STORMWATER – KEEPING IT CLEAN!

ARLINGTON, MASSACHUSETTS

AUGUST 12, 2014

Presented by Robert Descheneau, P.E.
Fay, Spofford & Thorndike

FAY, SPOFFORD & THORNDIKE FST 100 YEARS

Presentation Agenda

- Arlington Storm Drain and Sanitary Sewer
- Evolution of the Illicit Discharge Detection & Elimination Program (IDDE)
- Stormwater Sampling & Analysis – Methods and implementation
- Investigations – Identifying Illicit Connections
- Design & Construction – Rehabilitation techniques
- Outfalls Investigated and Rehabilitated

What is Stormwater?

- Stormwater is runoff water from rain or melting snow that flows across the landscape. Runoff flows off of rooftops, paved areas, bare soil, and lawns. Runoff gathers in increasingly large amounts (from puddles, to ditches, to streams, to lakes and rivers) until it flows into the ocean.

Arlington Storm Drain System

- Some parts over 100 years old
- Discharges stormwater to surface waters in Arlington
- Little or no treatment prior to discharge

Arlington Storm Drain System

- Approximately 518,000 LF = 98 miles of storm drain pipe
- The majority of the 170 outfalls discharge to
  - Mill Brook (53 Outfalls)
  - Mystic Lake
  - Mystic River
  - Alewife Brook
  - Spy Pond

Arlington Sewer System

- Approximately 567,000 LF = 107 miles of sewer pipe
- Some parts over 100 years old
- Discharges to MWRA interceptors
- Wastewater treated at Deer Island Treatment Plant

Illicit Discharge Detection & Elimination (IDDE) Program

- EPA "308" directive received in 1998 – Clean Water Act
  - Mystic River Watershed
- Notice of Noncompliance (NON)
  - 2000, 2007 and 2009
- Administrative Consent Order
  - 2010 (Sanitary Sewer Overflow)

Illicit Discharge Detection & Elimination (IDDE) Program

- National Pollutant Discharge Elimination System (NPDES)
  - Municipal Separate Storm Sewer System (MS4)
    - IDDE - One of several control measures

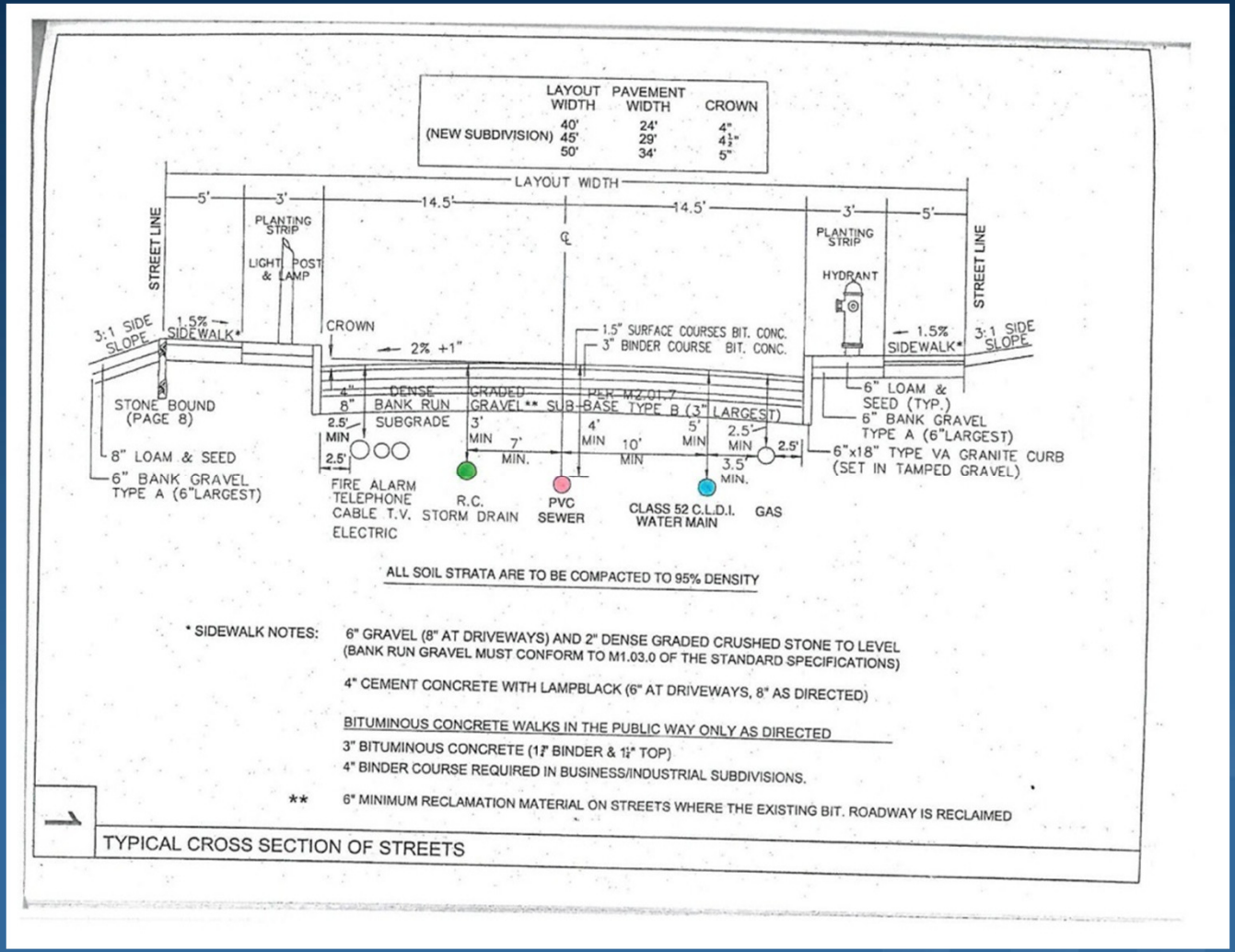
Target Contaminant

- E. coli
  - Produced by warm-blooded animals
- Primary Contact (Swimming)
  - 235 E. coli Colonies/ 100mL Sample
- Secondary Contact (Boating and Recreation)
  - 1,260 E. coli Colonies/ 100mL Sample
- Initial sampling levels at various outfalls
  - 100's – 10,000's

Illicit Connections

- Any discharge to a municipal separate storm drain that is not composed entirely of stormwater.
- Direct Connection
  - Sanitary sewer service connected to the storm drain
- Indirect Connection
  - Exfiltration from sewer – Infiltration to storm drain
    - Mainlines, service laterals and manholes

Subsurface Utility Cross Section



Sampling Field Work

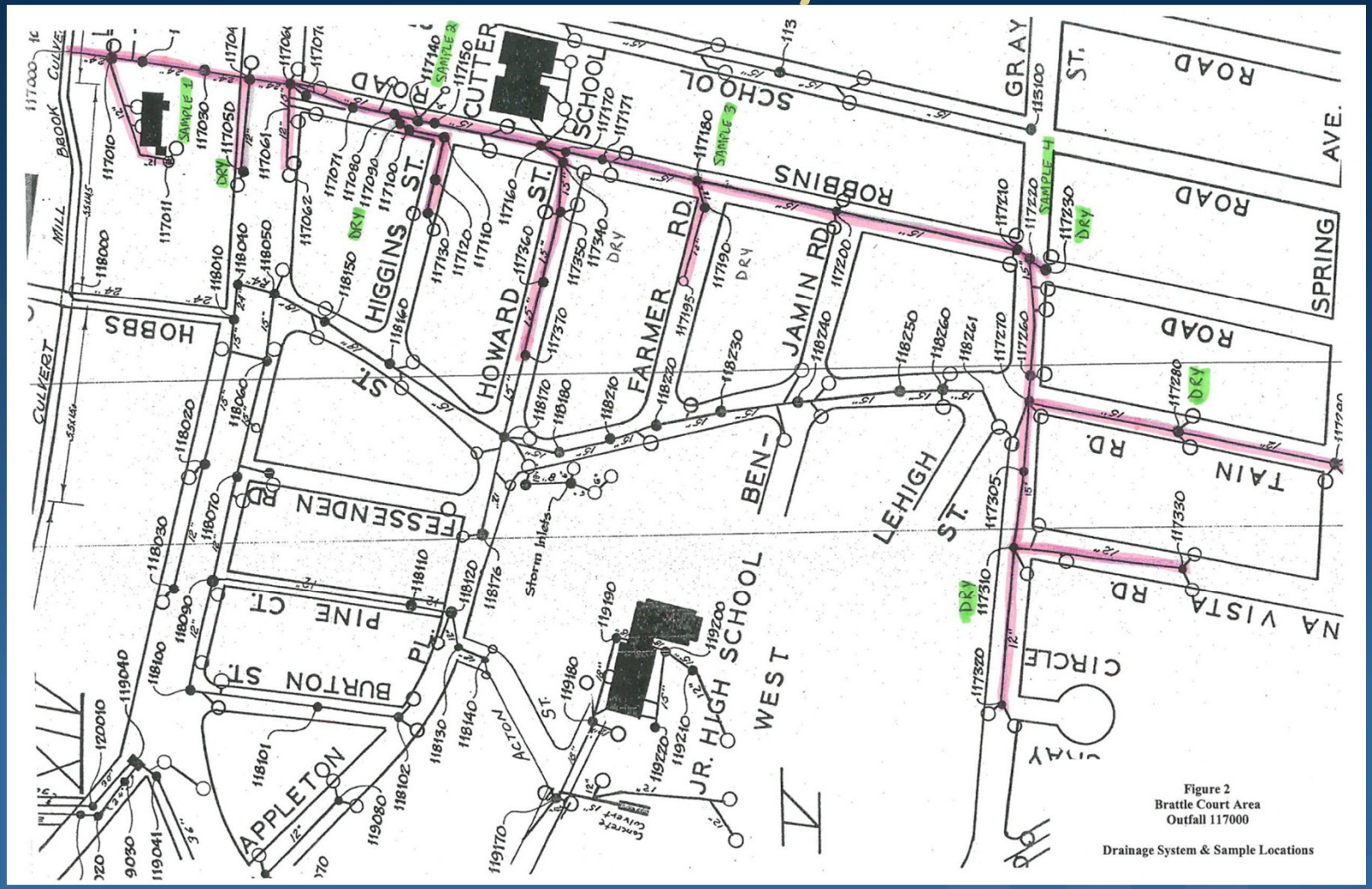
- Protocol
  - 72 hours – No rain or snow melt
  - 6 hour sampling window
  - Sterile sample jars
  - Samples analyzed by State certified laboratory

Equipment

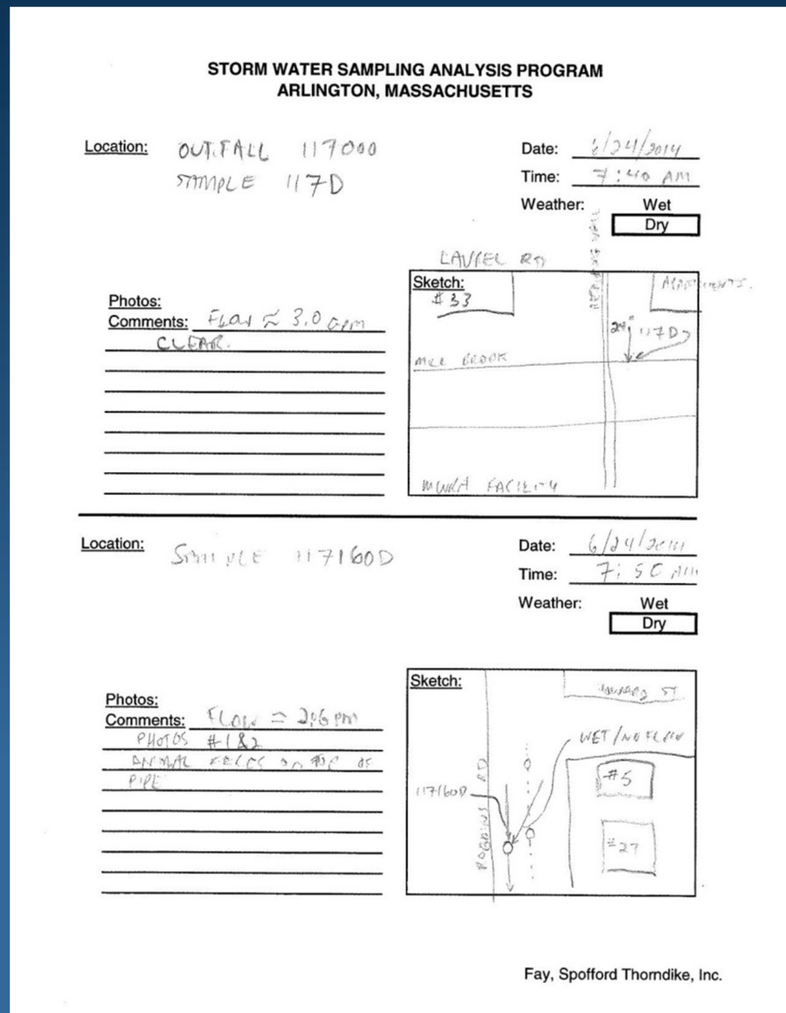
Dry Weather Stormwater Sampling

- Flow/No flow screening
  - Halfway points
  - Critical Junctions
- Identify key sample locations
- Dry vs. Moist/Minimal flow
  - Sandbag
  - Optical brighteners

Robbins Rd Tributary



Sampling Field Report



STORM WATER SAMPLING ANALYSIS PROGRAM
ARLINGTON, MASSACHUSETTS

Location: OUTFALL 117000
SAMPLE 117D

Date: 6/24/2014
Time: 7:40 AM
Weather: Wet / Dry

Sketch: #33
LAUREL RD
MILL BROOK
117D

Photos:
Comments: FLOW ≈ 3.0 GPM
CLEAR.

Location: SAMPLE 117160D

Date: 6/24/2014
Time: 7:50 AM
Weather: Wet / Dry

Sketch:
WET / NO FLOW
117160D
#5
#27

Photos:
Comments: FLOW ≈ 2 GPM
PHOTOS #1 & 2
ANIMAL FECES ON TOP OF
PIPE

Fay, Spofford Thorndike, Inc.

Sample Analysis

- Multiple rounds of sampling
  - Quarterly
- Post sample results
  - Additional sample locations can be added for second round of sampling
- Identify target areas to focus investigations
  - Upper reaches of the tributary targeted first

Investigation Method

- Closed Circuit Television (CCTV) Inspection
  - Sewer and Storm Drain

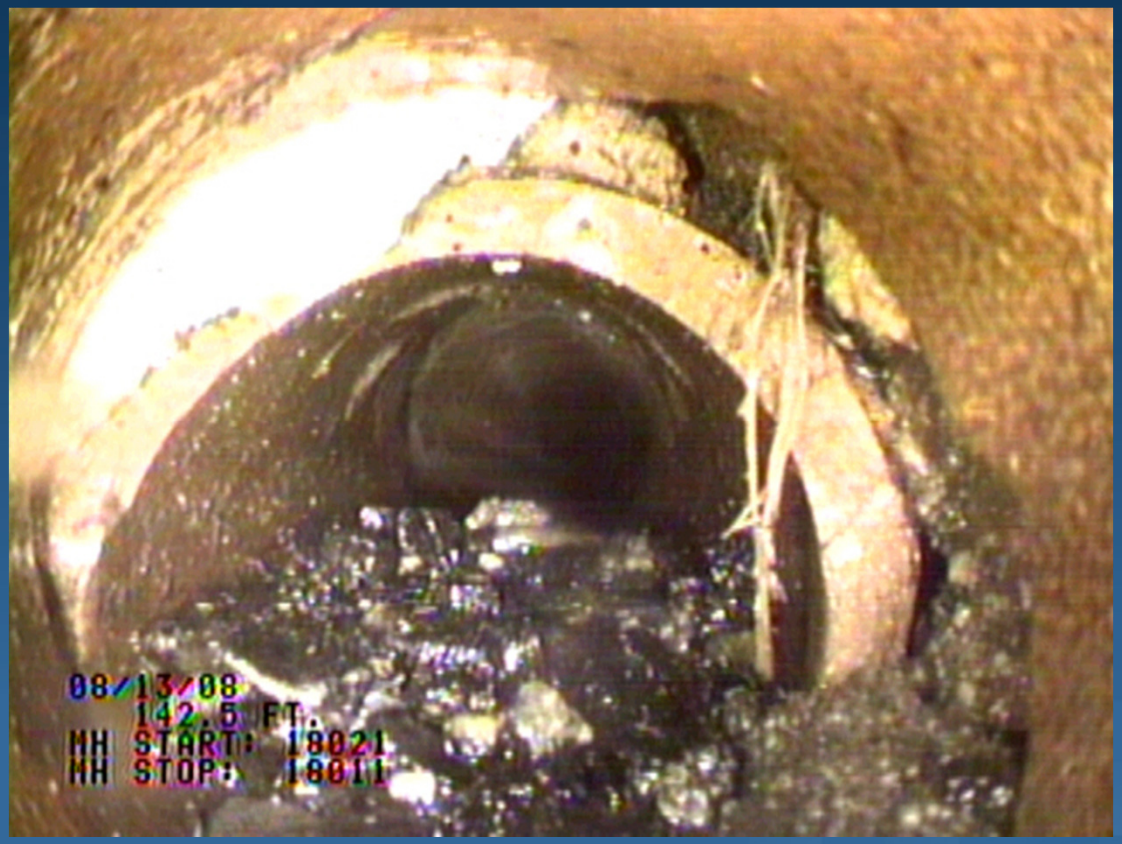
CCTV Inspection Results

- Mainline Sewers/Drains
  - Cracked/Broken Pipe
  - Root Intrusion
  - Sags
  - Separated/Offset Joints
  - Mineral Deposits
  - Active Infiltration
- Defective Services
  - Same Defects as Mainline

Mainline Structural Defects

Root Intrusion

Defective Service Laterals



Investigation Method

- Dyed Water Testing
  - Mainline sewer and sewer service laterals

Investigation Method

- Smoke Testing
  - Storm Drain

Sewer/Drain Rehabilitation Design

- Mainline
  - Cured-in-place(CIP) lining (MH to MH/point repair)
  - Replacement (manhole to manhole/point repair)
  - Testing and sealing joints
- Service Laterals
  - Replace sewer service connection
  - Lateral lining
  - Testing and sealing wye connection
- Manholes
  - Replacement
  - Lining (Cementitious or Epoxy material)

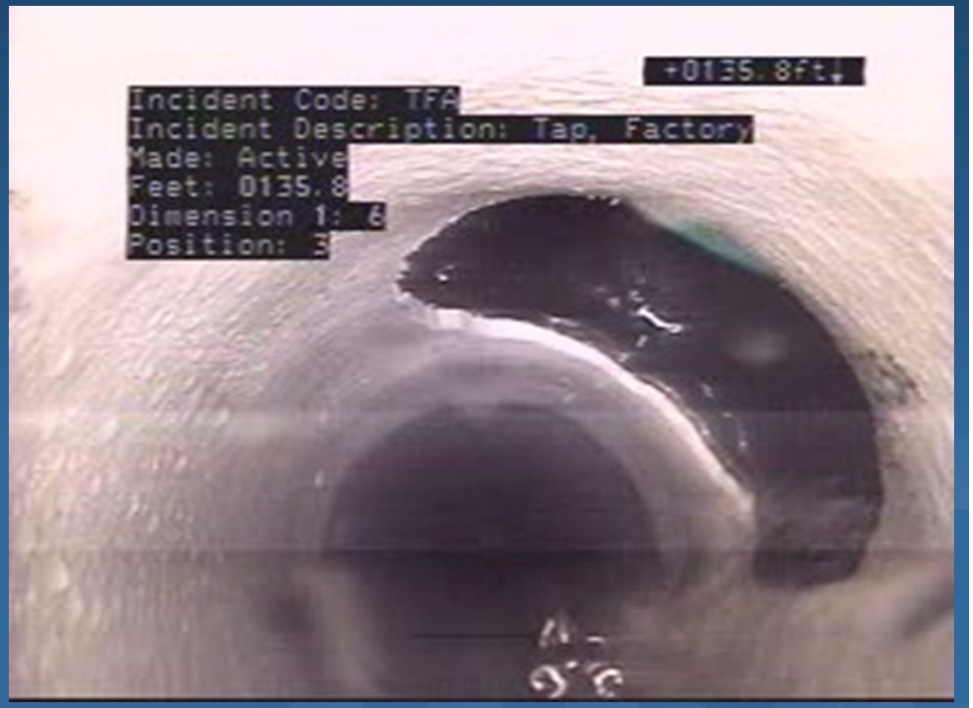
Mainline Full Length Replacement

Mainline Point Repair

Service Lateral Replacement

Mainline CIP Lining

Mainline CIP Lining



Point Repair Lining

Point Repair Lining

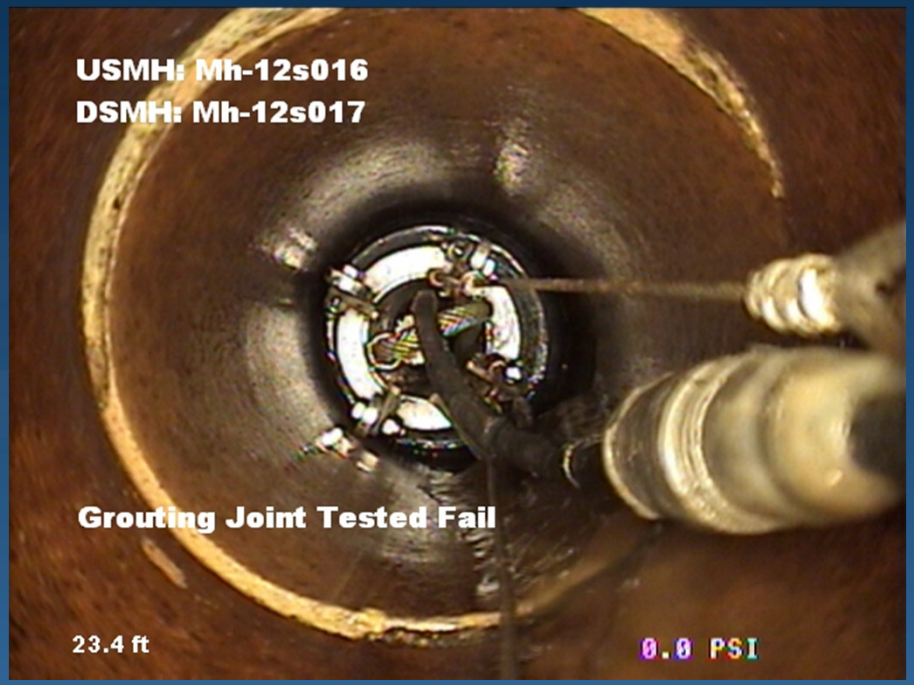
Service Lateral Lining

FAY, SPOFFORD & THORNDIKE FST 100 YEARS

Stormwater – Keeping It C lean!

Arlington, Massachusetts

Pipeline Joint Testing and Sealing



Manhole Rehabilitation

Areas Investigated & Rehabilitated

- Cross St. & Waldo Rd.
  - Alewife Brook outfall
- Hemlock St., Lansdowne Rd. & Pine St.
  - Mill Brook outfall near Grove St.
- Ridge St., Kimball St & Emerson St
  - Mill Brook outfall at Mystic Valley Parkway

Areas Rehabilitated

- Robbins Rd., Gray St. & Old Colony La.
  - Mill Brook outfall near Old Colony La.
- Forest St., Overlook Rd. & Washington St.
  - Mill Brook outfall (north side) at skating rink
- Ottoson Middle School Area
  - Mill Brook Outfall (south side) near Ryder St.

Summary of Project Costs (2000-2014)

- Sampling & Investigations (10 Outfalls)
  - $216,000
- Design (5 Projects)
  - $130,000
- Construction (5 Projects)
  - $1,004,000
- Total Cost
  - $1,350,000

Questions?