UCT
THE UNDERGROUND UTILITIES EVENT
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Service Lateral Rehabilitation

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Introduction

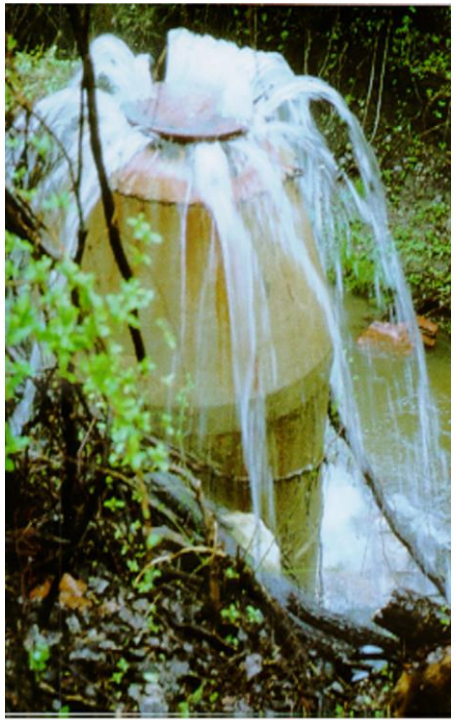
- Intent, to provide information on:
  - Lateral rehabilitation
  - Sealing options
- Studies have shown that 40% to 70% of I/I come from laterals
- Studies have confirmed that many lateral pipes have reached their life expectancy and are failing

Outline

Provide information on:

- Main Line Rehabilitation…Not the Entire Solution
- Understanding the Problem(s)
- Inflow and Infiltration (I/I) from Laterals
- History of Lateral Rehabilitation
- Private Lateral Dilemma
- Product/Process Options

Inflow/Infiltration



Corrective Actions

Main Line Rehabilitation is Not Enough

"Jefferson County (Birmingham, AL) has rehabilitated more than 3 million LF of main line sewers and SSO's still occur at an unacceptable rate. We've discovered that we must address the laterals"

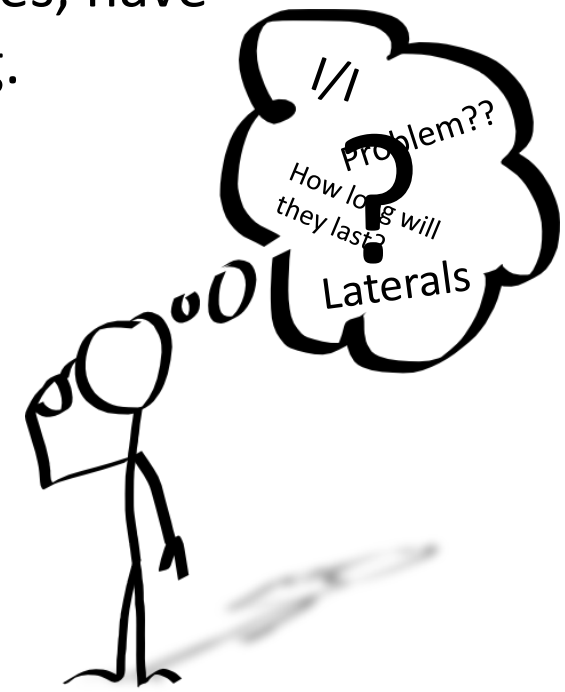
- *Daniel White, PE – Deputy Director (Sewer), Jefferson County, AL*

" Lateral rehabilitation was successful in reducing the occurrence of surcharging to less than once in two years, whereas the system was still surcharging about 15 times a year after the mainline rehabilitation only."

- *Metro Water Services & Davidson County (Nashville, TN)*

Survey Conducted – I/I from Laterals

- 45% of the participating agencies had **estimated** how much laterals contribute to total I/I.
- **Estimates** varied from 7%-80% with an average of 40%.
- Majority **felt** lateral pipes, like main line pipes, have reached their life expectancy and are failing.



Laterals are a major source of I/I within collection systems!

Service Laterals

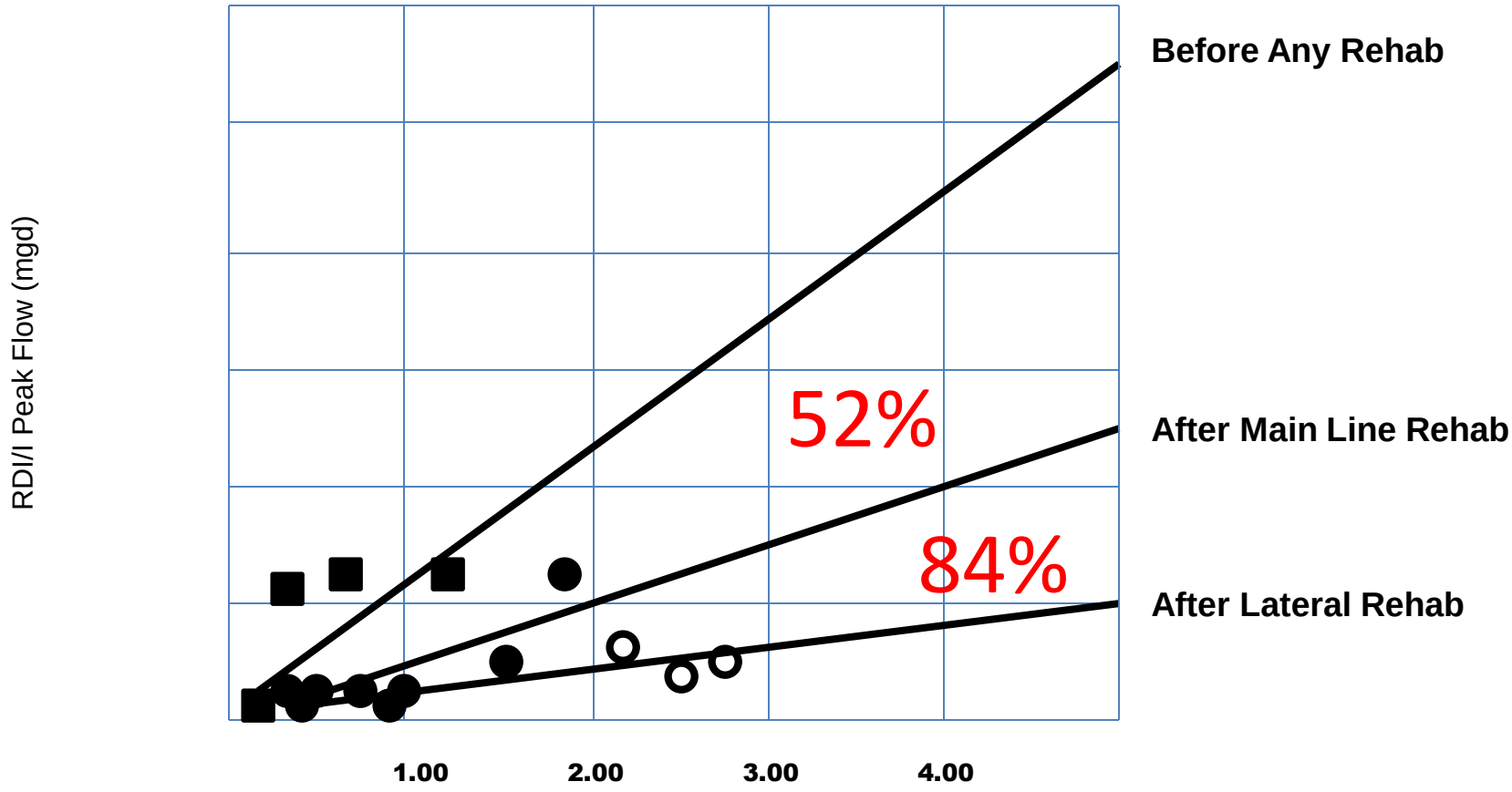
- Over 76 million sewer laterals in U.S.
- Lateral piping from 4” to 6” in diameter
- Estimated 3.8 billion feet of lateral piping

Lateral Rehabilitation History

The emphasis on service lateral rehabilitation was fueled in 1993 by an extensive study* conducted in Nashville, TN to evaluate the effectiveness of lateral rehabilitation on the reduction in I/I.

*(*awarded the first Rehabilitation Project of the Year by Trenchless Technology Magazine*)

Laterals are Part of the I/I Equation



Flow Monitoring (Oak Valley) – Metro Water Services & Davidson County

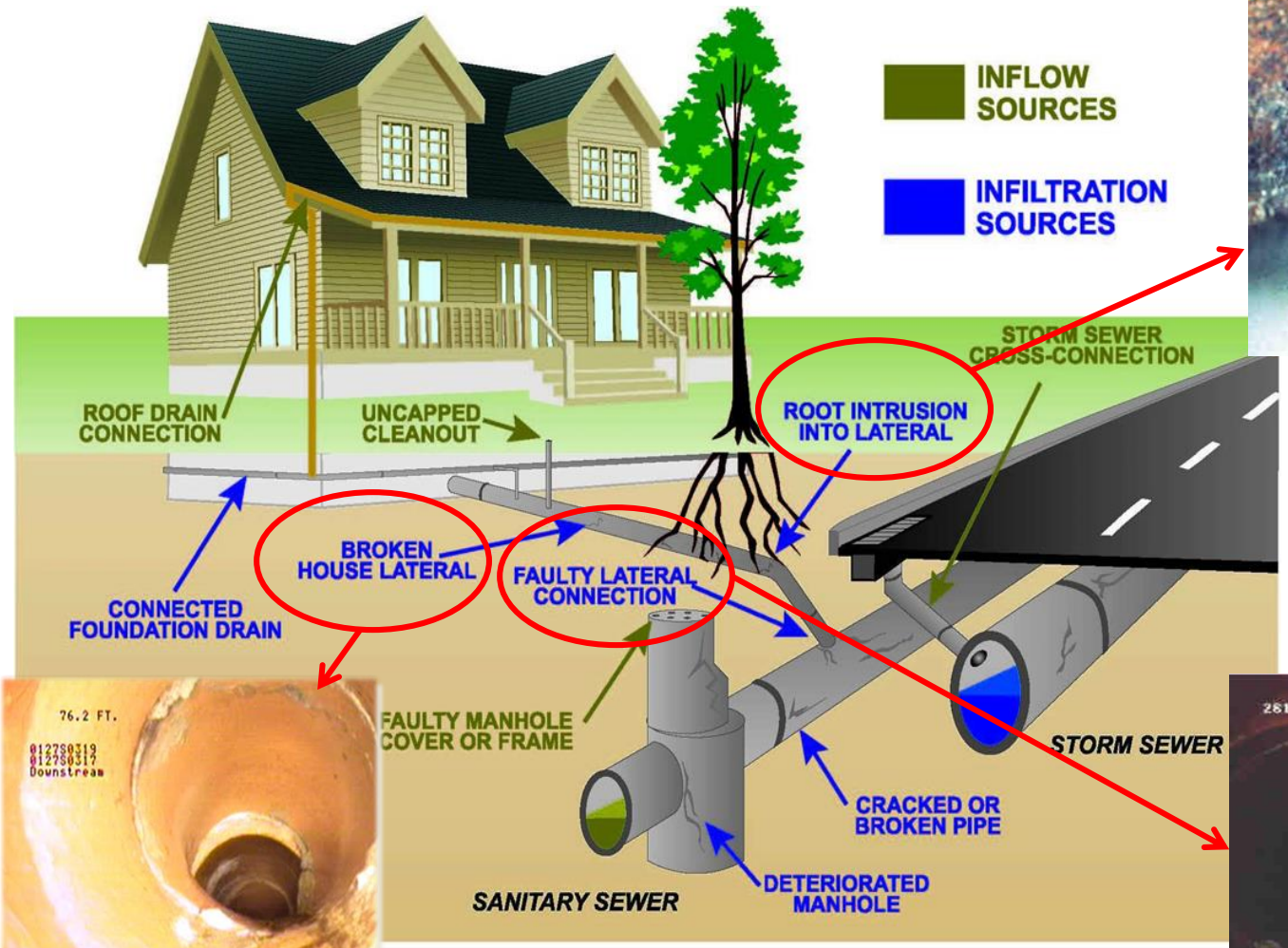
Lateral Renewal Programs

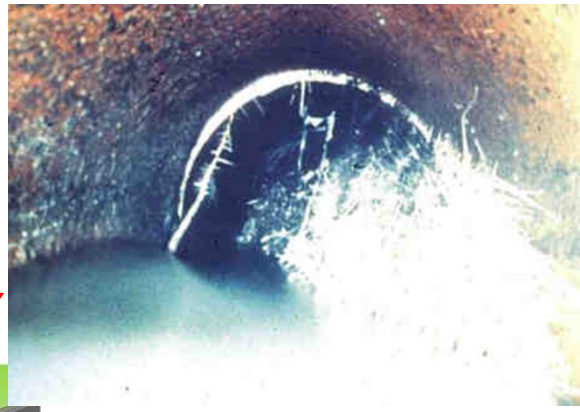
- Sewer laterals have been called the “Final Variable” of the collection system rehabilitation equation
- Laterals have been given less attention in the past due to:
  - Sheer number of laterals
  - “Snow Flake Effect”
    - No two laterals are alike
  - Lack of consistent effective and affordable inspection and renewal methods for small diameter lines
  - Complex issues of ownership and maintenance responsibilities

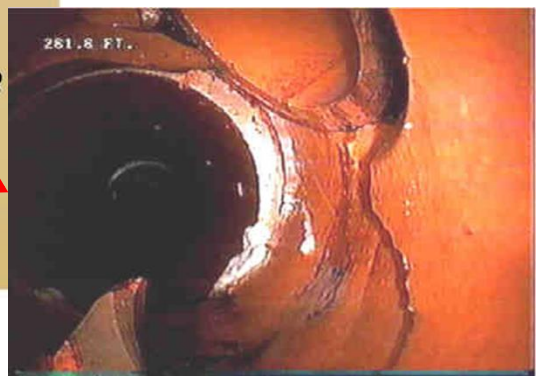
Lateral Market – Where is it Going?

- Municipalities are increasing focus on service laterals by including in rehab projects
- Insurance policies are now readily available for private ownership
- Creative pay terms are being implemented for private laterals that have to be repaired
- Inspections of laterals are becoming more common at the time of buy/sell of a house
- Municipality/Utility taking back ownership

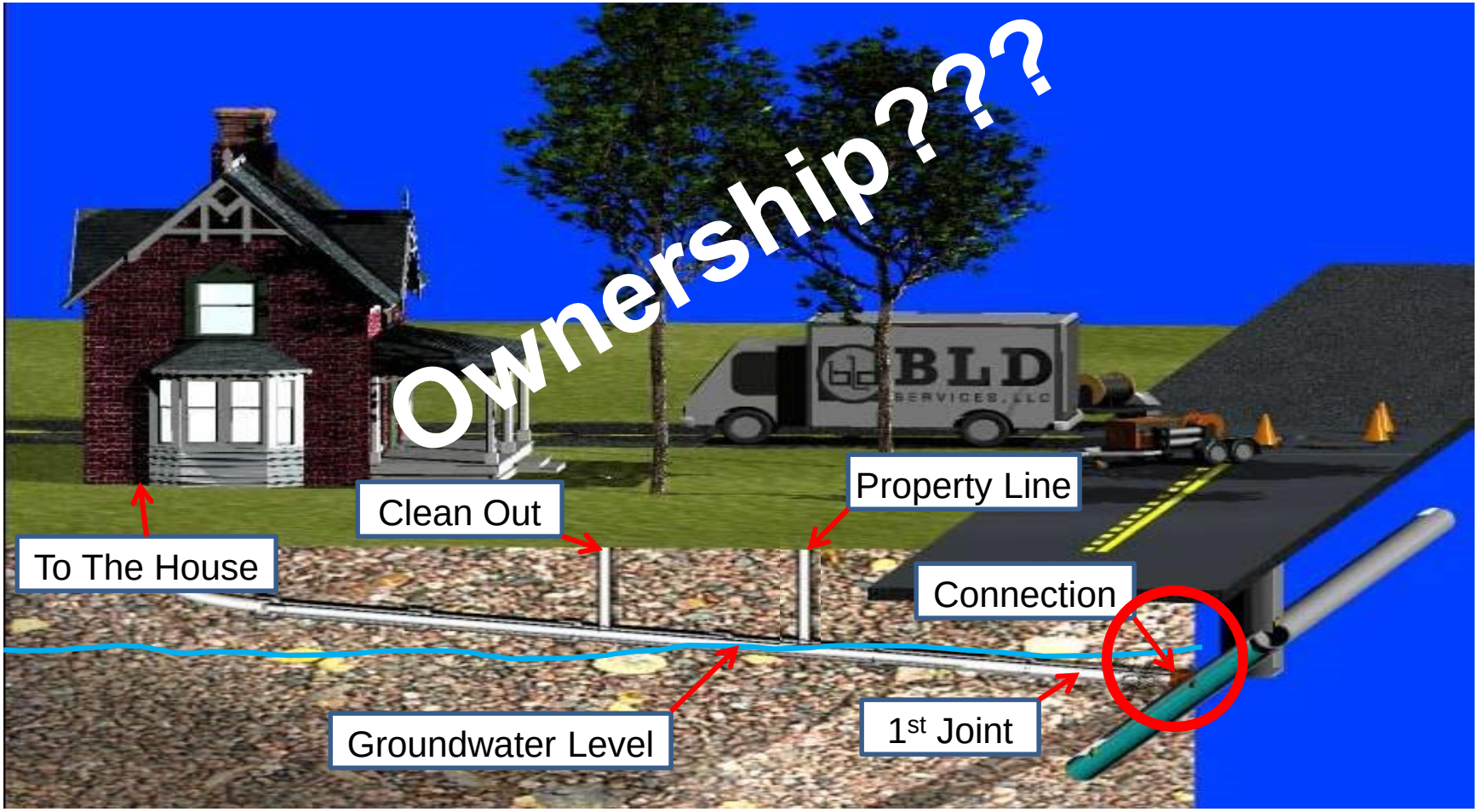
Understanding the Problem







Understanding The Problem



Understanding the Solutions

- **NASSCO Lateral Committee**

Establishing guidelines for specifications and standards for use of trenchless technology for lateral rehabilitation

Abstract

Overview of Lateral and Main/Lateral Connection Lining and Sealing Technologies

Prepared by the NASSCO Lateral Committee
07/31/16

The NASSCO Lateral Committee is dedicated to informing the public and industry on advancements and utilization of trenchless technologies for the purpose of renewing and sealing lateral service connections. In many cases, the use of sewer lateral trenchless technologies, including lining, sealing, grouting or bursting are often not specified in plumbing codes as a viable alternative to excavation, as their use and advantage are still undiscovered by many, and yet they have existed for years confirming their viability as a proven resource for renewing infrastructure.

The NASSCO Lateral Committee has developed an overview technical document as an educational resource for the purpose of advancing the acceptance of lateral trenchless rehabilitation technologies. The committee works with local system owners, state health departments and plumbing boards in an effort to educate owners on the advantages these technologies provide and enable acceptance into relative code books.

Several studies have confirmed that the lateral pipes in a typical collection system have reached their life expectancy and are either failing and/or contributing large amounts of infiltration/inflow to the main sewer pipeline. In response, technology providers have developed a number of products and technologies to line and seal lateral pipes and their connection to the mainline sewer. Lateral pipes often have multiple bends, diameter changes, offset joints, cracks, deposits, and roots which create considerable challenges when lining or sealing. The lateral pipe connection to the sewer main also poses problems due to leaks, cracks and poor alignment often created by improper connection procedures. The technologies described in this document address these issues with a goal to minimize impact on property owners and sewer providers.

Rehabilitation technologies have been developed to cope with the existing lateral pipe conditions and to provide an effective service life through proven, tested materials and refined installation procedures to satisfy owner expectations. The NASSCO Lateral Committee's "Overview" technical document provides insight into the various technologies that exist and provide a guide to assist agency owners in making determinations for utilizing such technologies.

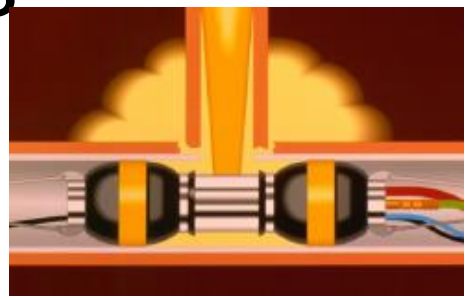
The NASSCO Lateral Committee is comprised of industry professionals, manufacturers, contractors and wastewater agencies throughout the United States of America that provide a pool of knowledge capital and unite their experience and knowledge in an effort to reach out to industry and promote educational resources, best practices and guidelines for developing technical specifications. The Lateral Committee meets quarterly to continuously refine and add technical content, research and present case studies to promote the further development of trenchless lateral rehabilitation. The Lateral Committee encourages and welcome's participation. The "Overview" technical document can be found on NASSCO's website (Nassco.org) at the following address:

http://nassco.org/industry_news/pdfs/lateral_rehab_white_paper_rev.pdf

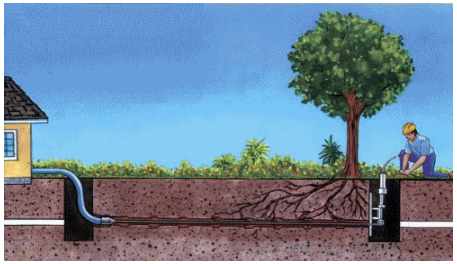
NASSCO Lateral Committee

Understanding the Solutions

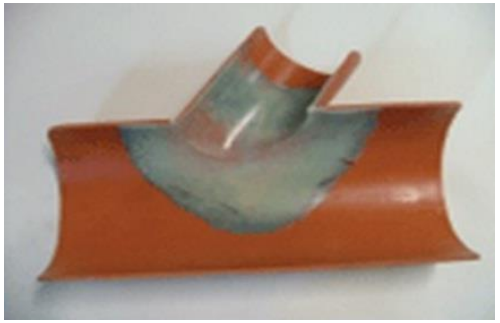
- **Grout**
  - Lateral & connection
  - Solution for heavy infiltration



- **Cured In Place Pipe (CIPP)**
  - Lateral Connection Seal – Brim Style
  - Lateral Connection Seal – Wrapping the Main
  - Lateral Connection Seal extending up the lateral a specified length
  - Lining the Lateral from an access point to the main (CIPP – Blind termination). Adding a connection seal to overlap.



- **Pipe Bursting**
- **Main Line Connection Seal**



CCTV – Lateral Inspection

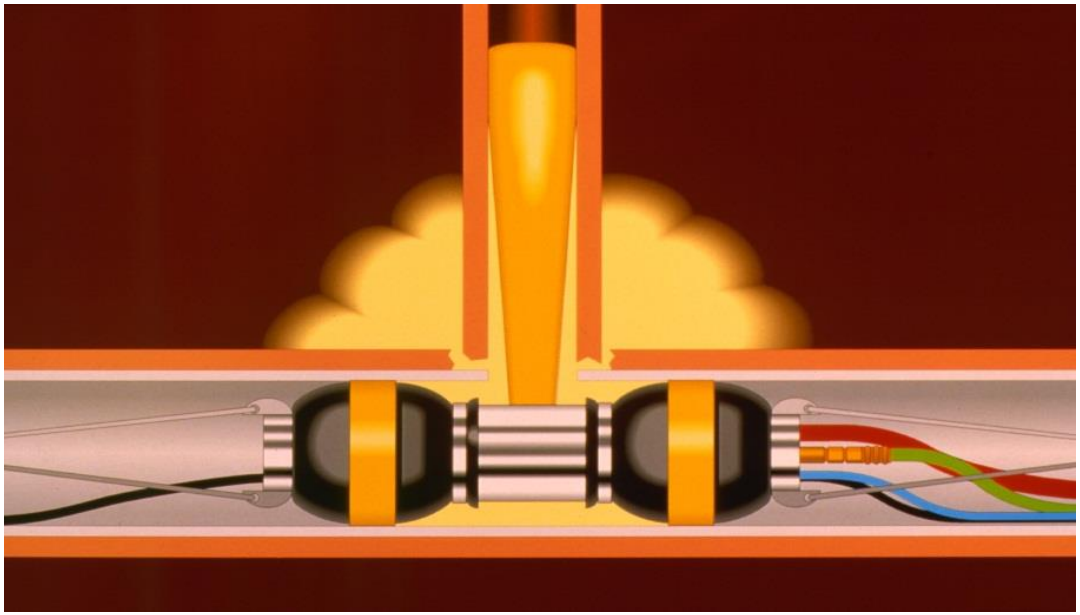
- CCTV capabilities have dramatically improved
- Up to 80+ ft from the mainline Pipe
- No cleanout needed
- Pre & Post rehabilitation CCTV Inspection

Lateral Cleaning

- Lateral cleaning techniques have improved
- Up to 80+ ft from the main line Pipe
- No clean out needed
- Done during CCTV inspection
- Removal of roots & debris

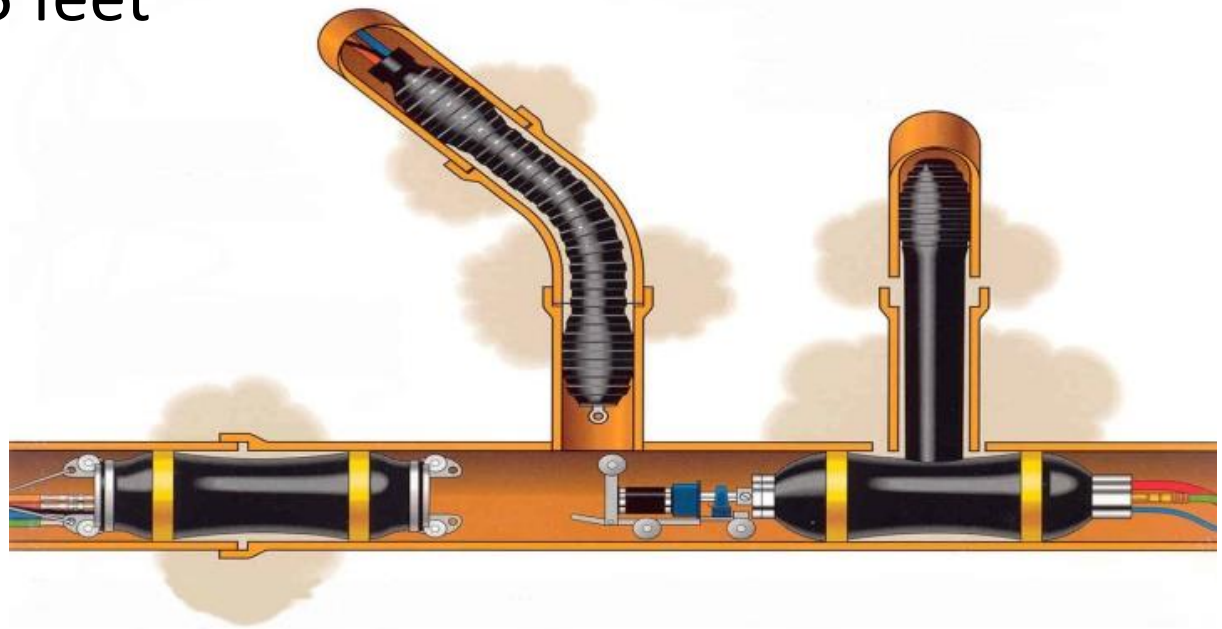
Grouting

- Packer is positioned inside the sewer at the lateral location
- The packer bladders are inflated isolating the predetermined portion
- A two component chemical grout is pumped



Lateral and Main/Lateral Connection Grouting

- A flexible push/pull packer allows grouting of laterals from above ground access
- The grout packer usually isolates an area of 3 to 5 feet

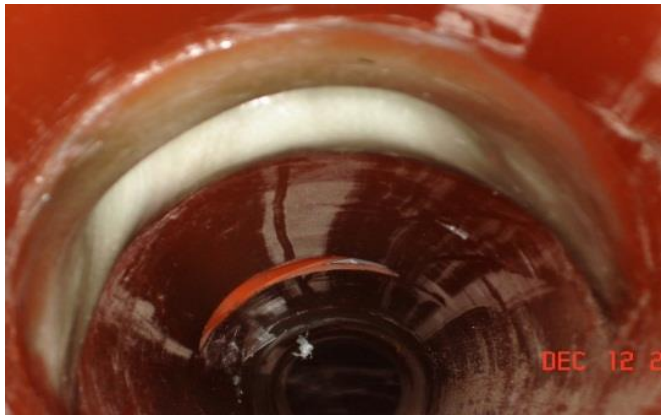


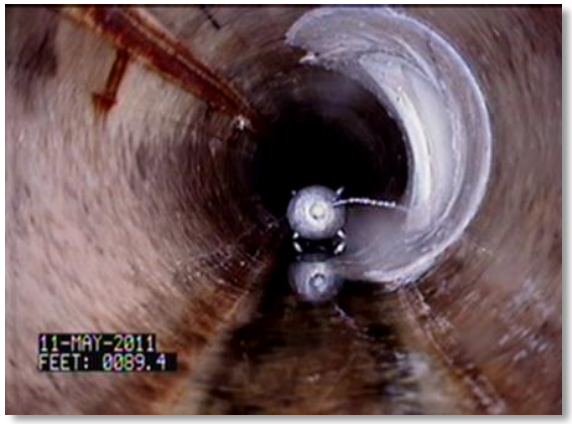
CIPP Lateral Lining

- 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

"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
- Hydrophilic material is used to seal the connection at the main
- Generally installed in shorter lengths





"Full-Wrap Style of CIPP Lateral

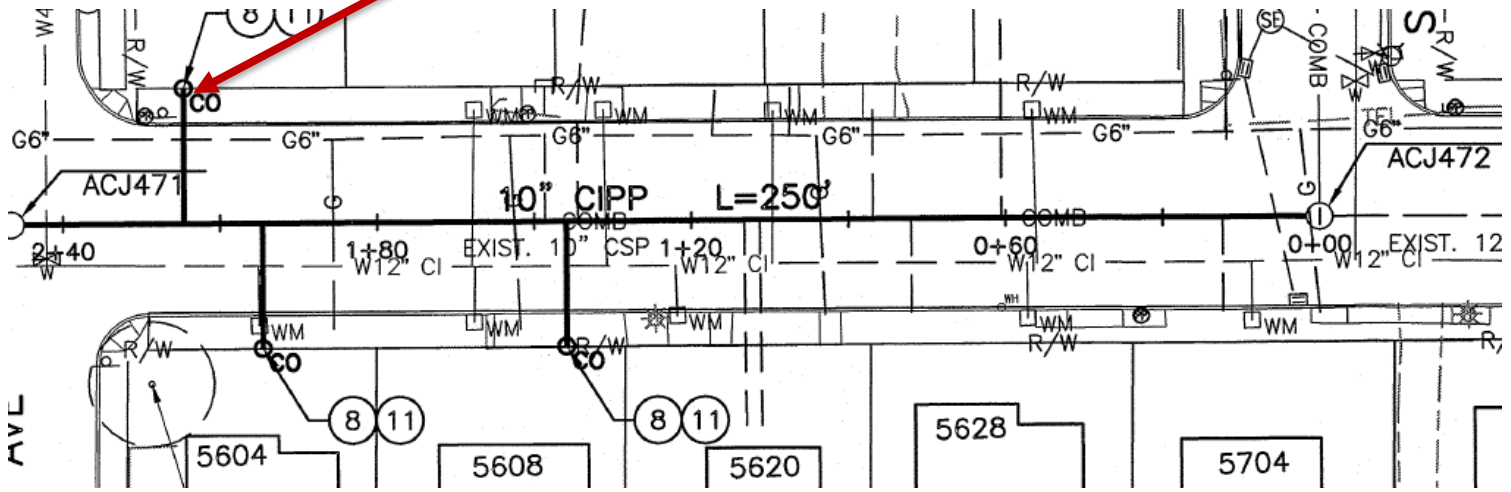
- Can be installed before or after main line rehabilitation
- Installed from mainline
- No clean out is required
- A bladder is used to inflate and position the resin saturated liner in place
- Liner forms a full circle around the inside of the main sewer pipe
- The main liner is approx. 16" in length and is 360^0 within the main line pipe
- Typical lateral lengths are from main line up to 60 ft.
- A clean out is usually required for lengths longer than 60 ft.
- Hydrophilic material is used to seal the lateral connection at the main and the terminating end of the CIPP lateral

Understanding the Solutions

- Lateral Connection Seal extending up the lateral a specified length

- 4” to 6”
- 12”
- 5ft & Longer

30ft Lateral Liner

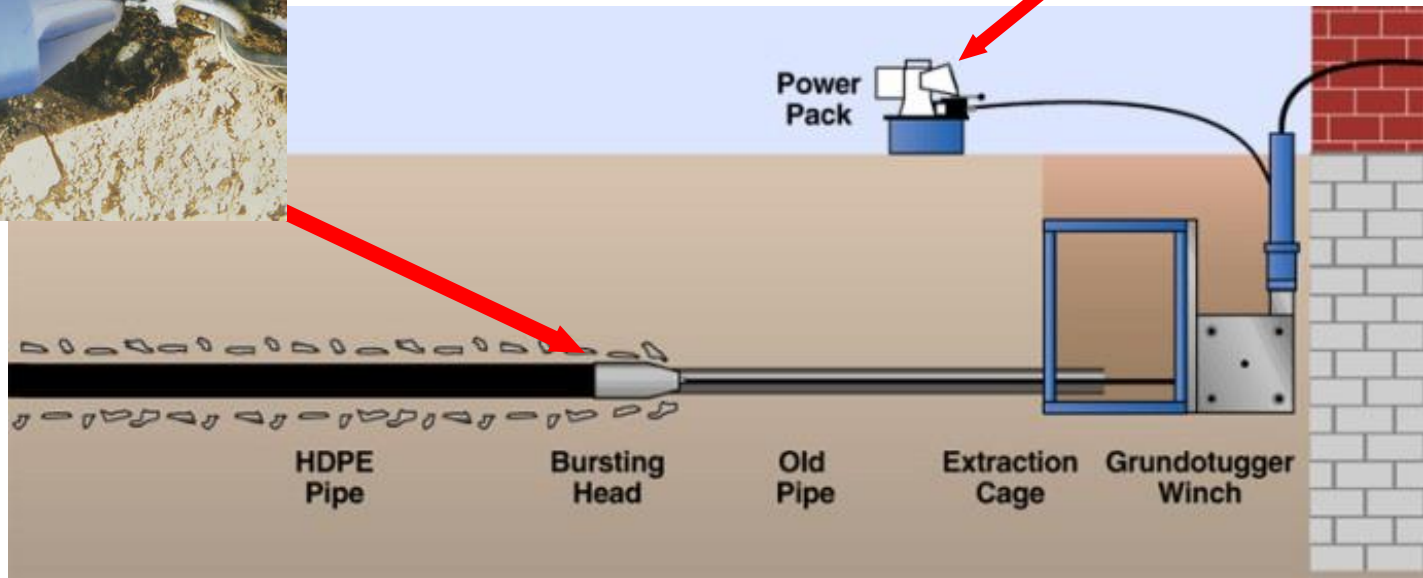


Understanding the Solutions

- Lining the Lateral from an access point to the main (cipp – blind termination). Adding a connection seal to overlap.

Lateral Pipe Bursting

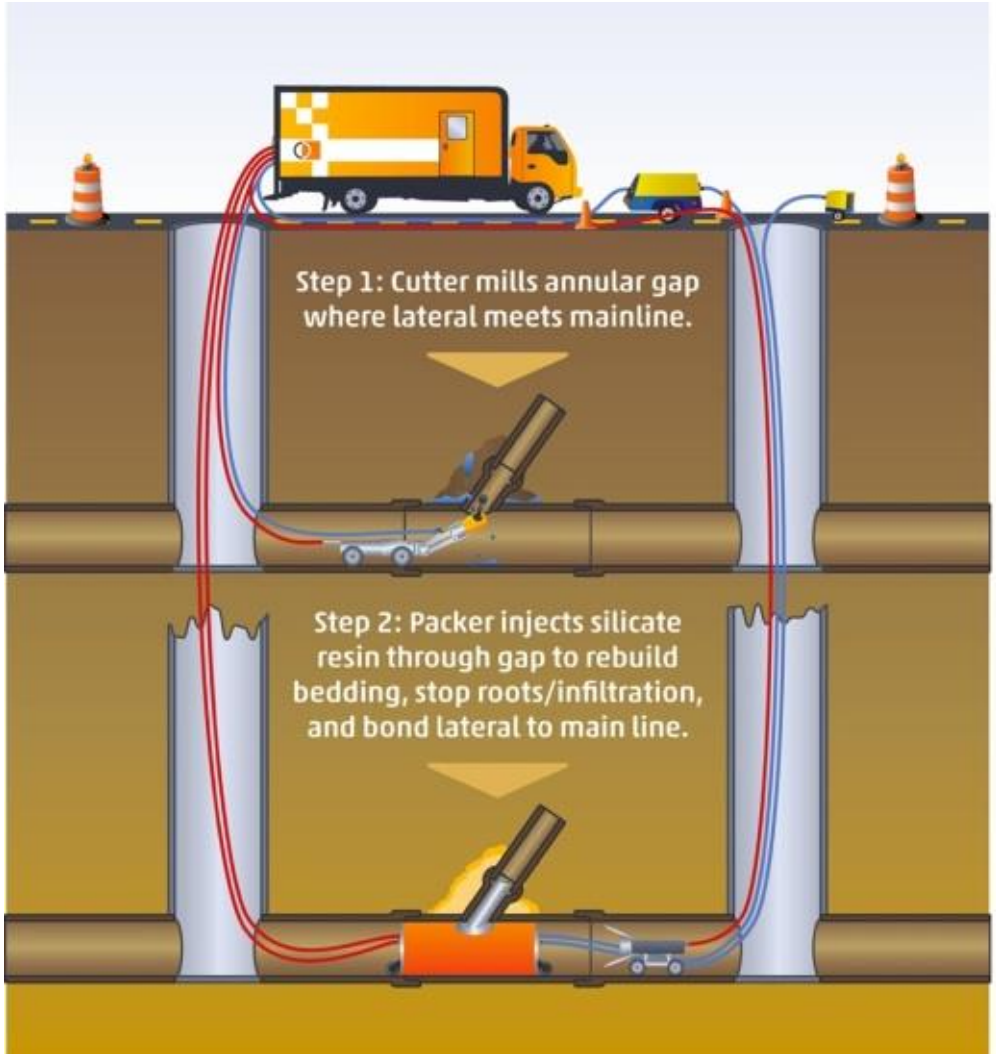
- The bursting head is either pulled or pushed in
- A "power pack" is used for pushing/pulling
- The majority are pulled in
- The new pipe can be a larger size



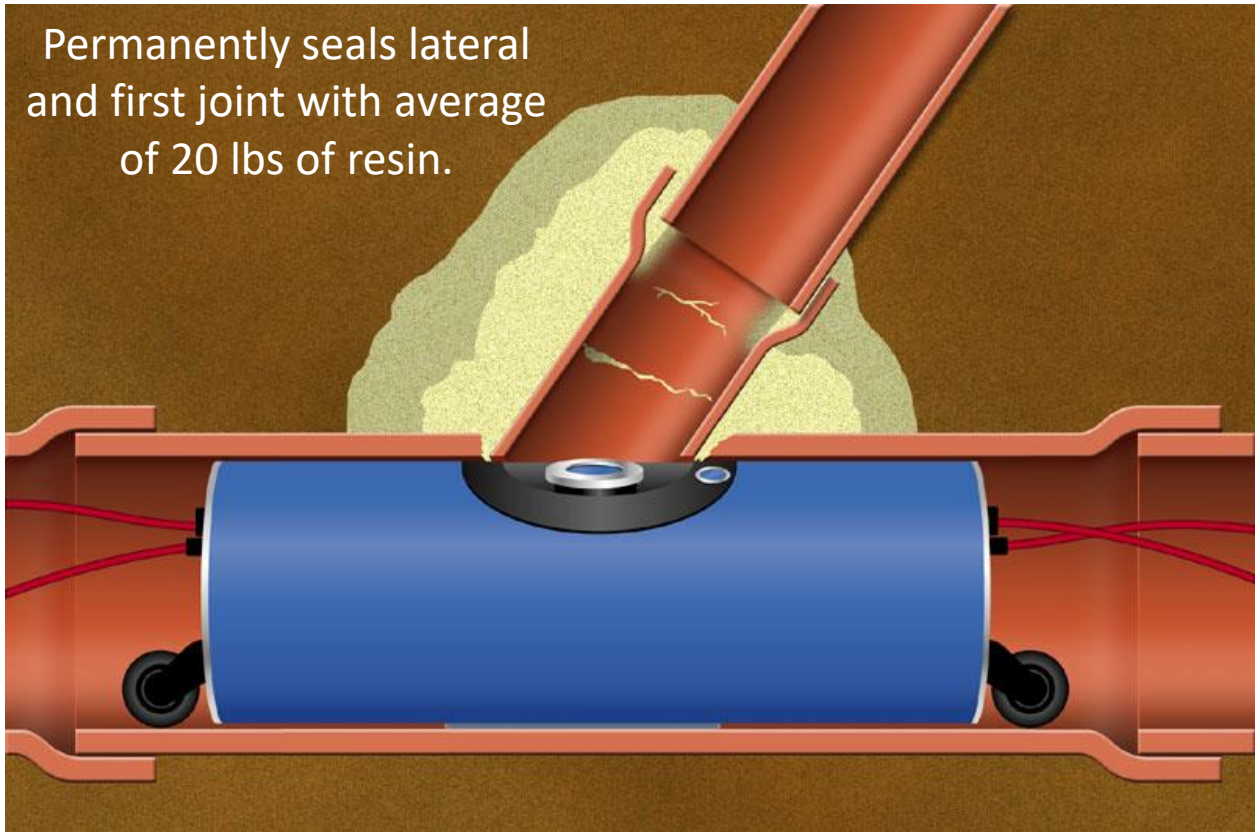
Main/Lateral Connection Sealing

- Connection prepared by cutting/milling robot
- Main line packer is positioned
- A lateral bladder is launched and isolates the connection
- A resin epoxy material is injected under pressure
- Resin is ambient or heat cured

Main/Lateral Connection Sealing



Main/Lateral Connection Sealing



Applicable for both lined and un-lined main pipe.

Lateral Resources

- NASSCO - Lateral Committee - 2012
  - *Overview of Lateral and Main/Lateral Connection Lining and Sealing Technologies*
  - http://nassco.org/industry_news/pdfs/lateral_rehab_white_paper.pdf
- WERF Studies
  - *Survey of Public Works Agencies – 2004*
  - *Methods for Cost-Effective Rehabilitation of Private Lateral Sewers – 2006*
- Miami-Dade Water and Sewer District
  - *Comprehensive Lateral Investigation Program - 2007*

Thank You

Questions?

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