Laterals Rehabilitation

CIPP Lateral Lining Processes and Systems

Brendan Doyle

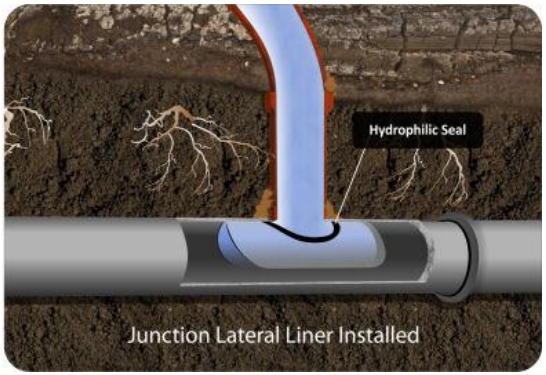
NASSCo Lateral Committee Chairperson

CIPP Lateral Lining - Introduction

- Lateral rehabilitation using CIPP
  - Why Should Laterals be Lined
  - Lateral Lining without a Seal
  - Top Hats/Brim Type Seal
  - Full Wrap Type Seal
  - Hydrophilic Materials
  - Specifications
  - Pricing

CIPP Lateral Lining

- CIPP
  - Trenchless
  - Timely
  - Reduces Infiltration
  - Removes roots
  - Full structural repair
  - Assumed 50 Year Life Expectancy
  - Full or Short Length Repair



CIPP Lateral Lining

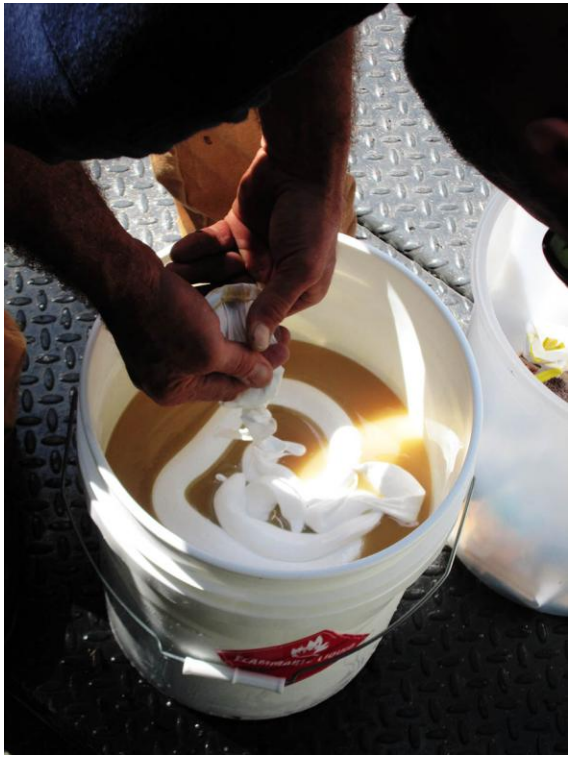
- Liners are similar to those used in main line CIPP rehabilitation
- Multiple Resin Systems
  - Polyester – Vinylester – Epoxy - Silicate
- Cure Systems
  - Ambient – Steam – Water – UV
- Meet typical ASTM specs for CIPP

CIPP Lateral Lining

- Lateral liners that line lateral but do not provide a lateral to mainline interface seal

CIPP Lateral Lining – Wetout

- CIPP – field wetout and liner preparation



CIPP Lateral Lining

- Involves rehabilitating laterals from a lateral access point
  - At or near the sewer main
  - At or near the building foundation

- Four Methods:
  - Clean-Out/Access Point Inversion
  - Double inversion
  - Single inversion
  - Pull-In-Place

Clean-Out/Access Point Inversion Process

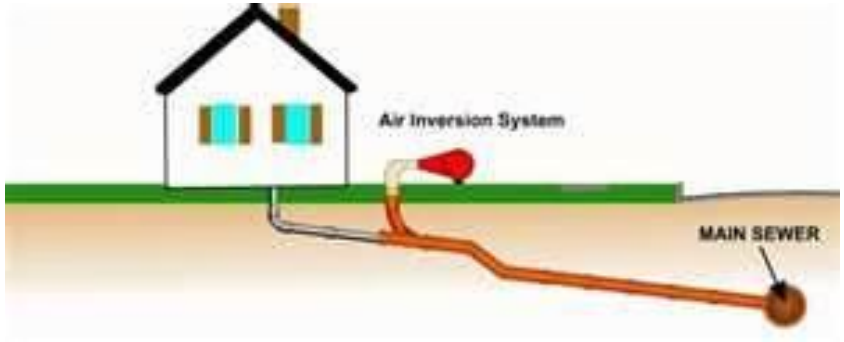
- A clean out/access point is required for this process
- Installation typically done by use of small “shooters”, “torpedo launchers”, “C.H.I.P. units”, etc.
- Installation done using the inversion process
- Single or Double inversion methods

Clean-Out/Access Point Inversion Process

- Ambient or steam cure
- Invert from pit, manhole or through cleanout
- Invert liners through 4” and 6” cleanouts
- Transition liners
- Flexible liners to accommodate size changes
- Requires accurate measurements

Single/Double Inversion Method

- Liner & bladder are simultaneously or separately inverted
- Camera can be inserted into the bladder
- Pressure is maintained and the liner cures



Single/Double Inversion Method

- Ambient or steam cure
- Invert from pit, manhole or through cleanout
- Invert liners through 4” and 6” cleanouts
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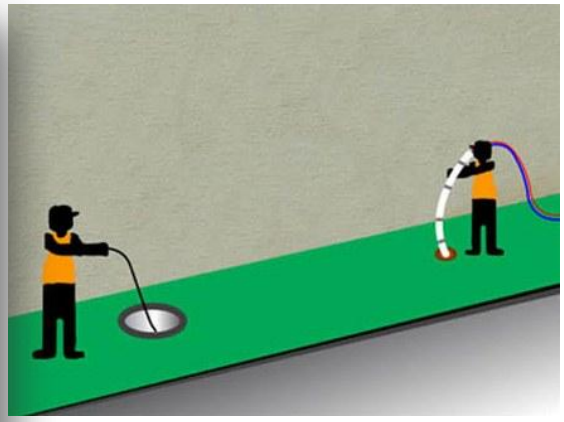
Pull-in Installation Process

- A clean out is required for this process
- Installation done by pull-in process



Pull-in Installation Process

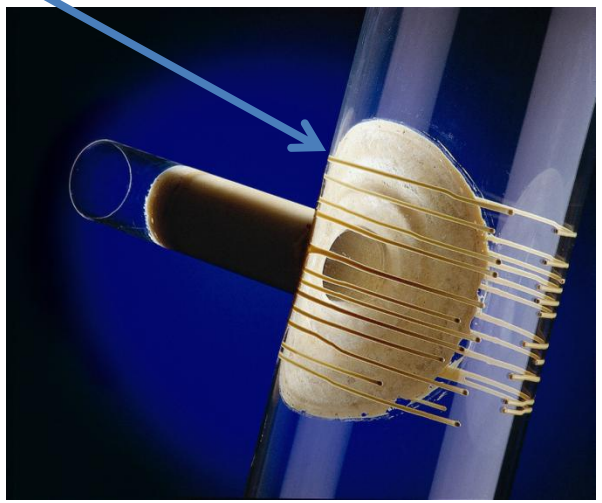
- Can be completed via pull in through the cleanout toward the main or
- Pull in through the main and up to the cleanout
- Requires access to be no less than diameter of pipe being lined
- Has limitations due to pull in process
  - Ojs
  - Broken pipe
  - Sharp edges

CIPP Lateral Sealing – WITH SEAL AT M/L

- Involves rehabilitating the interface between the lateral and the main line from the mainline sewer
- A portion or all of the lateral can be lined at the same time
- Length of lateral that is lined is dependent upon specification and product/installer
- Some require cleanouts

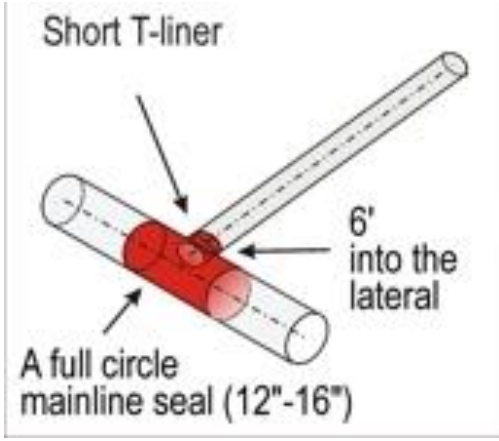
Styles of CIPP Lateral Seals

- Full Wrap Style
- Top Hat/Brim Style



CIPP Lateral Sealing

- Lateral liners that provide a lateral to mainline interface seal but limited lateral lining



CIPP Lateral Sealing

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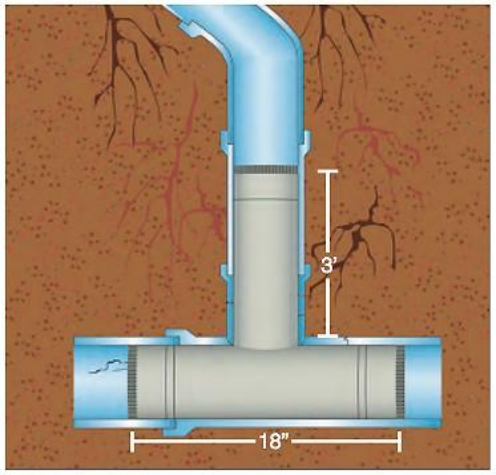
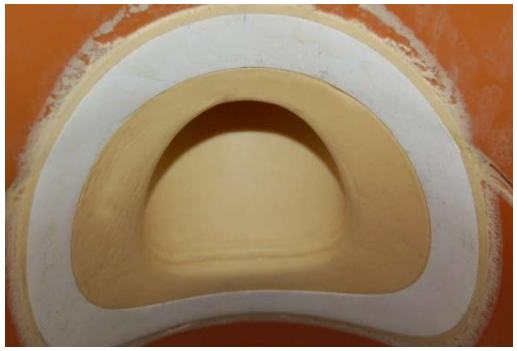


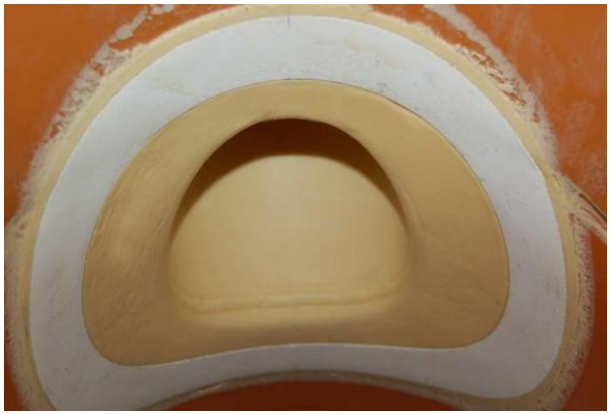
“Brim” Style of CIPP Lateral



- Industry terminology – “Top Hat”
- Process installed from the mainline
- No clean out is required
- Typically installed after mainline CIPP
- A bladder is used to inflate to put in place the resin saturated liner

“Brim” Style of CIPP Lateral

- Some products extend short lengths up lateral
- Some products can extend long lengths up lateral
- Some products depend on tight fit to host pipe
- Some products use hydrophilic materials to seal the connection at the main



“Full-Wrap” Style of CIPP Lateral

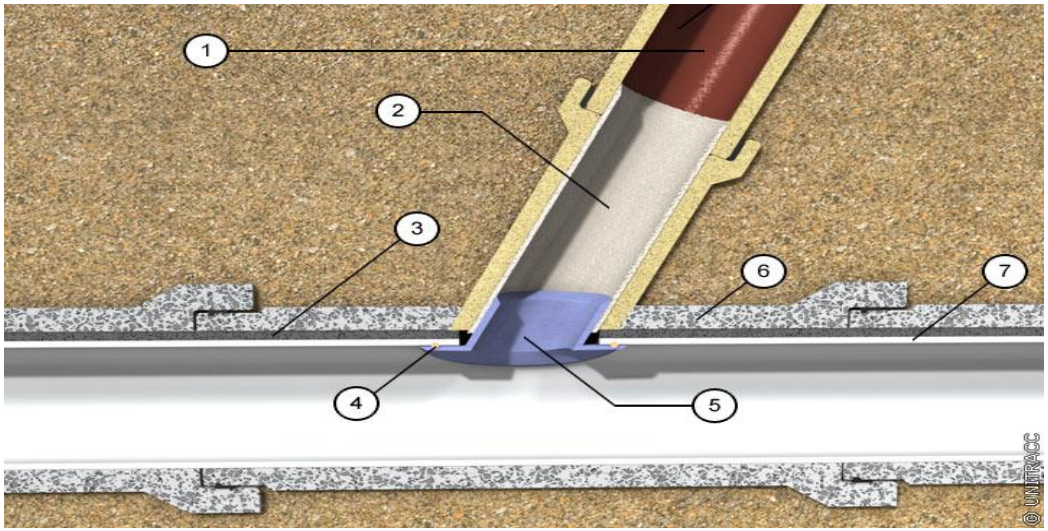
- Installed after main line rehabilitation, if any required
- Installed from mainline
- No clean out is required
- A bladder is used to inflate and position the resin saturated liner in place
- Liner forms a full circle around the inside of the main sewer pipe
- The main liner is approx. 16” in length and is 360^0 within the main line pipe

“Full-Wrap” Style of CIPP Lateral

- Typical lateral lengths are from main line up to 75+ ft.
- Further lengths are available but each product has different restrictions
- A clean out is sometimes required for longer lengths
- Some products use a hydrophilic material to seal the lateral connection at the main and the terminating end of the CIPP liner
- Some products depend on tight fit to host pipe for seal

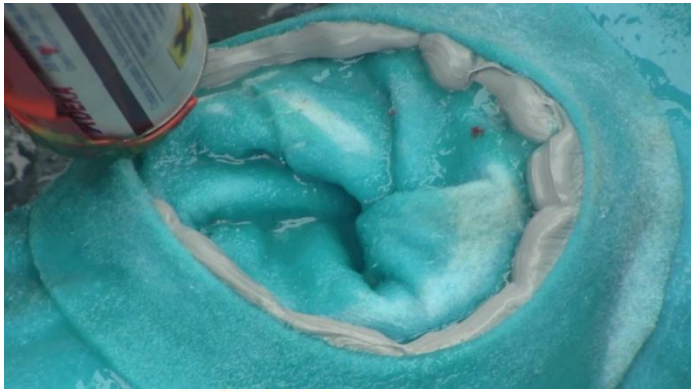
Combination of CIPP Technologies

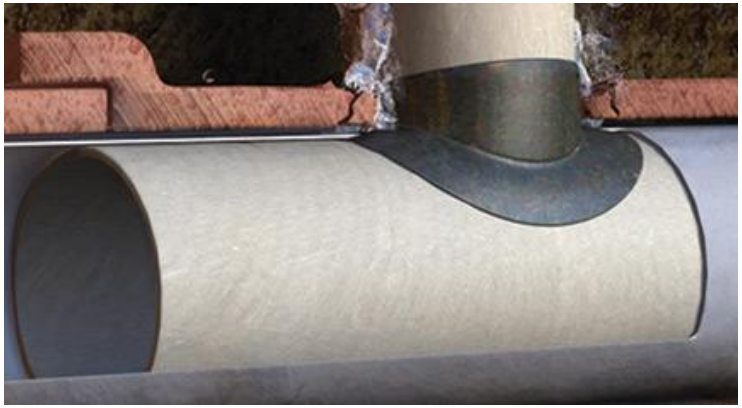
- Length of lateral liner is product specific
- Length may be dependent upon curing method
- Size of seal can vary
- Some designed to adhere to host pipe/liner
- Shorter lengths often times used in conjunction with lateral liners installed from the cleanout or other access point (2 step process that requires cleanout or access point)

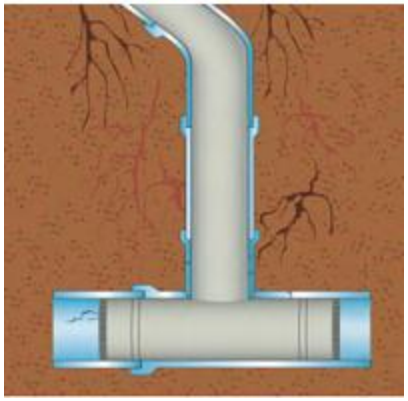


Hydrophilic Materials

- Used to seal lateral connection at the main
- Expands upon contact with water
- Various Configurations
  - Paste
  - Gaskets
  - O-Rings







Hydrophilic Materials

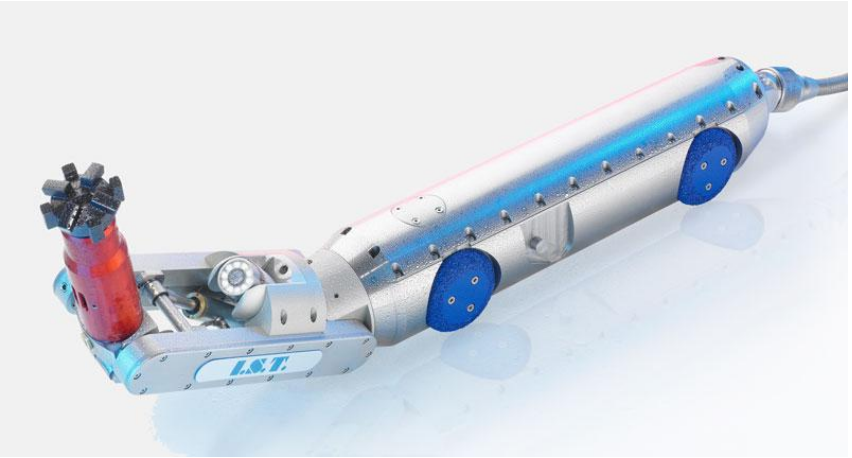
- Various materials have been tested after years of service and confirmed effectiveness to seal through hydration/dehydration cycles
- Some products state no need for hydrophilic materials due to adherence to pipe wall
- Acquire test data confirming product performance

Cutout Lateral Liners?

- Removing liner
- Picote cutter
- Requires cleanout

Cutout Lateral Liners?

- Brush out small lumps or excess resin
- Removing full wrap liner
- Cutout mainline piece



Lateral Rehabilitation - Specifications

- Refer to NASSCO specifications as needed
- Refer to manufacturer's specifications but avoid sole sourcing
- Be specific about what you want, if you don't specify it then a GC won't bid it
- Refer to ASTM specifications as applicable

Lateral Rehabilitation - Specifications

- Be careful of some standards that include patents – cause sole source bids

[1] This practice is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.62 on Sewer.
Current edition approved March 31, 1989. Published June 1989.

[2] The rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube is covered by a patent. (Insituform Pipes and Structures Ltd., Horsley Road, Kingsthorpe Northampton, England.) Interested parties are invited to submit information regarding the identification of acceptable alternatives to this patented item to the Committee on Standards, ASTM Headquarters, 1916 Race Street, Philadelphia, PA 19103. Your comments will receive careful consideration at a meeting of the responsible technical committee which you may attend.

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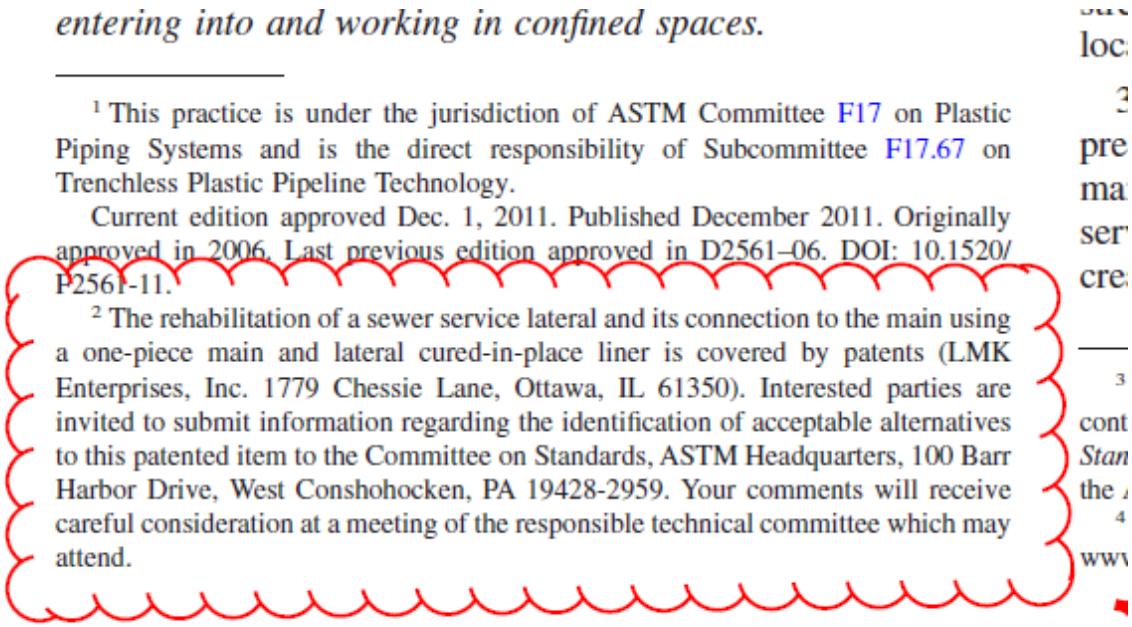


entering into and working in confined spaces.

[1] This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.67 on Trenchless Plastic Pipeline Technology.

Current edition approved Dec. 1, 2011. Published December 2011. Originally approved in 2006. Last previous edition approved in D2561–06. DOI: 10.1520/F2561-11.

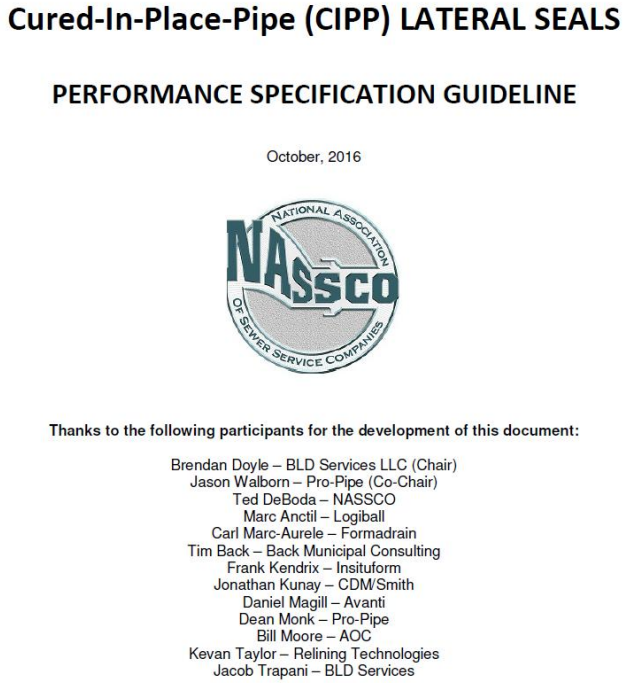
[2] The rehabilitation of a sewer service lateral and its connection to the main using a one-piece main and lateral cured-in-place liner is covered by patents (LMK Enterprises, Inc. 1779 Chessie Lane, Ottawa, IL 61350). Interested parties are invited to submit information regarding the identification of acceptable alternatives to this patented item to the Committee on Standards, ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Your comments will receive careful consideration at a meeting of the responsible technical committee which may attend.

Lateral Rehabilitation - Specifications

- Specifications suggestions
  - Demand experience
  - Request and check references
  - Allow multiple products to bid
  - https://www.nassco.org/resources/manufacturer-specifications
  - https://www.nassco.org/resources/guideline-specs

Lateral Rehabilitation - Specifications

- Submittals
  - Experience of Contractor
  - Product Qualifications
  - 3rd Party Test Data
  - Long term test data
  - Product Data
  - Bypass Pumping (if required)
  - Installation Data



Cured-In-Place-Pipe (CIPP) LATERAL SEALS

PERFORMANCE SPECIFICATION GUIDELINE

October, 2016

Thanks to the following participants for the development of this document:

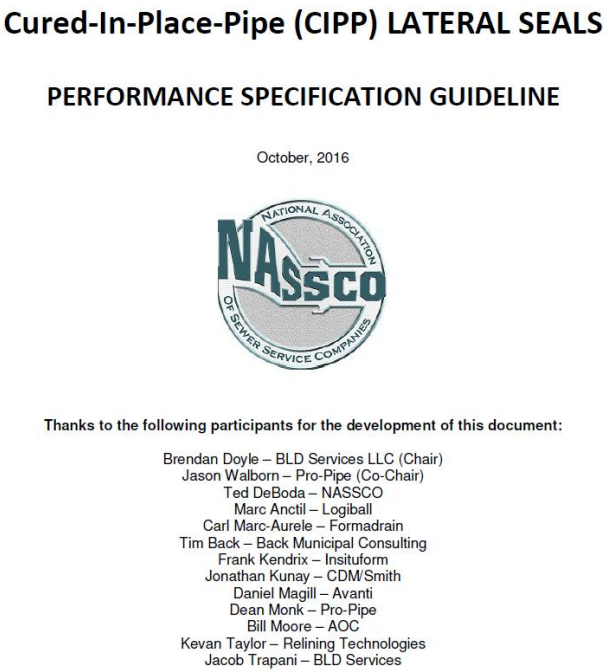
Brendan Doyle – BLD Services LLC (Chair)
Jason Walborn – Pro-Pipe (Co-Chair)
Ted DeBoda – NASSCO
Marc Anctil – Logiball
Carl Marc-Aurele – Formadrain
Tim Back – Back Municipal Consulting
Frank Kendrix – Insituform
Jonathan Kunay – CDM/Smith
Daniel Magill – Avanti
Dean Monk – Pro-Pipe
Bill Moore – AOC
Kevan Taylor – Relining Technologies
Jacob Trapani – BLD Services

Lateral Rehabilitation - Specifications

- Understand relevance of ASTM standards
- Competitive bidding
- Require experienced Contractors installing a proven product
- Understand need for cleanouts
- Understand need for work on private property

NASSCo Links

- https://www.nassco.org/resources/guideline-specs
- https://www.nassco.org/sites/default/files/lateral_seals_14oct2016.pdf



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Lateral Rehabilitation Pricing

- Pricing is driven by production
- Production is driven by lateral density and pipe size
- Length of lateral rehab
  - Camera launch or pan and tilt from main
  - Length of cleaning required
  - Length of lateral for rehabilitation
- Existence or Need for cleanout
- Wage rates

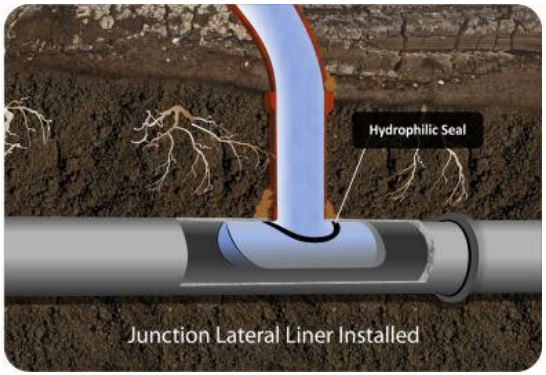
Lateral Rehabilitation – Long Term Cost Evaluation

Rehab Type	Structural Repair	Infiltration Reduction	Root Inhibitor	Trenchless	Design Life	Aprrox Unit $	50 Year Cost
Excavate & Replace	Yes	Yes	Yes	No	50 Yr	$6500	$6500
Injection Grouting	No	Yes	Yes	Yes	25 Yr	$400	$800
Epoxy Injection	Partial	Partial	Partial	Yes	50 Yr	$5000	$5000
CIPP	Yes	Yes	Yes	Yes	50 Yr	$3000	$3000

Assumes 3’ of lateral repair, except epoxy injection

Lateral Rehabilitation

- CIPP
  - Trenchless
  - Timely
  - Reduces Infiltration
  - Removes roots
  - Full structural repair
  - Assumed 50 Year Life Expectancy
  - Full or Short Length Repair



Thank You

Questions?