 No-Dig Program Committee Members

Erez Allouche ..... Trenchless Technology Center  
 Samuel Ariaratnam ..... Arizona State University  
 Alan Atalah ..... Bowling Green State University  
 Frank Badinski ..... York Region  
 Joe Barsoom ..... PB Americas, Inc.  
 Dave Bennett ..... Bennett Trenchless Engineers  
 Richard (Bo) Botteicher ..... Underground Solutions, Inc.  
 Glenn Boyce ..... Jacobs Associates  
 Mark Bruce ..... Can Clay Corp.  
 Jack Burnam ..... CH2M Hill  
 Craig Camp ..... Jacobs Associates  
 Ralph Carpenter ..... American Pipe Co.  
 Chris Carroll ..... Pure Technologies, Inc.  
 Ken Chua ..... City of Edmonton  
 George Cowan ..... Carp-Seca Construction  
 David Crowder ..... R.V. Anderson & Associates, Ltd.  
 Don Del Nero ..... CH2M Hill  
 Dennis Doherty ..... Jacobs Civil, Inc.  
 Brian Dorwart ..... Brierley Associates LLC  
 Dec Downey ..... Jasons Consultants, Ltd.  
 Glenn Duyvestyn ..... Hatch Mott McDonald  
 Jennifer Glynn ..... RMC Water & Environment  
 Mark Hallett ..... SAERTEX multiCom LP  
 Keith Hanks ..... City of Los Angeles  
 Larry Kiest, Jr. .... LMK Enterprises, Inc.  
 Brenda Kingsmill ..... Region of Halton  
 Bernie Krzys ..... Benjamin Media, Inc.  
 George Kurz ..... Barge Waggoner Sumner & Cannon  
 Kevin Laven ..... the Pressure Pipe Inspection Co.  
 Michael Livermore ..... Pure Technologies  
 Joseph Loiacono ..... Sanaxen Environmental Services  
 Jason Lueke ..... Arizona State University  
 Dorian Modjeski ..... TBE Group, Inc.  
 Jim Murphy ..... Colt Worley Parsons  
 Kevin Nagle ..... TT Technologies  
 Mohammad Najafi ..... University of Texas at Arlington/CUIRE

Collins Orton ..... TT Technologies  
 Matt Pease ..... Staheli Trenchless Consultants  
 Cindy Preuss ..... Harris & Associates  
 George Ragula ..... Public Service Electric & Gas  
 Kaleel Rahaim ..... Interplastic Corp.  
 Michelle Ramos ..... GeoEngineers, Inc.  
 Jeanette Rankin ..... Sadler Sign & Design  
 Jim Rankin ..... Vermeer Mfg.  
 Paul Reilly ..... Rain for Rent  
 Piero Salvo ..... WSA Trenchless Consultants, Inc.  
 John Schroeder ..... CDM  
 Chris Schuler ..... Miller Pipeline Corp.  
 Ari Selvakumar ..... USEPA  
 Sunil Sinha ..... Virginia Tech University  
 Kim Staheli ..... Staheli Trenchless Consultants  
 Isabel Tardif ..... CERIU  
 Richard Thomasson ..... Malcom Pirnie, Inc.  
 Ernie Ting ..... Town of Markham  
 Dennis Walsh ..... Woodard & Curran  
 Mark Wallbom ..... Underground Imaging Technologies, Inc.



ABOVE: NASTT's 2011 No-Dig Show Program Committee photo taken at Gaylord National in Washington, D.C. Photo courtesy David Crowder

## Hotel Information

**Location:** Gaylord National Resort & Convention Center

**Web:** Visit the hotel's website: [www.gaylordhotels.com/gaylordnational](http://www.gaylordhotels.com/gaylordnational)

**Address:** 201 Waterfront Street, National Harbor, MD 20745 USA

**Main Phone:** (301) 965-4000

**Fax:** (301) 965-2001

**Rates:** Standard (Single, Double) \$199

Triple \$219

Quad \$239

6% sales tax, 10% occupancy tax

\$15 resort fee includes first 20 minutes of phone calls, daily paper, (2) bottled waters and high speed internet access in each room.

**Reservations:** (301) 965-2000 (mention No-Dig Show when calling)

**Hotel Highlights:** Just minutes outside of Washington, DC, Gaylord National Hotel & Convention Center offers visitors to the Capital region everything they are looking for in a vacation, weekend getaway, business trip or just a night out.

With 2000 luxurious rooms, including 110 lavish suites, our spectacular 18-story glass atrium welcomes you to the hotel, offering sweeping views of the Potomac River, Washington, D.C. and Old Town Alexandria. Come and discover for yourself the jewel of the capital region — Gaylord National Hotel & Convention Center. Take an interactive walkthrough underneath our majestic climate-controlled glass atriums and discover the "wow factor" guests keep talking about!

**Cut Off Date:** March 4, 2011

**Cancellation:** Cancellations within 72 hours will not receive a refund of the \$199 deposit.



# Washington, D.C. Attractions

## Cherry Blossom Festival

The 2011 National Cherry Blossom Festival will be held March 26 - April 10. There will be many activities in the D.C. area, so plan to stay the weekend after the conference to enjoy this natural wonder at our capital.

Visit the National Cherry Blossom Festival website at [www.national-cherryblossomfestival.org](http://www.national-cherryblossomfestival.org) for more information.

## National Harbor

Rising from the banks of the Potomac, just south of the Woodrow Wilson Bridge, is National Harbor. This brand-new, 300-acre development offers tree-lined promenades with scores of the region's most exciting destinations for shopping and dining.

This expansive waterfront includes dynamic marinas, electrifying outdoor concerts, interactive art and other signature events, all within steps of the historic Potomac River.

See the full National Harbor event schedule at [www.nationalharbor.com](http://www.nationalharbor.com).

See the National Harbor map and directory at [www.nodigshow.com/pdfs/attractions/map.pdf](http://www.nodigshow.com/pdfs/attractions/map.pdf).

## Lasting Legacies

The Potomac region is not only home to the nation's capital but also to a diverse array of cultural and historical attractions reflecting the United States' rich heritage.

Washington, D.C. is well known for the National Mall. No shopping here — it's a mile-long strip of free museums housing national treasures of art, history, and more, collectively called the Smithsonian. Venturing beyond the Mall leads to some unexpected insights into American life, history and culture.

Read the digital version of Gaylord Magazine online at [www.gaylord-hotels.com/assets/gaylord-magazine/NA\\_Lastig-Legacies.pdf](http://www.gaylord-hotels.com/assets/gaylord-magazine/NA_Lastig-Legacies.pdf).

## Shopping at National Harbor

National Harbor's unique shops make for a truly unmatched shopping experience. Fashion Boulevard offers a mix of the hottest and most fashionable brands, with a million square feet of unparalleled shopping.

## National Harbor Marina & Piers

You couldn't be called "National Harbor" without an impressive marina. National Harbor's marina is a perennial favorite among the boating and non-boating community alike. Whether guests enjoy a season-long slip rental or an overnight stay, all have access to the marina's first-class amenities, hook ups and fueling station.

## Amenities

- 700-ft.-long pier
- 64 well-appointed boat slips
- Two 10,000-ft. platforms for corporate and private events
- Private slips are 48 to 120 ft. long and 45 ft. wide
- Facilities include private changing area with showers, laundry and gasoline service

## Rental Rates

- Permanent slips (1- and 2-year agreements) are \$125 per linear foot (LOA)
- Transient slips are \$2.25 per linear foot per day (LOA), plus electricity
- To reserve a slip, contact the Marina Manager at (443) 994-9529.

Rates subject to change without notice. Please visit <http://www.nationalharbor.com/consumer/marina.htm> for more information.



## List of Exhibitors

Company Name	Booth #	Company Name	Booth #
Akkerman, Inc.	501	Logiball, Inc.	421
American Augers	432	Maxliner	233
American Ductile Iron Pipe/American Spiral Weld	422	Mears Group, Inc.	515
AOC, LLC	509	Michels Corp.	209
AP/M Permaform	427	Midwest Mole, Inc.	514
Aqua-Pipe	301	Miller Pipeline Corp.	526
Aries Industries	115	Mission Clay/No-Dig Pipe	617
Avanti International	120	MSE LLC	232
Baroid Industrial Drilling Products	632	MTC	616
Benjamin Media/Trenchless Technology Magazine	607	NASSCO, Inc.	328
Bulldog Restraint System	408	NASTT	603
Buzzi Unicem USA	539	National Liner	235
Can Clay Corp.	520	Performance Pipe	534
CertainTeed Corp.	116	Perma-liner Industries, Inc.	138
CETCO	108	Pipe Medic by QuakeWrap	214
CIPP Corp.	333	Pipeline Renewal Technologies	613
Composites One	221	Pressure Pipe Inspection Co. (PPIC)	522
Control Chemical (1989) Corp.	731	Pure Technologies	121
Cosmic Tophat LLC	415	Rain for Rent	109
Cretex Speciality Products	701	RapidView IBAK North America	533
CUES	229	Raven Lining Systems	716
Danby, LLC	433	Reline America, Inc.	401
de neef Construction Chemicals, Inc.	700	RS Technik	332
Derrick Equipment Co.	334	SAERTEX multiCom LP	320
Digital Control, Inc.	104	Sauereisen, Inc.	445
Ditch Witch	409	Sekisui-SPR America's LLC	717
Duke's Root Control, Inc.	517	Sewervue Technology Corp.	608
Formadrain, Inc.	117	Southeast Directional Drilling	216
Godwin Pumps	327	Spectrashield Liner Systems	326
Herrenknecht	423	Sprayroq, Inc.	601
HTS Pipe Consultants, Inc.	420	Structural Technologies	323
Icon Tunneling Group	633	Terre Hill Composites	614
Inliner Technologies	314	The Robbins Co.	228
Insituform Technologies, Inc.	208	TT Technologies, Inc.	201
Interplastic Corp.	309	U.S. Composite Pipe South, LLC	324
Jack Doheny Co.	321	Underground Solutions	215
Jacobs Associates	611	Vac-Tron Equipment LLC	100
LMK	521	Vermeer	101





# NASTTT's 2011 No-Dig Show

## Floorplan



# NASTT's 10th Annual Educational Fund Auction & Reception

## Funding Educational Excellence in the Trenchless Technology Industry

Don't miss NASTT's must-attend event – the annual Educational Fund Auction and Reception – on the evening of Monday, March 28, at the 20th annual No-Dig Show in Washington, D.C. The Auction is a wonderful way to support the students while having a great time bidding on amazing items.

Since its inception in 2002, the Auction has raised \$356,000 and directed those funds exclusively toward educational activities offered by NASTT. Thanks to the generous support of people like you, NASTT has been able to enhance the educational experience for its student members by sponsoring their attendance at the Annual No-Dig Conference as well as the membership at large with targeted training courses such as Horizontal Directional Drilling (HDD), New Installation Methods and Pipe Bursting to name a few.

To continue meeting the needs of our students and membership, we need your help! Get involved and make an investment in the future of our industry by donating items and/or services to the Auction or by sponsoring this well-attended event. This may be the single best trenchless investment you make!

To donate to the Auction, please e-mail Auction chairman Joanne Hughes at [jhughes@rslining-systems.com](mailto:jhughes@rslining-systems.com) and Angela Ghosh at [aghosh@nastt.org](mailto:aghosh@nastt.org). Or visit the No-Dig Show website for donation ideas: [www.nodigshow.com](http://www.nodigshow.com).



### NASTT Educational Fund Auction Committee Members

Joanne Hughes (chair)  
Jim Rankin, Cindy Preuss, Bernie Krzys,  
Angela Ghosh and Jack Brunam



# North American Society for Trenchless Technology Municipal & Utility Achievement Awards

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NASTT is pleased to announce the 2011 Municipal & Utility Achievement Awards recognizing exceptional achievement among American and Canadian municipalities and public utilities that have made significant contributions to the development and growth of the trenchless industry. All parties may submit nominations and self-nominations are welcomed.

## Nominee's Information:

Organization Name \_\_\_\_\_

Contact Person(s) \_\_\_\_\_

Address \_\_\_\_\_

Phone Number \_\_\_\_\_

E-mail \_\_\_\_\_

## Select All Applicable Trenchless Methods Categories:

- |  |  |
|--|--|
| <input type="checkbox"/> Auger Boring/Pipe Jacking       | <input type="checkbox"/> Microtunneling              |
| <input type="checkbox"/> Cured-in-Place Linings          | <input type="checkbox"/> Pipe Bursting               |
| <input type="checkbox"/> Horizontal Directional Drilling | <input type="checkbox"/> Sliplining                  |
| <input type="checkbox"/> Asset Management                | <input type="checkbox"/> Fold and Form/Deform-Reform |
| <input type="checkbox"/> Lateral Lining                  | <input type="checkbox"/> Pilot Tube Boring           |
| <input type="checkbox"/> Manhole Rehabilitation          | <input type="checkbox"/> Other                       |

## Why Are You Nominating This Organization?

Please include a 100-word summary of nominee's qualifications for this North American award listing achievements and contributions during the last 20 years as to how the nominee helped to advance the trenchless technology industry. Supplementary material such as news stories, annual reports, brochures, photographs which illustrate the nominee's achievements and contributions would be helpful.

## Nomination Submitted By:

Name \_\_\_\_\_

Company/Organization \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_

## Award Criteria:

- Awardees must be current NASTT members in 2011.
- The nominee may be a municipality or publicly owned utility.
- Selection will be based on level of participation that an organization or its representatives have contributed to education for and promotion of the trenchless industry, involvement in significant noteworthy projects and the participation in and the continuity in the success of the trenchless industry during the last 20 years.
- Selection of the awards will be made by the NASTT Awards Committee using the information supplied in the nomination form.
- Notification of awards by Friday, January 14, 2011.

Awards will be presented at the NASTT 2011 No-Dig Show during Closing Luncheon event in Washington, D.C., on March 30, 2011 at the Gaylord National Hotel & Convention Center.

Nomination Submittal Deadline: Friday, December 22, 2010

Nominations may be submitted by:

### Mail: NASTT

Michael Willmets, Executive Director  
6128 Arbourwood Drive  
Ottawa, ON K1C 7KB  
Canada

Fax: 613 424-3037

E-mail: [mwillmets@nastt.org](mailto:mwillmets@nastt.org)



# Attendee Registration Form

NASTT's 2011 No-Dig Show • March 27 – 31, 2011

Washington, D.C.

## 4 Easy ways to Register!

1. Register online at [nodigshow.com](http://nodigshow.com)
2. Fax completed form to 330-468-2289
3. Call Benjamin Media Inc. at 330-467-7588

4. Mail your completed form to:  
Benjamin Media Inc.  
PO Box 190  
Peninsula, OH 44264 USA  
**Attn: Conference Division**

### 1. Attendee Information *Please print clearly to insure proper spelling on your registration materials*

Name: \_\_\_\_\_ Job Title: \_\_\_\_\_

Company/Organization: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Province: \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_ Website: \_\_\_\_\_

### 2. Registration Options:

Early Registration prices effective until February 25, 2011. Payment must be received with registration for early registration prices. Registration received after February 25, 2011, will be charged regular registration prices. Proof of collegiate status or NASTT membership must be provided to receive applicable discounts.

#### Option 1

#### Full Conference Registration\*\*

	Early	After February 25
NASTT Member	<input type="checkbox"/> \$500.00 US	<input type="checkbox"/> \$600.00 US
Non-Member*	<input type="checkbox"/> \$700.00 US	<input type="checkbox"/> \$800.00 US
Student	<input type="checkbox"/> \$75.00 US	<input type="checkbox"/> \$75.00 US

*Upon initial registration, each additional registration from the same organization saves \$50.*

\*Includes NASTT Membership for the current calendar year.

\*\*Full conference registration includes admission to the technical paper sessions and exhibits. Pre/Post conference seminars and networking events must be purchased separately.

#### Option 2

#### One-Day Conference & Exhibition\*\*\*

*Please specify which day you would like to attend.*

	Early	After February 25
NASTT Member		
<input type="checkbox"/> Mon. <input type="checkbox"/> Tue. <input type="checkbox"/> Wed.	<input type="checkbox"/> 300.00 US	<input type="checkbox"/> 350.00 US
Non-Member		
<input type="checkbox"/> Mon. <input type="checkbox"/> Tue. <input type="checkbox"/> Wed.	<input type="checkbox"/> \$350.00 US	<input type="checkbox"/> \$400.00 US
Student		
<input type="checkbox"/> Mon. <input type="checkbox"/> Tue. <input type="checkbox"/> Wed.	<input type="checkbox"/> \$25.00 US	<input type="checkbox"/> \$25.00 US

\*\*\*One day conference and exhibition registration includes admission to the technical paper sessions & exhibits on the specified day only. Pre/Post conference seminars & networking events must be purchased separately.

#### Option 3

#### Exhibits Only

Mon., Tue. & Wed.  \$20.00 US

3. Total Amount Due \$ \_\_\_\_\_ US

### 4. Payment Method

Check enclosed (Payable to NASTT in US funds only)

Purchase Order# \_\_\_\_\_ (Please submit copy of PO)

Please charge my Credit Card:  Mastercard  Visa

Name on card: \_\_\_\_\_

Account #: \_\_\_\_\_

Exp.: \_\_\_\_\_ 3 digit security code (on back of card): \_\_\_\_\_

Signature: \_\_\_\_\_

Address: \_\_\_\_\_

City \_\_\_\_\_ State/Province: \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_

### Trenchless Technology Specialized Seminars

#### Pre-Conference Seminar

##### Trenchless Technology Short Course

(Sunday)

	Early	After February 25
NASTT Member	<input type="checkbox"/> \$100.00 US	<input type="checkbox"/> \$150.00 US
Non-Member	<input type="checkbox"/> \$150.00 US	<input type="checkbox"/> \$200.00 US

#### Post-Conference Seminars

	Early	After February 25
HDD Consortium/NASTT Horizontal Directional Drilling (HDD) Good Practices Guidelines Course (Wed. & Thurs.)	<input type="checkbox"/> \$300.00 US	<input type="checkbox"/> \$400.00 US
NASTT New Installation Methods Good Practices Course (Wed. & Thurs.)	<input type="checkbox"/> \$300.00 US	<input type="checkbox"/> \$400.00 US
NASTT Cured-in-Place-Pipe (CIPP) Good Practices Course (Wed. & Thurs.)	<input type="checkbox"/> \$300.00 US	<input type="checkbox"/> \$400.00 US
NASTT Sewer Laterals Rehabilitation & Replacement Good Practices (Wed. & Thurs.)	<input type="checkbox"/> \$300.00 US	<input type="checkbox"/> \$400.00 US
NASTT Pipe Bursting Good Practices (Wed. & Thurs.)	<input type="checkbox"/> \$300.00 US	<input type="checkbox"/> \$400.00 US

### Networking Events

#### Gala Awards Dinner (Tuesday, March 29)

	Early	After February 25
Individual Ticket _____ No. of Tickets	<input type="checkbox"/> \$90.00 US	<input type="checkbox"/> \$100.00 US

#### Corporate Table Sponsor

(10-person table)  \$1,500.00 US

Make your reservations at the official host hotel of NASTT's 2011 No-Dig Show, the Gaylord National Hotel & Convention Center

**Call 301-965-2000**

Mention the show to receive special room rates!

For additional information, contact Michelle Hill at Benjamin Media Inc. Call 330-467-7588 or e-mail [mhill@benjaminmedia.com](mailto:mhill@benjaminmedia.com)

FOR OFFICE USE ONLY

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### ★ CANCELLATION POLICY ★

Refunds MUST be submitted in writing prior to February 25, 2011, for 80% refund. Refunds will NOT be issued after February 25, 2011. Personnel can be substituted at any time.



# NASTT's 2011 No-Dig Show



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Gold Sponsors



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Witch**



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