Successful Implementation of an Agreed Order

Houston, Texas
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This Presentation will...

• Exhibit Planning Process
• Introduce Methodology of Development / Implementation
• Exhibit Current Progress
• Present Benefits of the Program
• Present Recommendations / Conclusions
Houston at a Glance

- Fourth largest city in the US
- Founded in 1836
- 48 inches of rain
- Unstable soils
- Flat terrain
- 2.9 million people served
- 669 square miles

Unstable Soils = Pipe Leaks
Wastewater Infrastructure

- 40 Permitted WWTPS
  - 210 to 225 MGD Actual
  - 563 MGD Permitted

- 3 Wet Weather Facilities

- Over 380 Lift Stations

- 36.7 Mil LF Collection Lines
  - 1.75 Mil LF (5.5%) 36-inch to 144-inch

- 1.8 Mil LF Force Mains

- 124,500 Manholes
Planning Process

• Analyzed SSO from 2001 to 2003:
  ➢ 98% in dry weather
  ➢ 97% occurred in small diameter sewers (<24-inch)
  ➢ Temporary blockage, grease build up and structural failure

• Optimal Solution:
  ➢ Clean and renew 6-inch to 24-inch sewers

• Creation of SSO Severity Levels (Tiers)
  ➢ First Tier: Basins w/ more than 1 RSSO during the 3-yr period
  ➢ Second Tier: Basins w/ >1 SSO/yr during the 3-yr period
  ➢ Third Tier: Basins w/ <1 SSO/yr during the 3-yr period
  ➢ Fourth Tier: Basin w/ 0 SSO/yr during the 3-yr period
Planning Process continued

478 basins selected for Scheduled Pipe Renewal
Total Estimated Rehabilitation: 6,731,000 feet

First Tier: 140
Second Tier: 338
Third Tier: 474
Fourth Tier: 512

Total 1,464

Since then have grown to 1,562 basins
Planning Process

• City Goal Renewal Rate
  ➢ 600,000 LF / FY = 1.6%

• City Goal Cleaning Rate
  ➢ 3.5 Mil LF/FY = 9.5%

• Current Budget
  ➢ $65.0 to $80.0 Mil / FY

• Optimal Solution
  ➢ Clean and renew 6-inch to 24-inch sewers
Our Current Plan

• May 2004 - City submitted Wastewater Collection System Overflow Plan and Schedule (Plan)

• July 1, 2004 thru June 30, 2005 – City began voluntary implementation of proposed Plan in good faith

• April 2005 - City and TCEQ executed voluntary Compliance Agreement

• November 2005 - Agreed Order executed for 11 service areas
Agreed Order Implementation

- Hired mostly new staff
- Developed SOP and trained staff
- In-house staff
  - Planning, analysis & engineering
  - Contract preparation, bidding & RCA documents
  - Work orders

CITY OF HOUSTON

PROCEDURE MANUAL FOR SEWER MAINTENANCE AND REHABILITATION CONTRACTS

April 2007
Agreed Order Implementation continued

• Large work orders – approximately 25,000 LF
• Work order grouped by geographic area
• Constructability team investigates the feasibility of method of renewal
• Construction Management Group monitors progress, quality and contract compliance
Methods of Rehabilitation

• Sliplining – Average Cost: $15/LF (services)
  ➢ Pulling or pushing liner into existing sewers by use of mechanical or hydraulic equipment
  ➢ Manhole inverts / benches are reworked / reshaped
  ➢ Existing sewers remain in operation during process

• Pipe Bursting – Average Cost: $50/LF (6-inch to 18-inch)
  ➢ Installing new pipe material w/i enlarged bore
  ➢ Replacement pipe is either pulled or pushed into the bore
Methods of Rehabilitation continued

• Cured-in-Place – Average Cost: $95/LF (8-inch to 48-inch) $350/LF (30-inch to 72-inch)
  - Resin-impregnated flexible tubes inserted into existing sewers
  - Cures into hard, impermeable, corrosion resistant liner

• Manhole Rehab – Average Cost: $90/VF
  - Seal active leaks in structure with cement powder/hydraulic cement
  - Repair wide cracks, holes and disintegrated mortar
  - Reshape manhole inverts
  - Apply sealing compound
Methods of Rehabilitation

• Cleaning/Televising – Average Cost: $2/LF
  ➢ Cleaning – use of mechanical, hydraulic-propelled or high-velocity equipment
  ➢ Remove grease, soil, sand, solids, roots, etc.
  ➢ Televising – Video inspection of existing sanitary sewers to evaluate lines
Benefits of Approach

- Flexible contracts
- Proactive approach
- Address entire area
- Minimize change orders
- Fast paced
- Special situations – grouped together under special contracts
Agreed Order Accomplishments

Renewed 7.34 million linear feet from FY 2005 to FY 2012
Agreed Order Accomplishments continued

Cleaned 29.0 Mil LF from FY 2005 to FY 2012
Houston Leads the Nation

Data Source provided by University of Texas Arlington - Report Survey 7/29/2007

*Data Source provided by the City of New York

**Data Source provided by the City of Chicago
Agreed Order Effectiveness

[Agreed Order Effectiveness graph showing the number of SSOs per month from FY05 to FY12. The graph includes monthly averages and highlights the impact of Hurricane Ike.]
Private vs Public SSOs

WASTEWATER COLLECTION SYSTEM SSOs - FY 12

- Public SSOs
- Private SSOs
- Total SSOs

SSOs

Month

JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN

Public SSOs
Private SSOs
Total SSOs

SSO’s 82
Public 46
Private 36
Wastewater Operations Benchmarking Compared to AWWA 2005 Survey

Sewer Overflow Rate
(Median Range, 25th–75th Percentile)

- **West**, **South**, **Midwest**, **Northeast**
- **>500,000**, **100,001–500,000**, **50,001–100,000**, **10,000–50,000**, **<10,000**
- **Combined Wastewater**
- **Water**
- **All Participants**

FY 05 – Sewer Overflow Rate per 100 mile = 30.57
FY 06 – Sewer Overflow Rate per 100 mile = 21.24
FY 07 – Sewer Overflow Rate per 100 mile = 16.64
FY 08 – Sewer Overflow Rate per 100 mile = 12.64
FY 09 – Sewer Overflow Rate per 100 mile = 15.16
FY 10 – Sewer Overflow Rate per 100 mile = 15.87
FY 11 – Sewer Overflow Rate per 100 mile = 19.20
FY 12 – Sewer Overflow Rate per 100 mile = 13.89
15 years of progress in solving customer and environmental needs.
Fats, Oil and Grease (FOG)

- **Corral the Grease** public education program
  - Distributed Fat Trapper Kits / Pamphlets
  - Presentations to HAA, HOA and Schools

- City Council approved revision to Chapter 47 “Grease Ordinance” on May 2, 2007

- **Interceptor Enforcement**
  - 12,295 Inspected
  - 7,697 Issued Violation Notices
  - 286 Issued Citations
Program Benefits

- Flow Reduction – 10% or 20 MGD @ $1,350 / MGD
  - $9.85 Mil/yr
- Stoppage Reduction = 5,000 / yr
- SSO Reduction = 250*12 = 3,000 / yr
Questions?