

Regular Workshop – April 20, 2015  
Agenda Item 10

Agenda Item: Inflow and Infiltration (I&I) Study Results

Presenter: Town Manager & Staff

Summary: The Town Commission requested a staff update on the recent Inflow & Infiltration Study (I&I) as well as an update wastewater gravity rehabilitation efforts. The Assistant Town Manager and Ms. Laura Baumberger with Carollo Engineers will present an update on the Town's I&I study, project status, and future plans.

Attachments: 4-13-15 Memo, Assistant Town Manager to Manager;  
Carollo Engineers' PowerPoint Presentation.

Recommended  
Action: None, informational only.

## M E M O R A N D U M

Date: April 13, 2015

**TO:** Dave Bullock, Town Manager  
**FROM:** Anne Ross, Assistant Town Manager  
**SUBJECT:** Inflow and Infiltration (I&I) Study Results

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The Town Commission requested a staff update on the recent Inflow & Infiltration Study (I&I) as well as an update on wastewater gravity rehabilitation efforts.

Ms. Laura Baumberger with Carollo Engineers will present an update on the Town's I&I study, project status, and future plans.

Attached is a PowerPoint presentation that will be used as part of the April 20, 2015 Regular Workshop Meeting presentation.

Please don't hesitate to contact me if you have any questions.

Informational only, no action required.

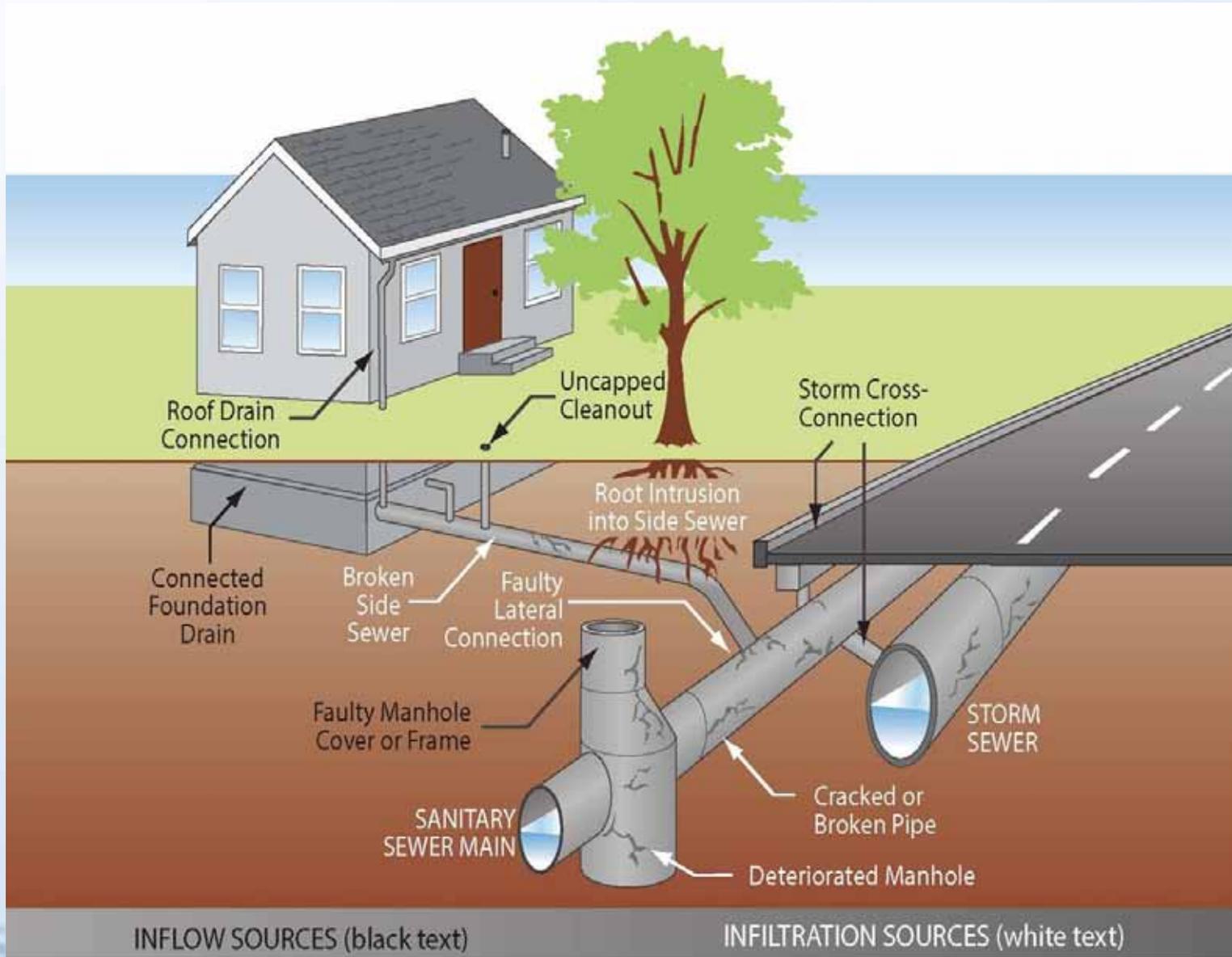
# Inflow & Infiltration Study and Rehabilitation Pilot Study



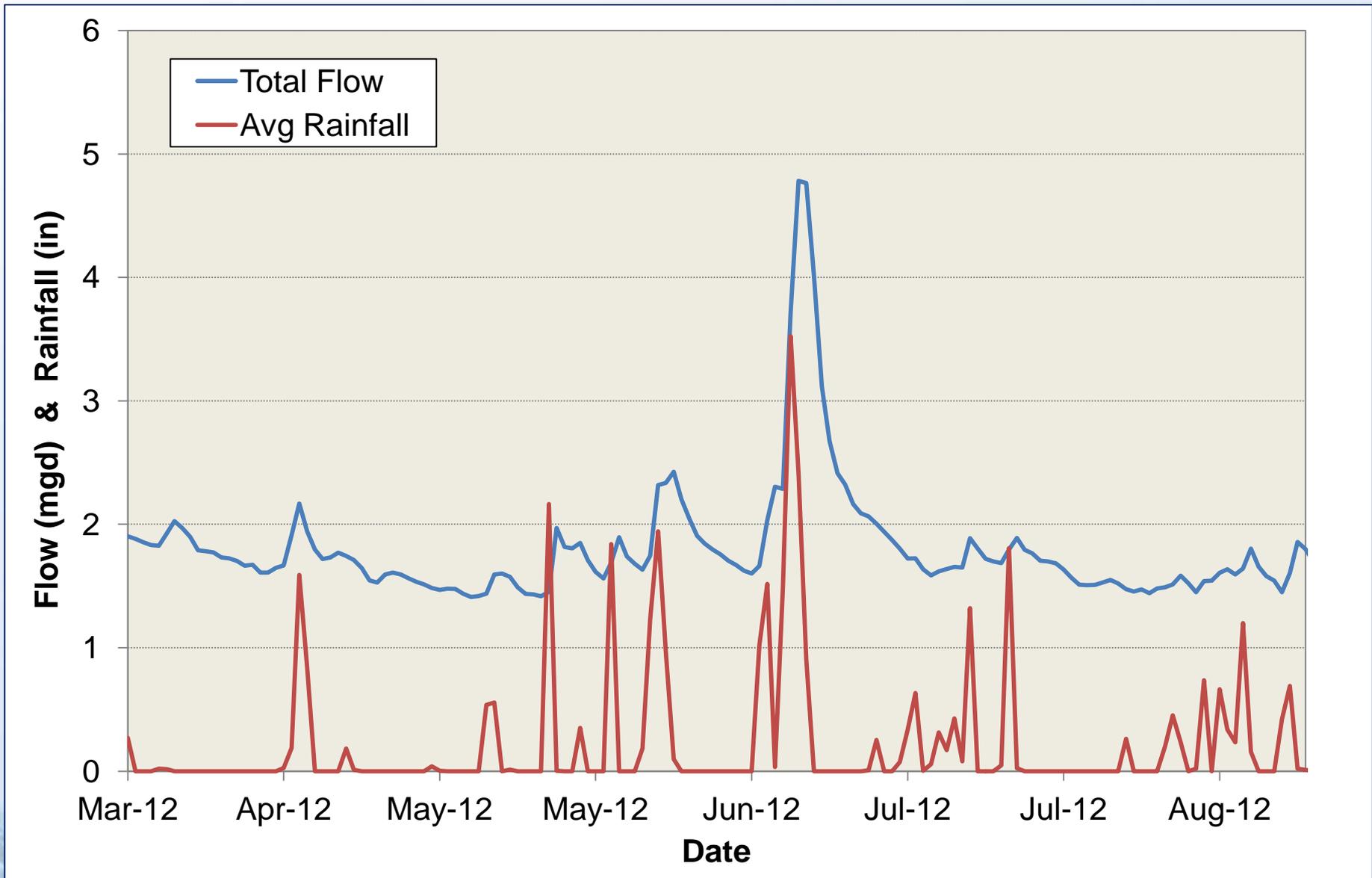
Town Commission Regular Workshop

April 20, 2015

# What is Infiltration and Inflow (I&I)?



# Inflow occurs during rainfall events



# Typical Extreme Flow Peaking Factors

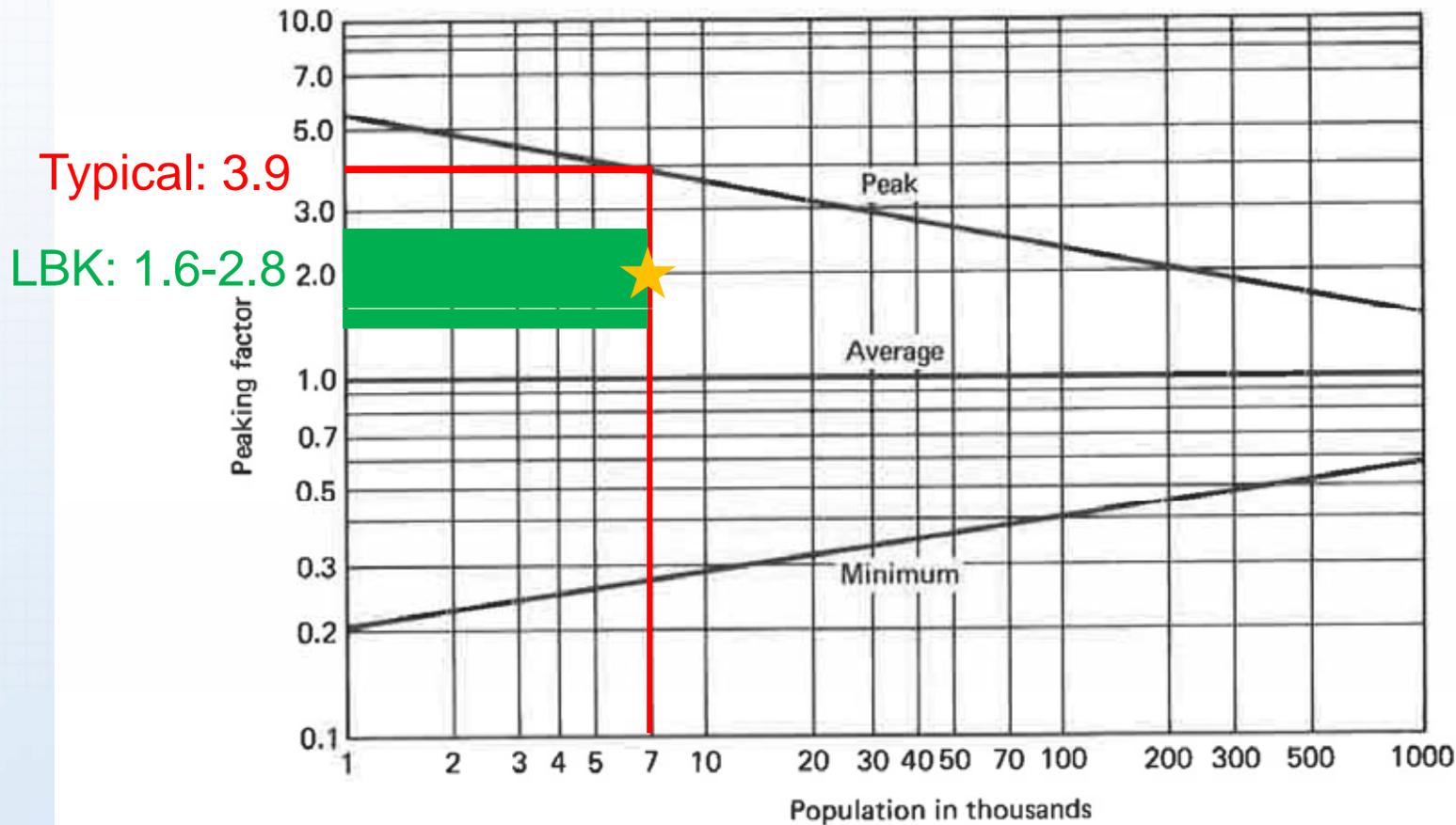
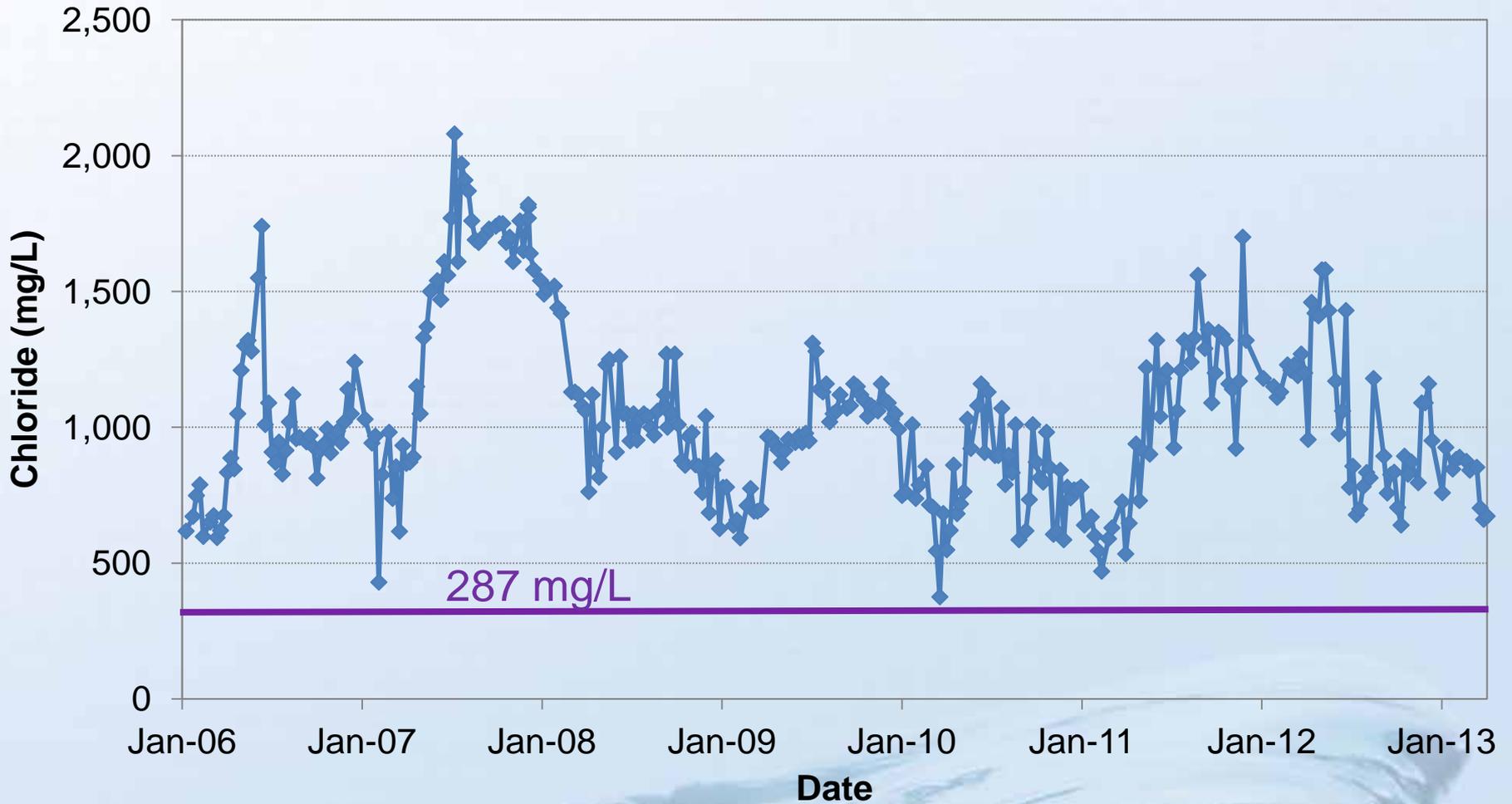


Figure 3-2 Ratios of Extreme Flows to Average Daily Flow (Peaking Factor) for Municipal Wastewater Under Dry Weather Conditions (from Ref. 16; used with permission of Water Environment Federation, and American Society of Civil Engineers).

# Why is I&I a Problem for Longboat Key?

1. Treatment fees are paid to Manatee County to treat this excess water
2. Manatee County Sewer Use Ordinance requires chloride concentration of less than 287 mg/L

# Historical Wastewater Chloride Concentration



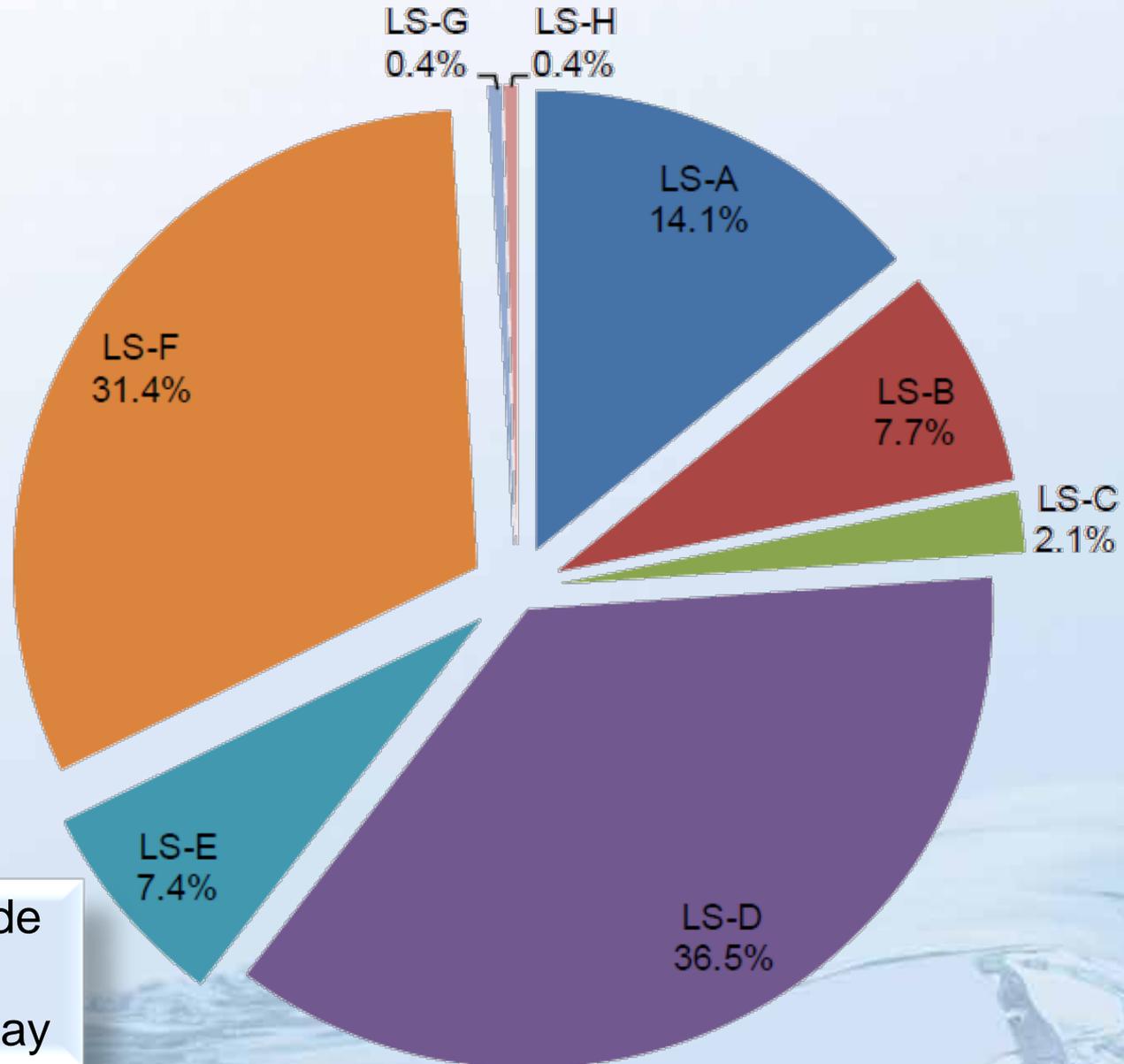
# Town's Historical Rehabilitation Projects

Year	Lined Pipe (LF)	Laterals (No.)	Manholes (No.)	Project Cost (\$)
2002	9,120	96	18	\$682,706
2003	5,485	108	16	\$683,019
2005	928	16	2	\$70,472
2006	5,668	116	15	\$656,475
2007	5,010	68	18	\$357,448
2008	6,668	101	21	\$570,726
2009	15,622	221	51	\$1,166,998
2011	4,976	73	96	\$456,911
<b>TOTAL</b>	<b>53,477</b>	<b>799</b>	<b>237</b>	<b>\$4,644,755</b>

# Collection System I&I Study

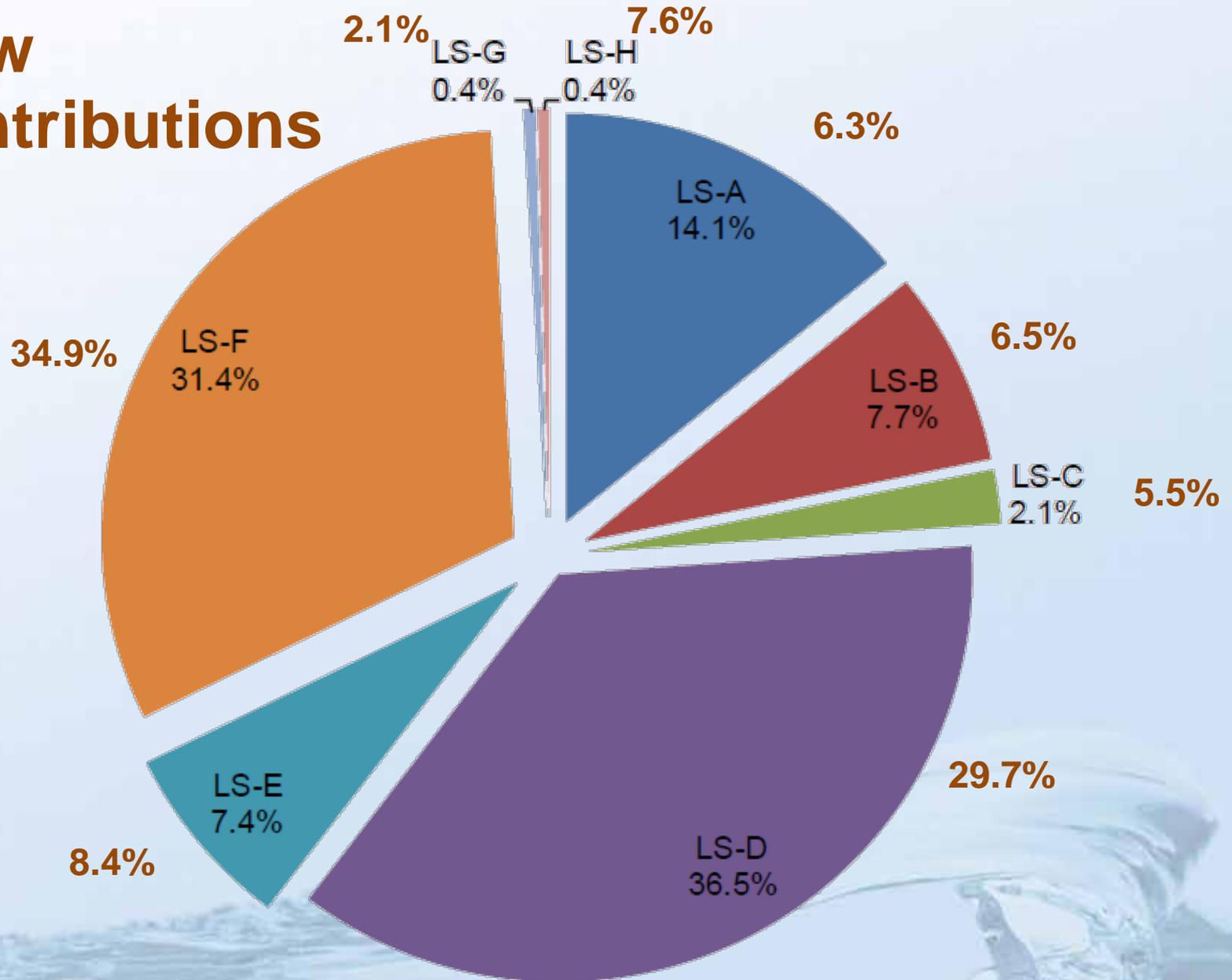
- I&I Study completed in 2012-2013
- Systematic approach to evaluating chloride concentrations and flow data to pinpoint areas with highest amount of I&I
  - Chloride “mapping”
  - Wastewater flow volumes during dry and wet periods
- Prioritized recommendations for sewer pipe rehabilitation and repairs
- Procurement of rehabilitation contractors in Fall 2013
  - Newer technologies

# Sewer Basin Chloride Contributions

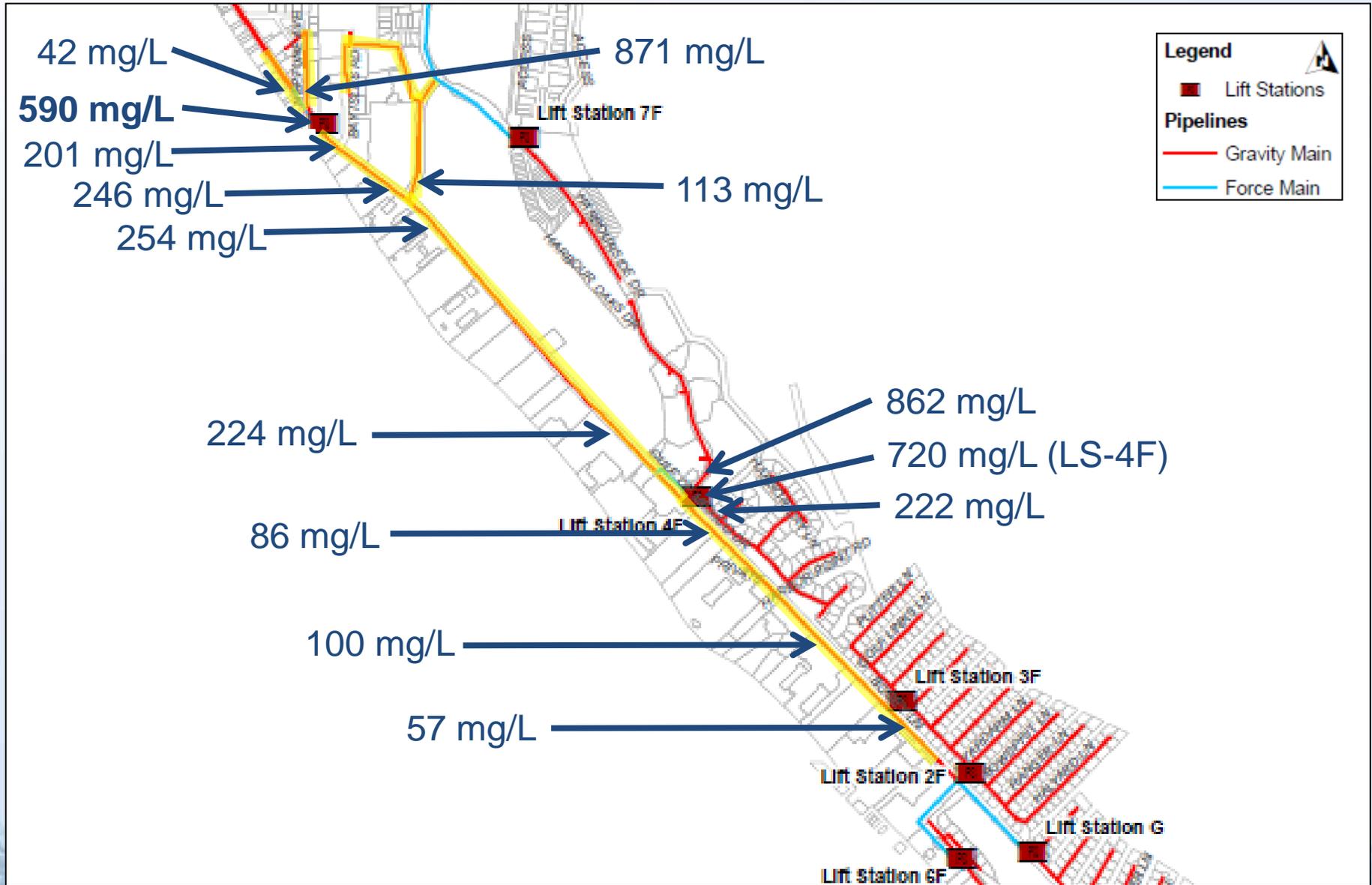


Total Chloride  
Mass =  
15,610 lbs/day

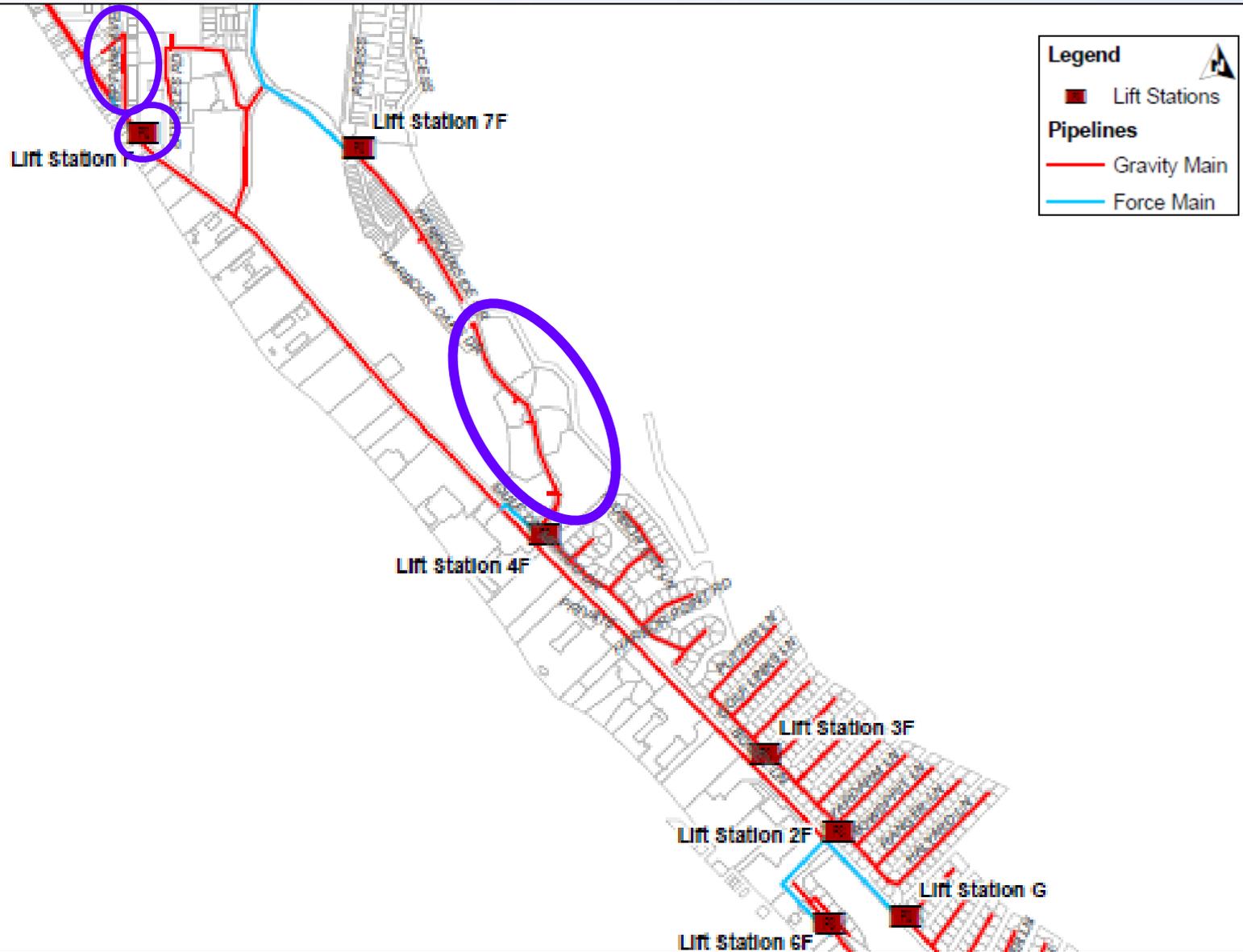
# Sewer Basin Chloride Contributions and Flow Contributions



# Lift Station F Chloride Concentration Map

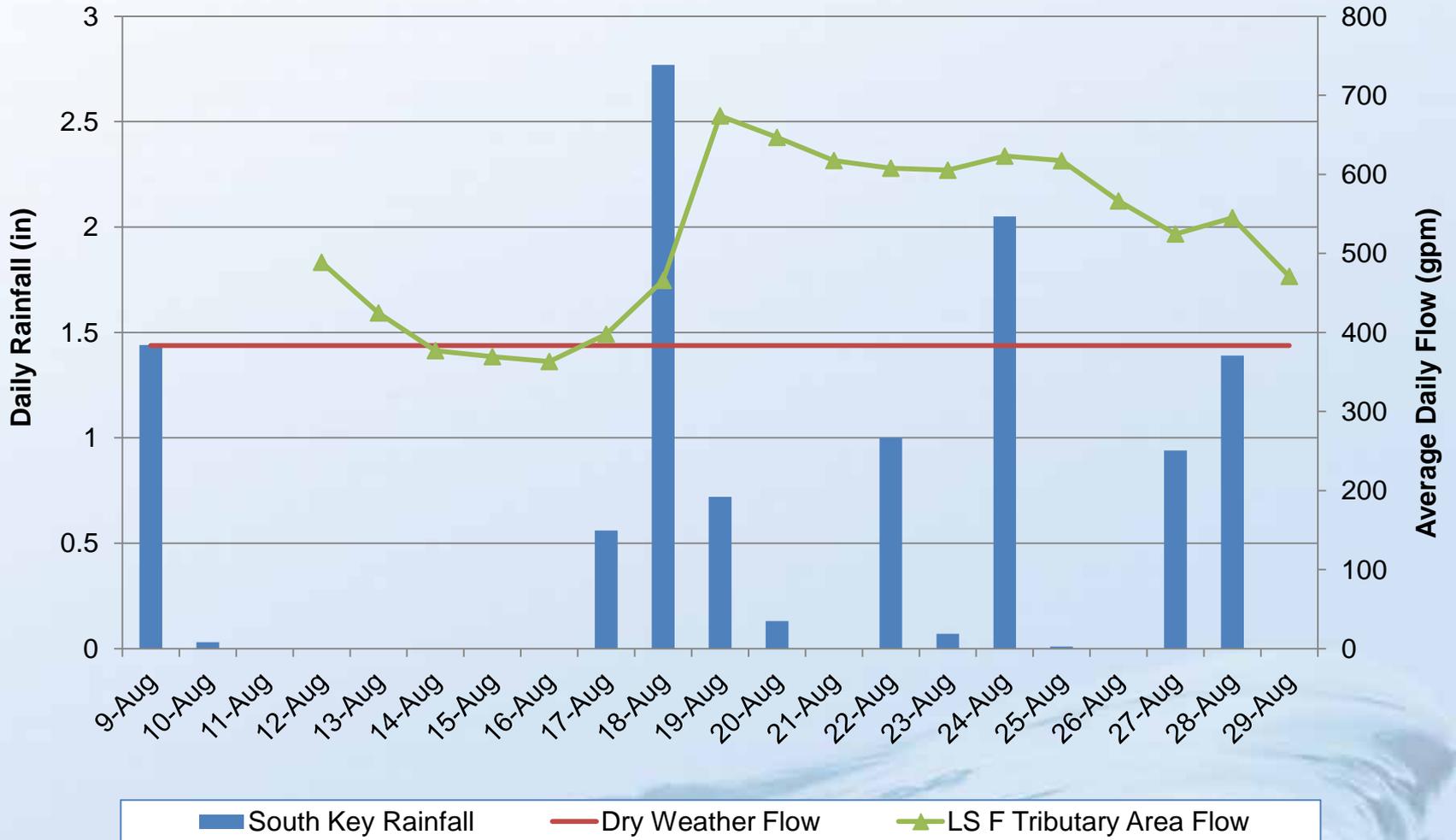


# Lift Station F – High Infiltration Areas



# Daily Rainfall and Lift Station F Flow 2013

Lift Station F Tributary Area Hydrograph  
(Using flow measured at MH E-10)



# I&I Corrective Action Plan

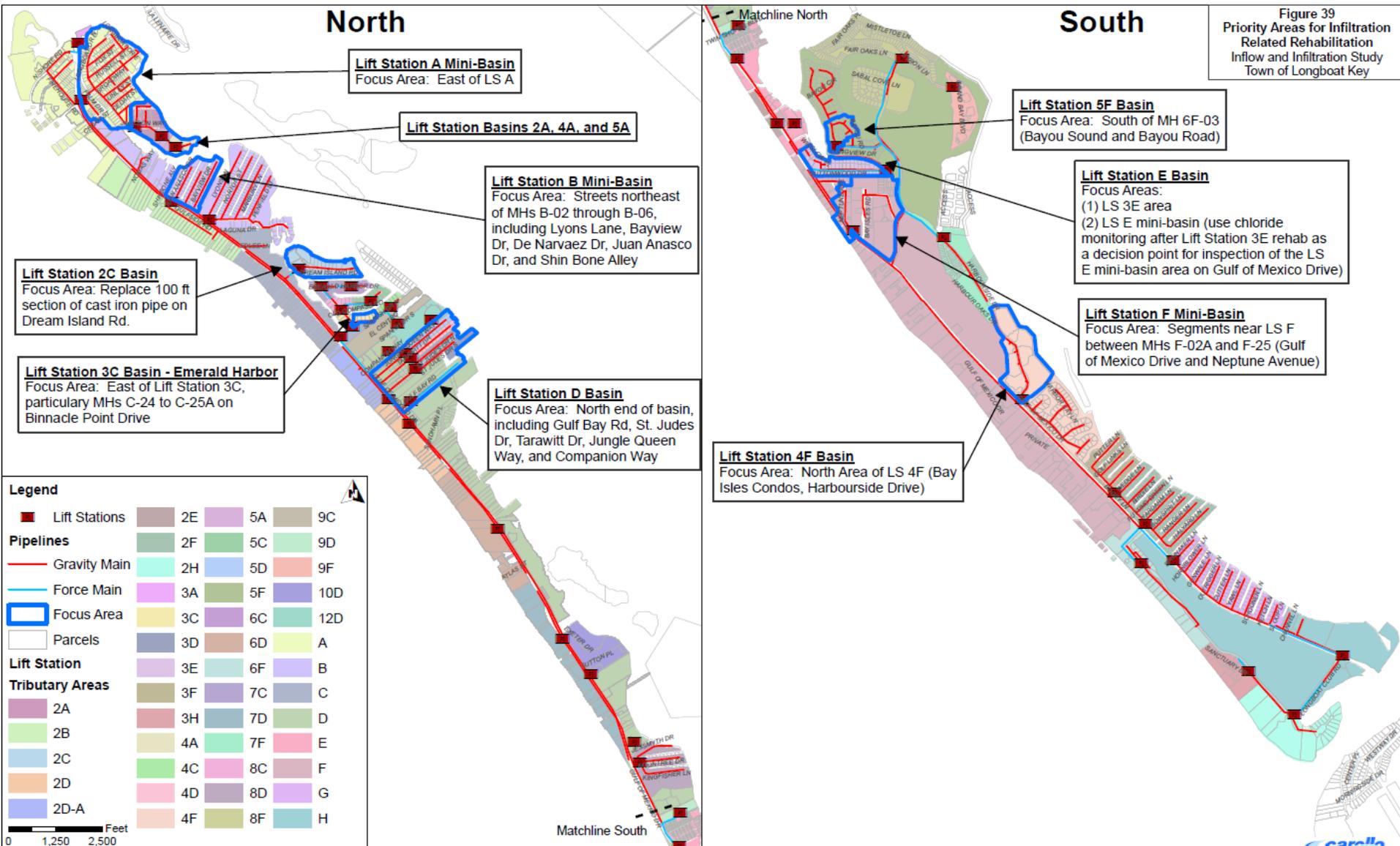
- Annual Budget:
  - Slipline Gravity Sewer and Services: \$600K
  - Wetwell and Manhole Repair: \$75K
- Basin rehabilitation prioritized based on infiltration (chloride mass) and inflow.
- Focus areas for infiltration repairs selected using chloride mapping

# I&I Study Report Identifies Target Areas for Chloride Reduction



# Priority Areas for Infiltration Related Rehabilitation

Figure 39  
Priority Areas for Infiltration  
Related Rehabilitation  
Inflow and Infiltration Study  
Town of Longboat Key



# I&I Corrective Action Plan

Priority	Basin	Scope for Infiltration Repairs	Scope for Inflow Repairs	Estimated Cost	Schedule
1	LS F Mini-Basin	Between MH F-02A and F-25 (Gulf of Mexico Drive and Neptune Ave)	All of LS F Mini-Basin	\$613,000	Year 1
2	LS D Basin	Gulf Bay Rd, St. Judes Dr, Tarawitt Dr, Jungle Queen Way, and Companion Way	LS D Mini-Basin, LS 2D and 2D-A, LS 6D, LS 7D	\$1,867,000	Year 1 - 4
3	LS A Mini-Basin	Area east of LS A	NA	\$1,402,000	Year 4 - 6
4	LS 2C Basin	Entire LS 2C basin	NA	\$247,000	Year 6-7

# I&I Corrective Action Plan

Priority	Basin	Scope for Infiltration Repairs	Scope for Inflow Repairs	Estimated Cost	Schedule
5	LS 4F Basin	North area of LS 4F (Bay Isles Condos, Harbourside Drive)	NA	\$807,000	Year 7 - 8
6	LS E Basin	Winslow Place	LS E Mini-Basin	\$573,000	Year 8 - 9
7	LS B Mini-Basin	Lyons Lane, Bayview Dr, De Narvaez Dr, Juan Anasco Dr, and Shin Bone Alley	All of Lift Station B Mini-Basin	\$781,000	Year 9 - 10
8	LS 2A, 4A, and 5A Basins	Inspection and lateral reconstruction of basin areas	NA	\$285,000	Year 10

# I&I Corrective Action Plan

Priority	Basin	Scope for Infiltration Repairs	Scope for Inflow Repairs	Estimated Cost	Schedule
9	LS 3C Basin	LS 3C basin area, Binnacle Point Drive	All of Emerald Harbor (LS 3C Basin)	\$372,000	*Note
10	LS 5F Basin	Area south of Manhole 6F-03 (Bayou Sound and Bayou Road)	NA	\$550,000	
11	LS C Mini-Basin	NA	All of LS C Mini-Basin	\$83,000	
12	LS 10D Basin	NA	Work with private owners to reduce inflow in this area.	\$55,000	

**\*Note:** If actual project costs are less than estimated or available budget increases, accelerate the plan to include additional priority areas as budget allows.

# Three-Step Rehabilitation Process



- Options for rehabilitation are dependent on the condition of the asset and economics of repair
- Each prioritized area will be inspected to determine the appropriate corrective action measures

# Summary of Total Estimated Cost for Rehabilitation over 10 Years

## Infiltration

- Cleaning
- Inspection
- CIPP lining of mainlines
- Lateral reconstruction/lining
- Manhole lining
- Contingency
- Engineering/Admin

**\$5.90 Million**

## Inflow

- Smoke testing
- Lateral reconstruction/lining (10%)
- Manhole inspection
- Chimney seals
- Inflow dishes
- Contingency
- Engineering/Admin

**\$0.74 Million**

# Pilot Study

# I&I Pilot Study

- Selected two of the areas prioritized for rehabilitation
- Conducted cleaning and testing to determine necessary repairs/rehabilitation
  - Fog testing
  - Pipeline cleaning and video inspection (mainlines and laterals to homes)
  - Manhole inspections
- Perform rehabilitation
- Measure improvements (decrease) in chloride concentration and flow
- Adjust I&I Study recommendations if needed based on results of Pilot Study

# Pilot Test Area – Broadway Street

**Figure 1**  
**Lift Station A**  
Wastewater Collection System  
Inflow and Infiltration Study  
Town of Longboat Key



# Pilot Test Area – Jungle Queen Way

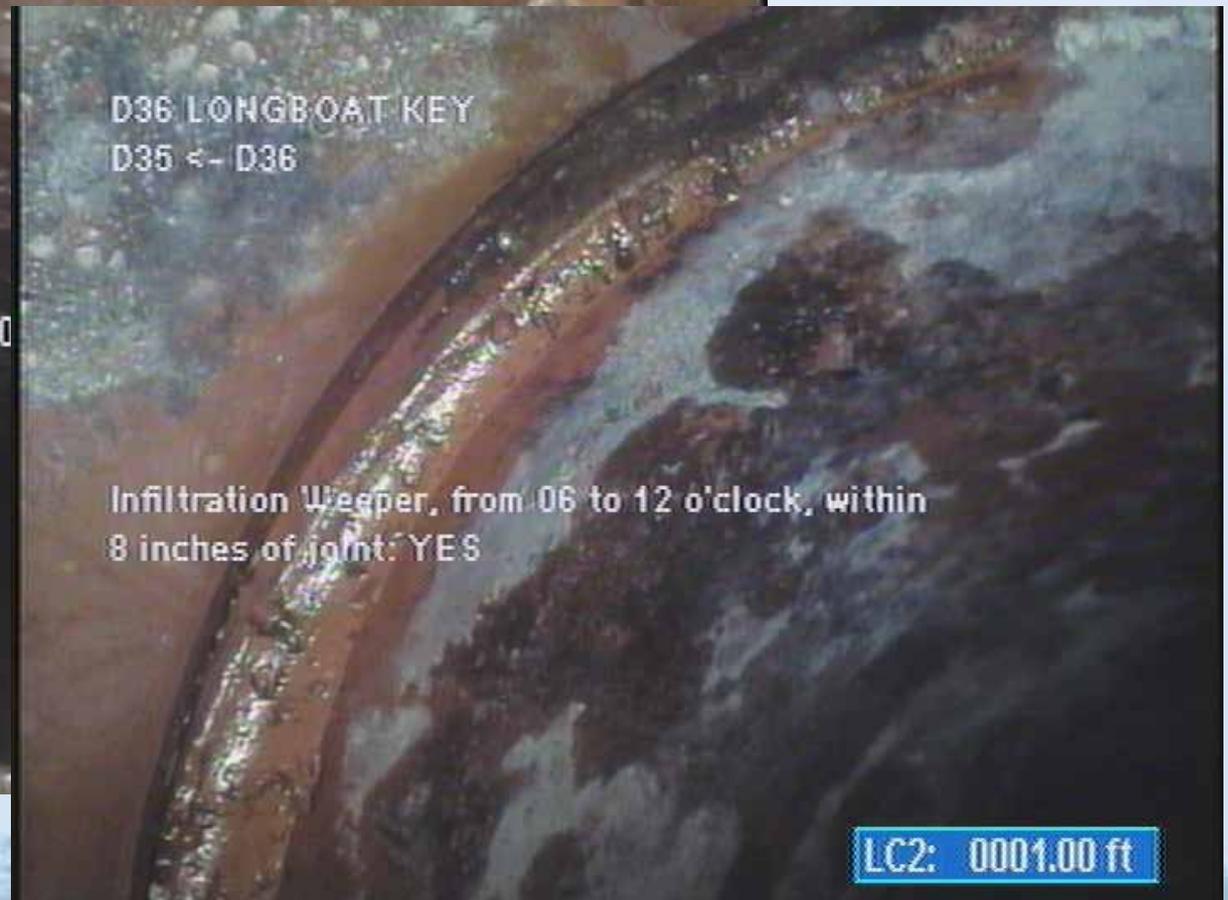


# Flow Meters Installed for Lift Stations A & F



*Flow monitoring equipment for LS-F (Manhole E-10).*

# Pilot Study Inspection Results



# Pilot Study Results on Jungle Queen Way – Laterals to Homes

Address	Material	Length (ft)	Remarks/Recommendations
708 JQW	VCP	11	Good condition
687/705 JQW	VCP	6	Good condition
690 JQW	VCP	10	Recommend CIPP lining (crack)
798 JQW	VCP	12	Good condition
780 JQW	VCP	12	Good condition
777 JQW	VCP	9	Recommend CIPP lining (infiltration)
762 JQW	VCP	13	Recommend CIPP lining (infiltration)
765 JQW	VCP	8	Good condition
744 JQW	VCP	12	Recommend CIPP lining (infiltration)
741 JQW	VCP	11	Recommend CIPP lining (infiltration)
726 JQW	VCP	12	Recommend CIPP lining (infiltration)

# Next Steps

- Cleaning / Inspections – 1<sup>st</sup> Quarter 2015
- Rehabilitation / Repairs – 2<sup>nd</sup> – 3<sup>rd</sup> Quarter 2015
- Pilot Study Report – 3<sup>rd</sup> Quarter 2015
- Modify I&I Study as needed and move forward with sewer rehabilitation – 4<sup>th</sup> Quarter 2015
- On-going monitoring of flow and chloride



**End of Agenda Item**