Smoke Testing for Sewer Evaluations

An Overview for Hot Springs Village
AGENDA

- Introductions
- What is smoke testing?
- Why do we do it?
- How do we do it?
- What do you need to do?
RJN Group, Inc.

- Engineering Firm established in 1975
- Specialist in Collection Systems
  - Monitoring and Evaluation
  - Design and Trenchless Technologies
- Ranked by
  - ENR – Design and Wastewater (Top 500)
  - Trenchless Technologies (Top 15)
- Certified in NASSCO: PACP and MACP
- Culture and Core Services in Collection Systems Engineering
- Completed over 750 I/I Projects
Similar Sewer System Projects

- Nebraska
  - Bellevue
  - Grand Island
  - Lincoln

- Kansas
  - Abilene
  - Goddard
  - Leavenworth
  - Lawrence
  - Salina

- Missouri
  - Allen County
  - Blue Springs
  - Columbia
  - Kansas City
  - Lee's Summit

- Iowa
  - Ankeny
  - Cedar Rapids
  - Des Moines
  - Davenport
  - Dubuque

- Illinois
  - Addison
  - Belvidere
  - Bolingbrook
  - Downers Grove
  - Elgin
  - Hoffman Estates

- Indiana
  - Indianapolis
  - Plainfield

- Ohio
  - Columbus

- Kentucky
  - Louisville

- Tennessee
  - Nashville

- Georgia
  - Atlanta
  - Cobb County
  - Forsyth County

- Florida
  - Brevard County
  - Hallandale Beach
  - Homestead

- Texas
  - Austin
  - El Paso
  - Houston

- Colorado
  - Denver

- Nevada
  - Las Vegas

- Arizona
  - Phoenix

- California
  - Los Angeles
  - San Francisco

- Oregon
  - Portland

- Washington
  - Seattle

- Alaska
  - Anchorage

- New York
  - New York City

- Pennsylvania
  - Philadelphia

- New Jersey
  - New York City

- New Hampshire
  - Manchester

- Massachusetts
  - Boston

- Connecticut
  - Hartford

- Maryland
  - Baltimore

- Hawaii
  - Honolulu

- District of Columbia
  - Washington, DC

- Puerto Rico
  - San Juan
Arkansas Knowledge

Hot Springs (2008 – present)
City Corporation (2009 – present)
Fayetteville (1989 – present)
Fort Smith (2003 – present)
Little Rock (2004 – present)
North LR (2012 – present)
Alma (2009 – 2011)
Jonesboro CWL (2012-present)
West Memphis (2013-present)
Clarksville (2015 - present)
HSVPOA (2015 – present)
Infiltration and Inflow

- Extraneous Flow Enters from Two Sources
  - Infiltration - groundwater that enters through defective pipes, manholes, or building connections
  - Inflow - surface water that finds direct entrance by way of downspouts, sump pumps, manholes, and catch basins
Field Investigation Methods - SSES

- Manhole / Visual Pipe
- Visual Pipe Inspect
- Smoke Testing
- Flow Isolation
- Dyed Water Flooding
- TV Inspection
Smoke Testing initiated in 1961 in McPherson, KS.
Smoke Testing endorsed by EPA in all Regions for I/I Studies
Zinc Chloride Smoke preferred by EPA
“Smoke” Candles are Non-Toxic
Smoke leaves NO visible residue
Contains NO Explosive Materials
Approx. 50% of the visible portion is atmospheric moisture
Not a true smoke, mist formation is seeded by zinc chloride
Why do we Smoke Test?

- Identify Location of Stormwater / Groundwater
- Typical Inflow Source Technique
  - Performed with other techniques such as dye testing
  - House-to-house inspection
- Performed During Dry Months and Low Groundwater
  - June – October
- Upstream and Downstream Manholes are Restricted
Why do we Smoke Test?

- Locates Defects
  - Pipes
  - Laterals
  - Structures
  - Focus on I/I
How do we Smoke Test?

- Methods
  - Blowers
  - “Smoke”
How do we Smoke Test?
Smoke Testing

- **Documentation**
  - GPS Coordinates
  - Private Sector

Defect Type: Cleanout
Location: Private
Address: 5520 Inwood Dr.
Severity: Heavy
Inflow (gpm): 2.5
<table>
<thead>
<tr>
<th>Street</th>
<th>Address</th>
<th>Defect Observed</th>
<th>Intensity</th>
<th>Drainage Area (SF)</th>
<th>Quantify</th>
<th>Photo No.</th>
<th>Possible Cross Connection At</th>
<th>Cross Conn. Photo No.'s</th>
<th>Smoke Along Main Sewer?</th>
<th>Surface Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Public Cleanout/Defective</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Catch Basin</td>
<td></td>
<td>Yes</td>
<td>Pavement</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Public Cleanout/Missing Cap</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Storm Ditch</td>
<td></td>
<td>No</td>
<td>Pavement</td>
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<tr>
<td></td>
<td></td>
<td>Water Meter</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Storm Manhole</td>
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<td>Yes</td>
<td>Pavement</td>
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<tr>
<td></td>
<td></td>
<td>Private Cleanout/Defective</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Storm Sewer Cleanout</td>
<td></td>
<td>Yes</td>
<td>Pavement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private Cleanout/Missing Cap</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Other (Explain)</td>
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<td>No</td>
<td>Pavement</td>
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<td>Private Building Lateral</td>
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<td>None</td>
<td></td>
<td>No</td>
<td>Pavement</td>
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<td></td>
<td></td>
<td>Driveway Drain</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Segment Length</td>
<td></td>
<td>No</td>
<td>Pavement</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ground Conditions</th>
</tr>
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<tbody>
<tr>
<td>Dry</td>
</tr>
<tr>
<td>Damp</td>
</tr>
<tr>
<td>Standing Water</td>
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</tbody>
</table>
Public Relations

- Public Meetings
- Door Hangers
- Signs
- Door-to-Door Contact
- Internet Information
- Newspapers, etc.
Will test during dry days, will stop during rain events
Will complete about 5,000 linear feet per day
Will take about 5 weeks to test entire HSV system
Our Process

- Prepare map of test area every morning for HSVPOA Staff
- Notify Fire Department every morning of test area
- Distribute Notices to residential homes 48 hours in advance
- Notify each place of business in person, ask for sign-off
How does it affect me?

Smoke in your home?

- Smoke will NOT enter your home unless you have defective plumbing OR dried-up drain traps.
- Please pour water in sink drains, tubs, toilets, to fill the trap.

Crews on your property?

- Some sewer lines and manholes may be located in an easement on your property. Crews will need access to the easements.
- Workers will NOT need to enter your house or business during test.
Smoke Testing Town Hall

Questions?

Thank You!