



THE TOTAL SOURCE

educational sessions

The When, Why, and How Manhole I&I Reduction

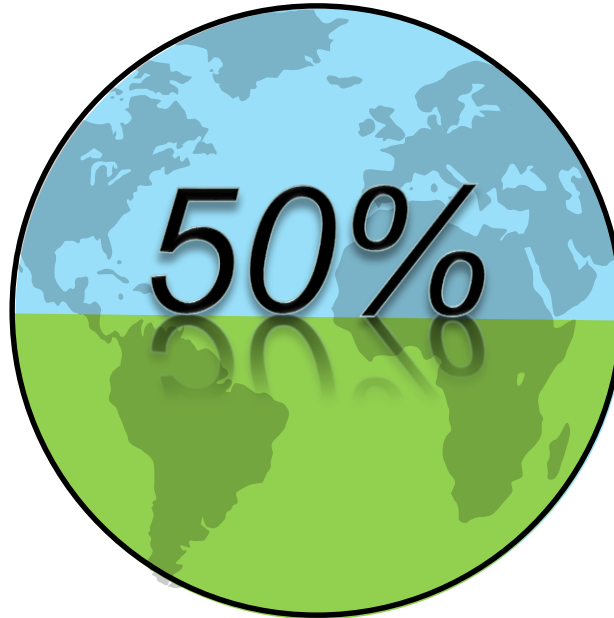
Presenter

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Midwest Regional Manager



The Problem with I&I



“According to the EPA estimates, infiltration and inflow represent almost **half** of all flow at treatment plants nationwide. Infiltration and inflow (I/I) is a huge problem, and it only worsens over time if it is not addressed.”

-United States Environmental Protection Agency; Office of Research and Development, Washington DC 20460
EPA/625/R-961007



Infiltration vs. Inflow (I&I)

What is the difference between Infiltration and Inflow?

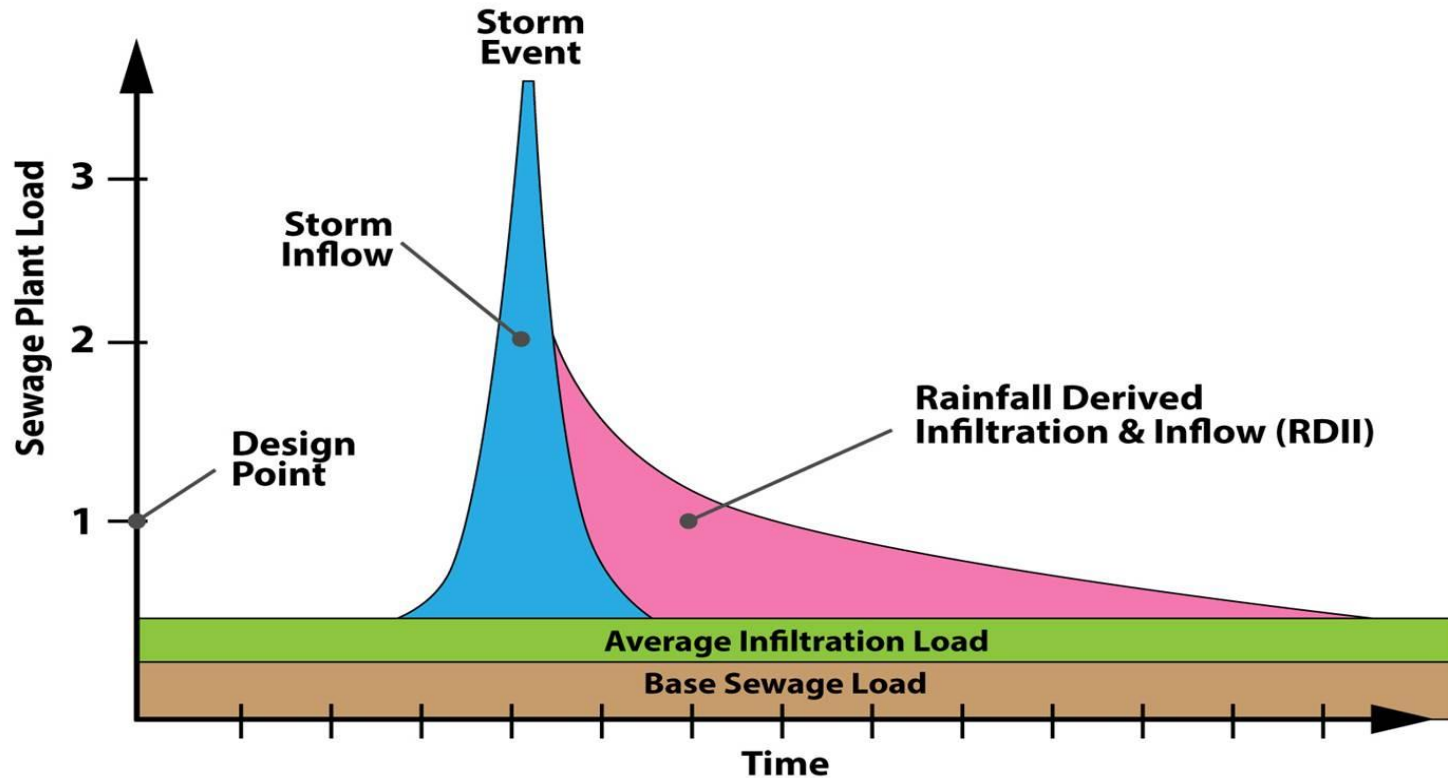
Infiltration is **groundwater** which enters the sewer collection system (pipelines and manholes) through defects in the sewer system.



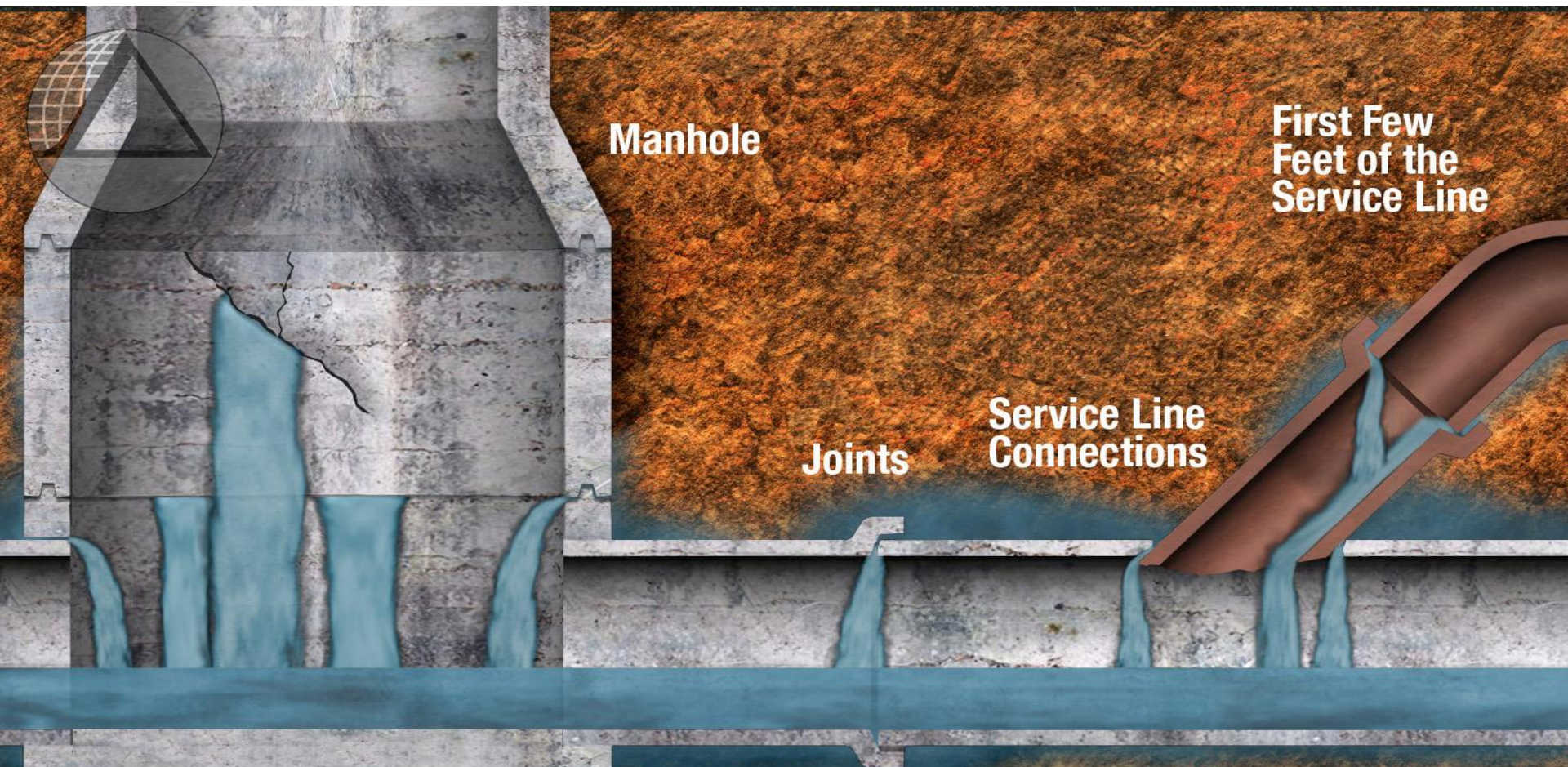
Inflow is defined as **surface water** entering the sewer via flooded sewer vents, leaky manholes, storm drains, basement drains and by means other than groundwater.



Simplified Sewage Treatment Plant Loading Scenario



4 Critical Points of I&I



Low Hanging Fruit of I&I

First Defense for Sealing the System

Easy Access

Vulnerable to Defects

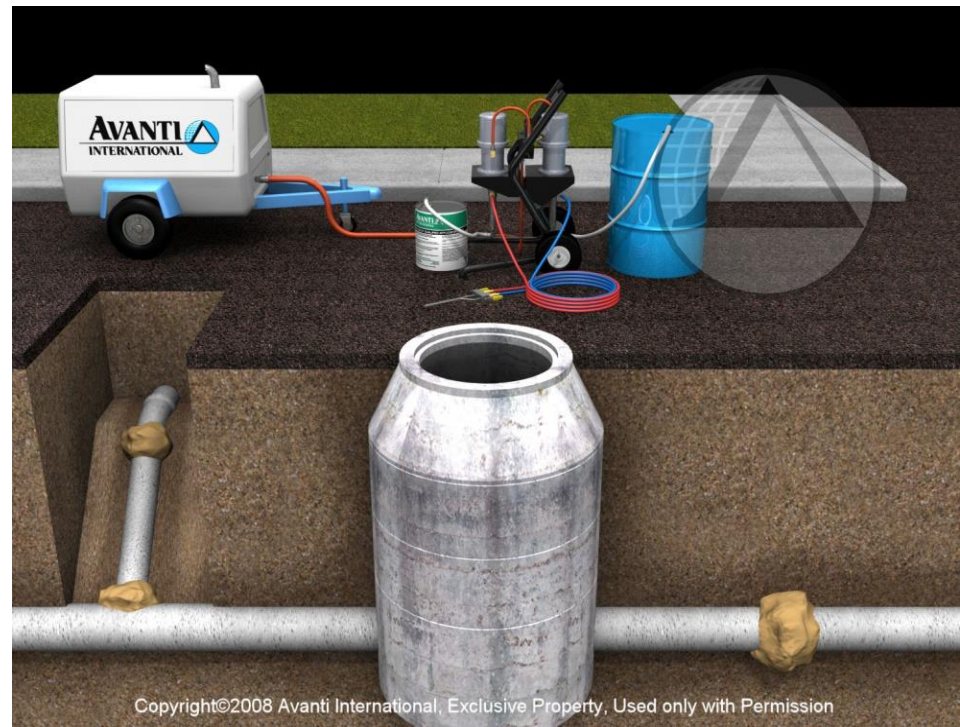
Cracks

Pipe Penetrations

Faulty Seals

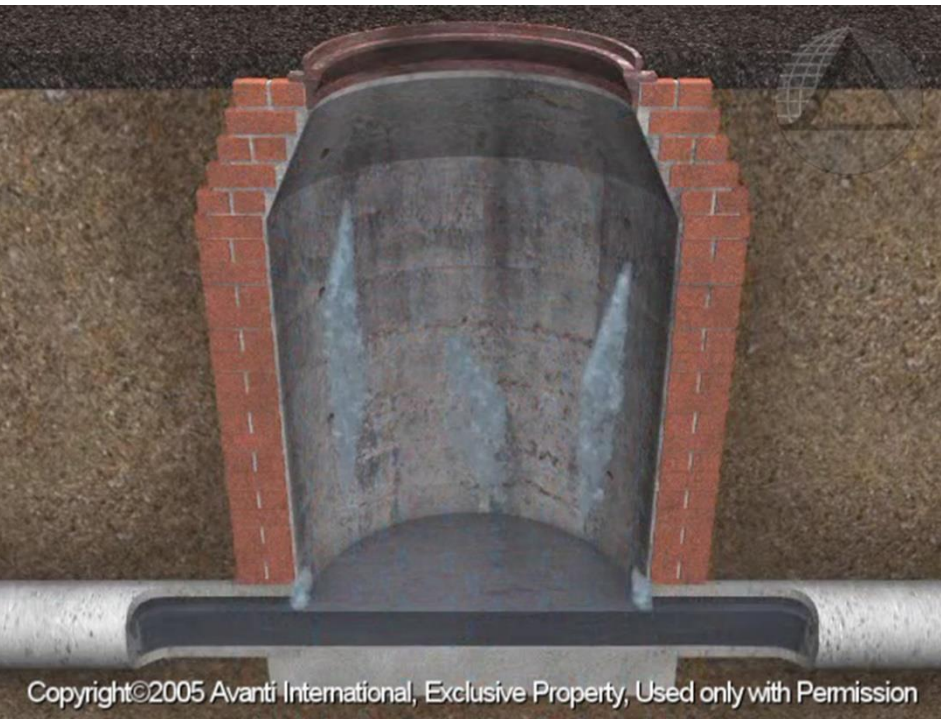
Barrel Joints

Lifting Holes

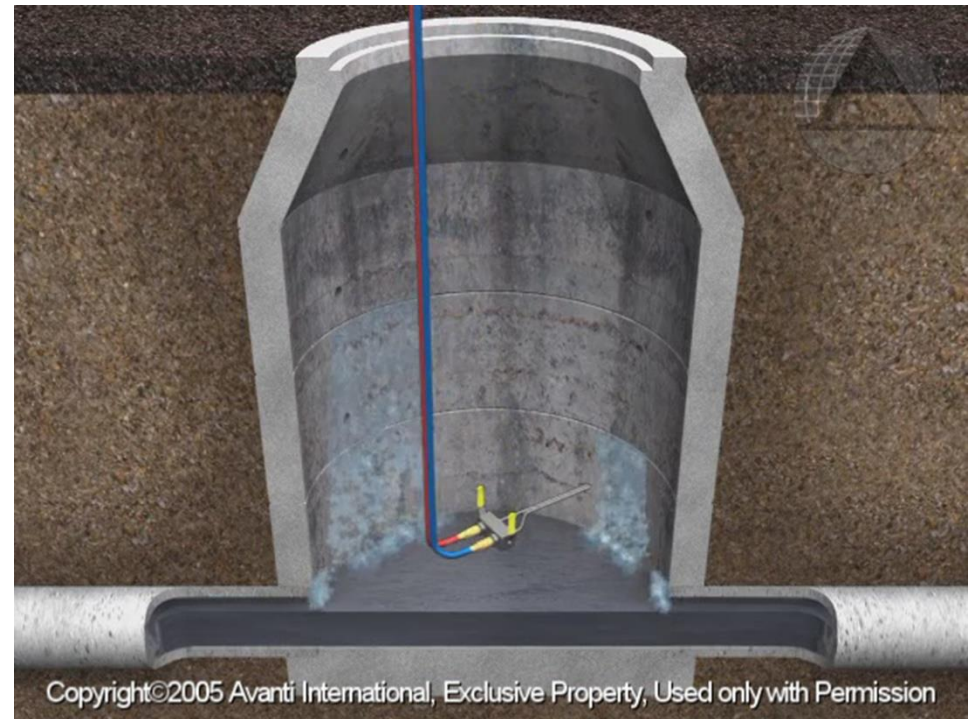


Types of Manholes

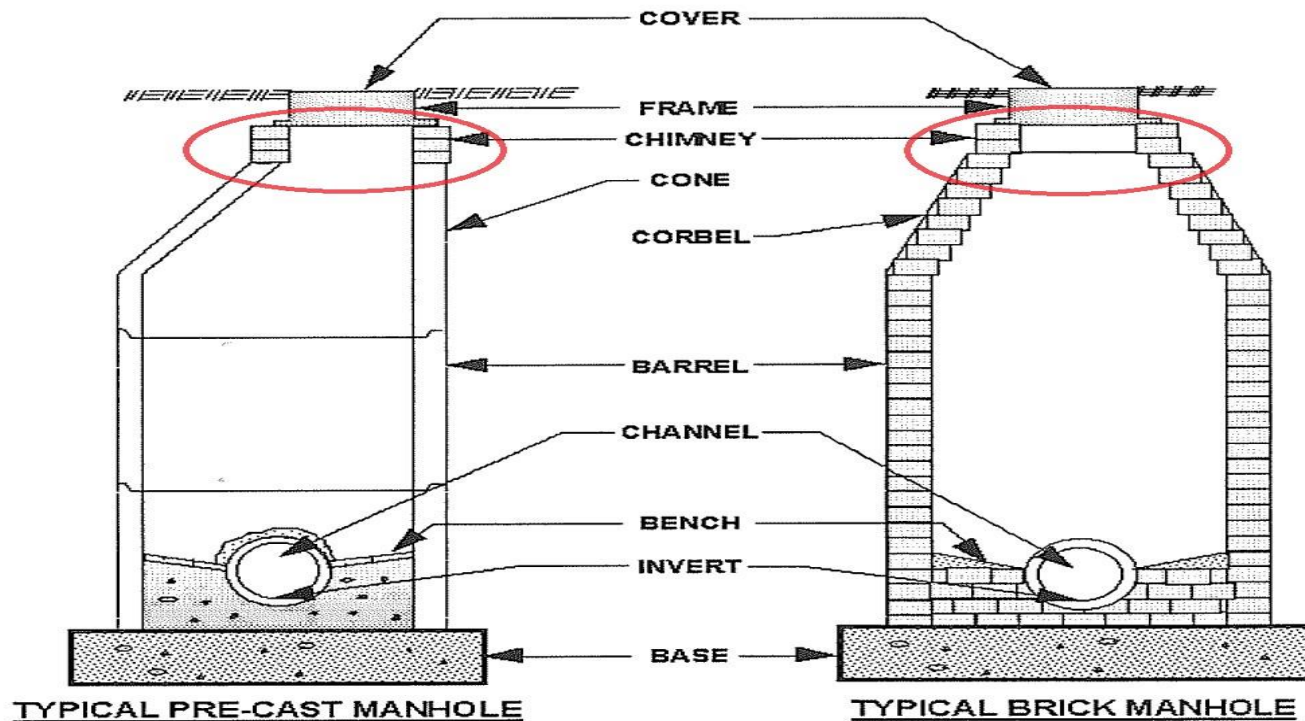
Brick and Mortar



Pre-cast Concrete

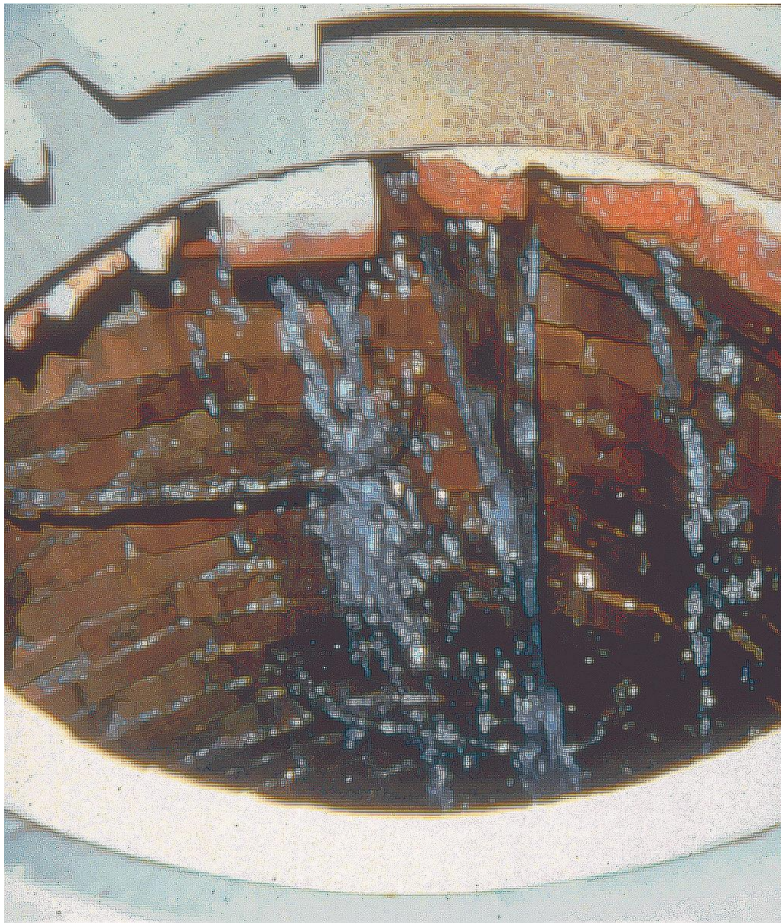


Sources of Inflow in Manholes



BASIC MANHOLE COMPONENTS

Sources of Inflow in Manholes



Sources of Inflow in Manholes



Most exposure to the elements

Damage from Freeze/Thaw cycle

Constant Auto/Truck Traffic and Loads

Sources of Inflow in Manholes



Sources of Infiltration in Manholes



What is Injection Grout?

Liquid resin that turns into an impermeable solid in a predictable time frame

- stop leaks in above grade structures
- stop infiltration in below grade structures
- stabilize soils
- control groundwater
- seal annular space between host pipe & liner



No such thing as “WonderGrout”

- Each are engineered to perform different tasks
- Additives change outcomes
- Technology you can control
- Technology engineers can specify
- What you know—matters



Primary Grout Families

ACRYLIC GROUTS

Acrylamide

NMA / Acrylic

Acrylate

POLYURETHANE GROUTS

Gel / Foam

Flexible / Rigid

CEMENTITIOUS GROUTS



Spot Repair

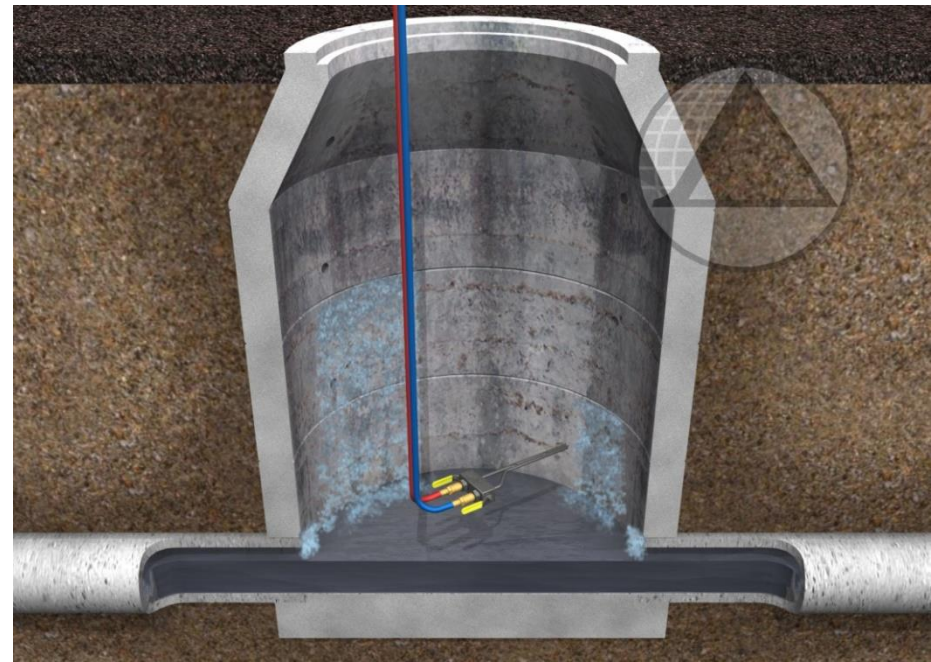


Encapsulation

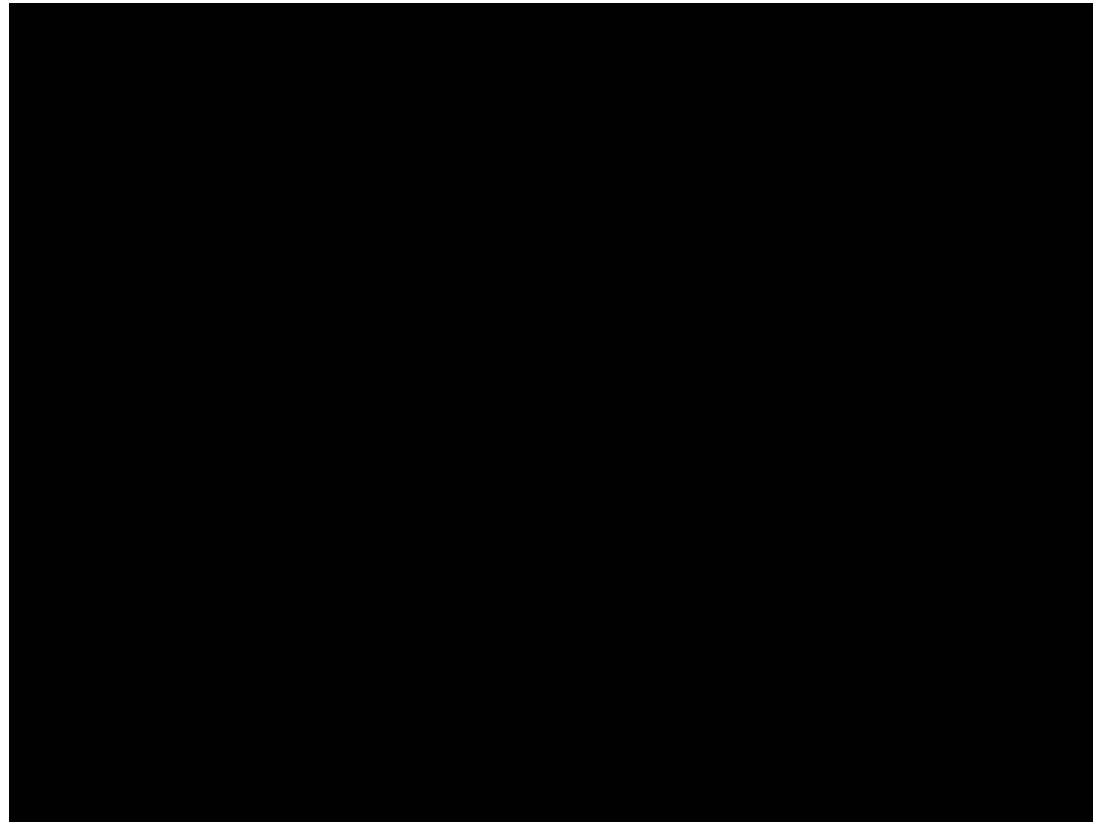


5 Techniques for Sealing MH

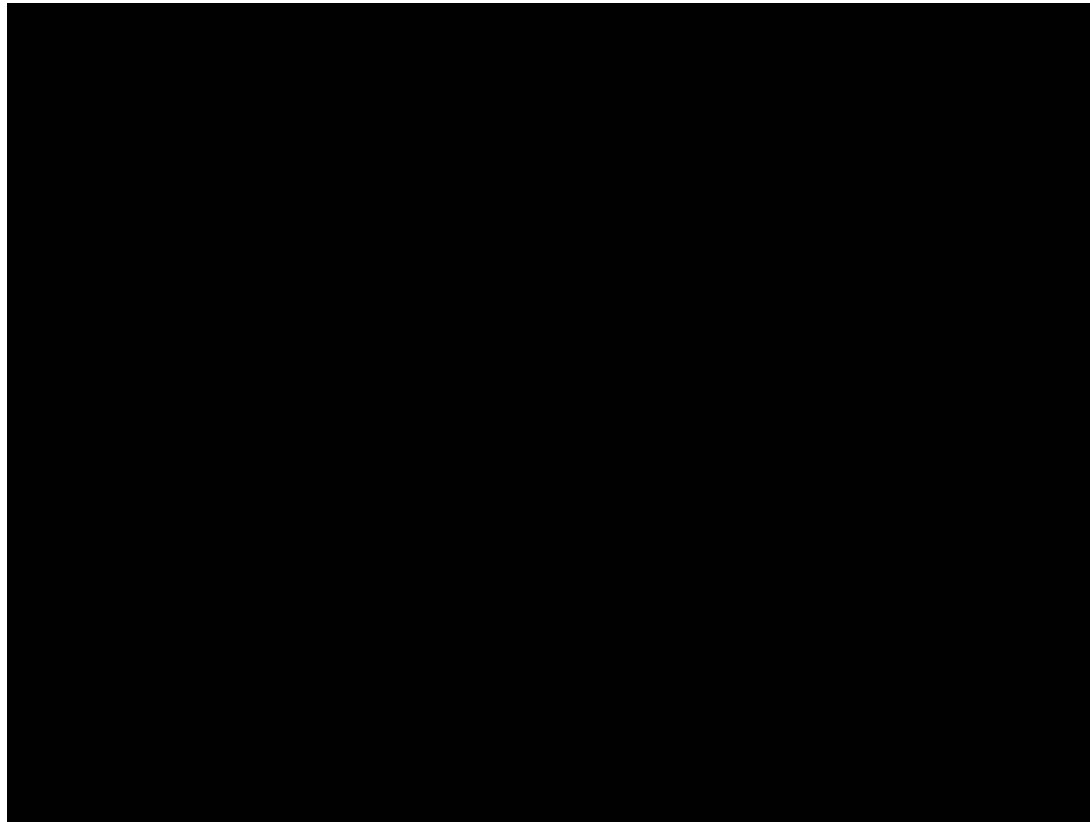
1. Vertical Crack Injection
2. Horizontal Joint Injection
3. Oakum Soakum
4. Curtain Grouting
5. Probe Grouting



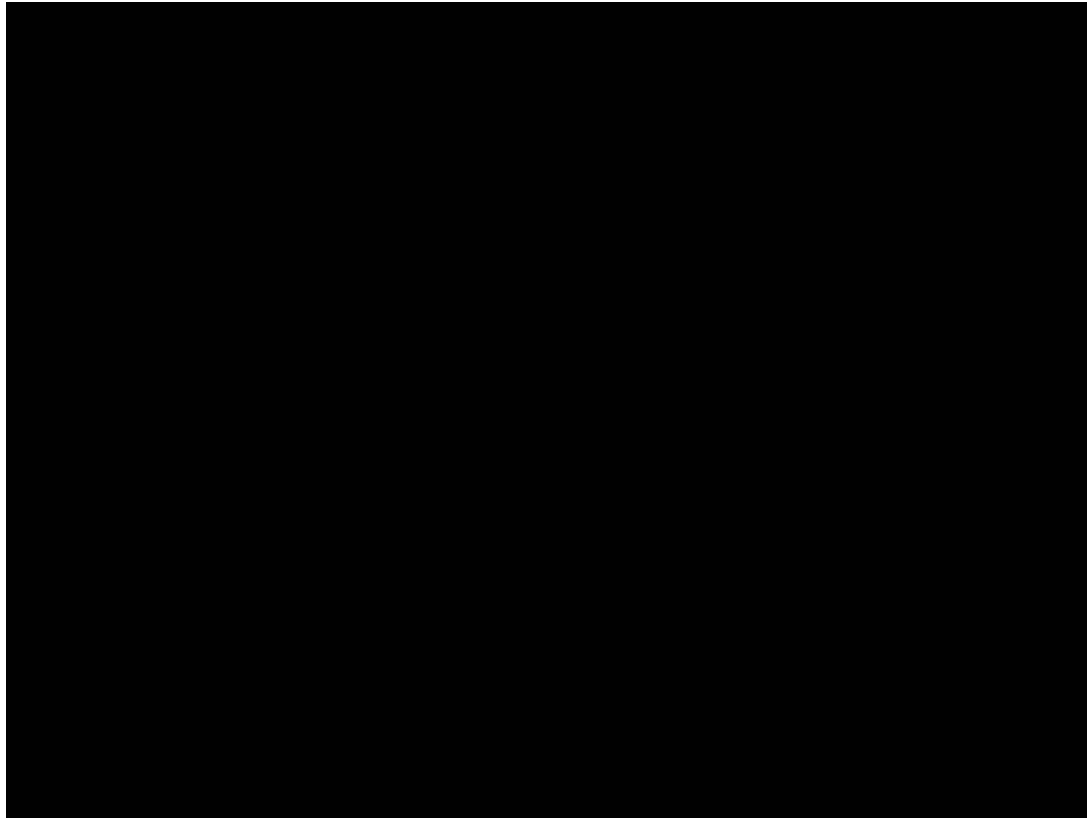
Vertical Crack Injection



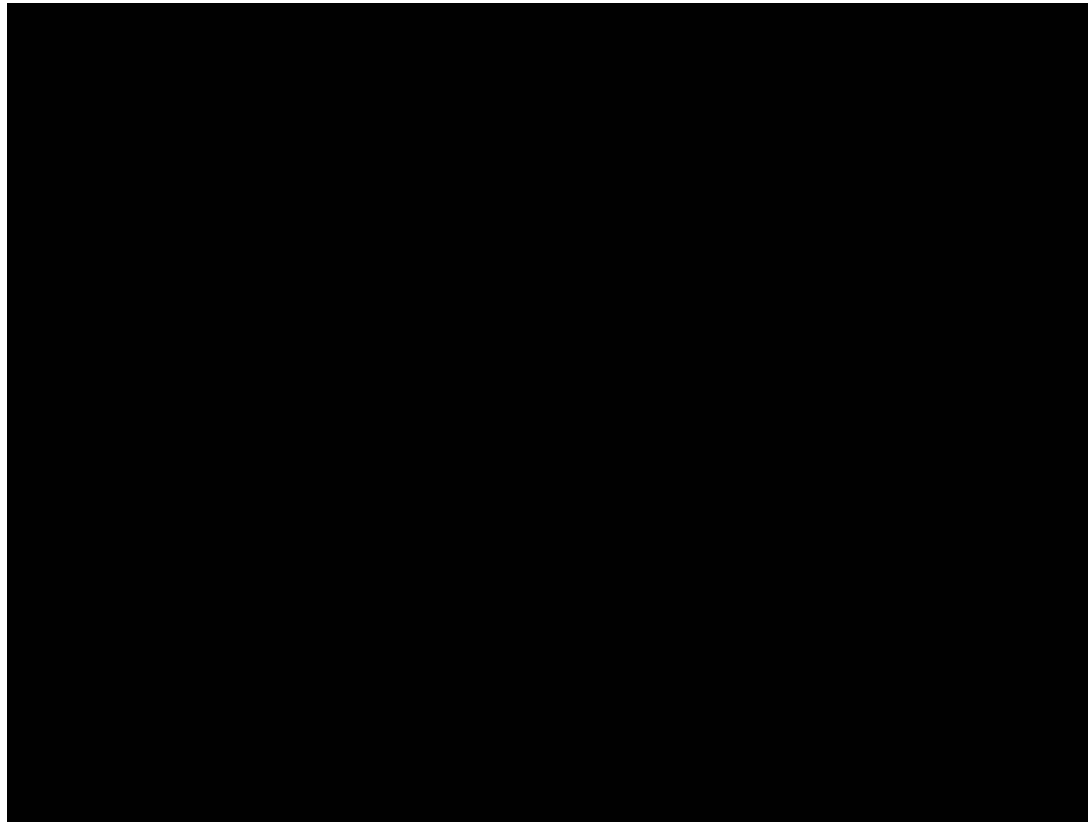
Horizontal Joint Injection



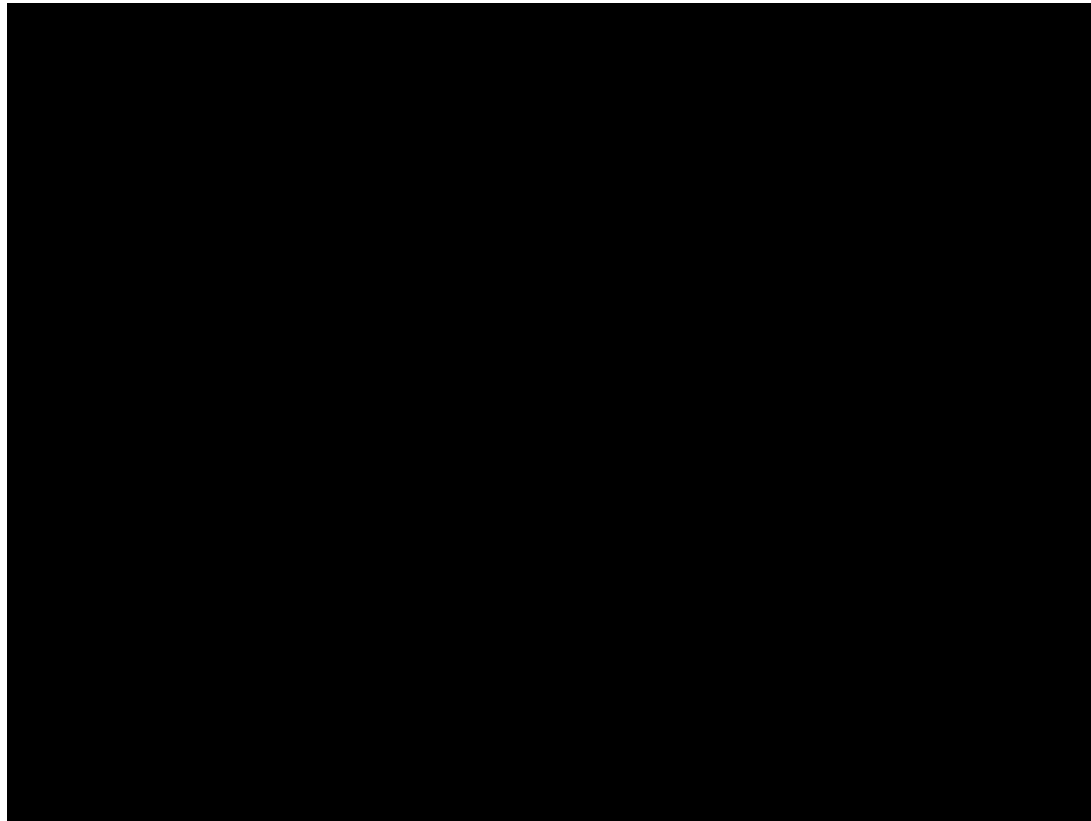
Oakum Soakum



Curtain Grouting



Probe Grouting



Injection Grouting Manholes

First Defense for MH Rehabilitation

As a **stand-alone** solution

- Least cost, high return-on-effort
- Reduce flow & cost of I&I
- Fill voids, extend lifecycle of structure



Injection Grouting Manholes

First Defense for MH Rehabilitation

As part of a **multi-step** solution

- Step 1: stop active water leaks
- Required for cement coatings, epoxy linings
- More durable, long-term solution



Question & Answer



Thank You!
Please Visit Us @ Booth 749

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