North Sandwich Sanitary Sewer System Flow Monitoring & Stormwater Conveyance Analysis Studies

City of Sandwich Flood Reduction Program

Presented By:

Jeffrey W. Freeman, P.E., CFM, LEED AP
Timothy N. Paulson, P.E., CFM
Engineering Enterprises, Inc.

Stakeholder Outreach Meeting
City of Sandwich, IL

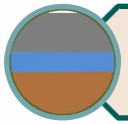
July 16, 2018

52 Wheeler Road, Sugar Grove, IL 60554 ~ (630) 466-6700 tel ~ (630) 466-6701 fax ~ www.eeiweb.com

Presentation Overview

Acronym Soup

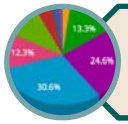
Sewer System Operation



Infiltration & Inflow (I/I) Overview

Project Approach

Resident Survey Review



Survey Results to Date

Q&A

Acronym Soup

DAF = Design Average Flow

DMF = Design Maximum Flow

gpm = Gallons Per Minute

MGD = Million Gallons Per Day

NPDES = National Pollutant Discharge Elimination System

O,M&R = Operation, Maintenance & Rehabilitation

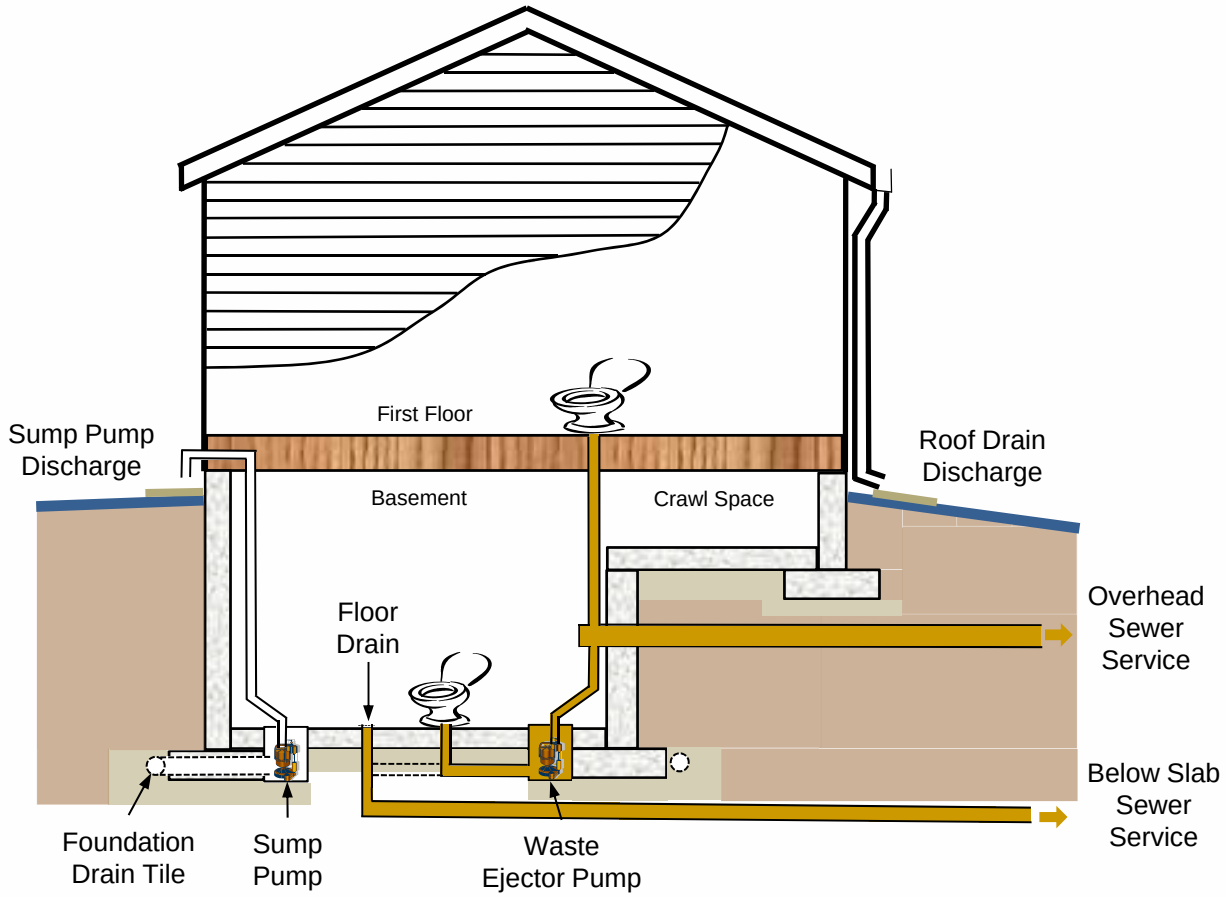
SSO = Sanitary Sewer Overflow

SSS = Sanitary Sewer System

WWTF = Wastewater Treatment Facility

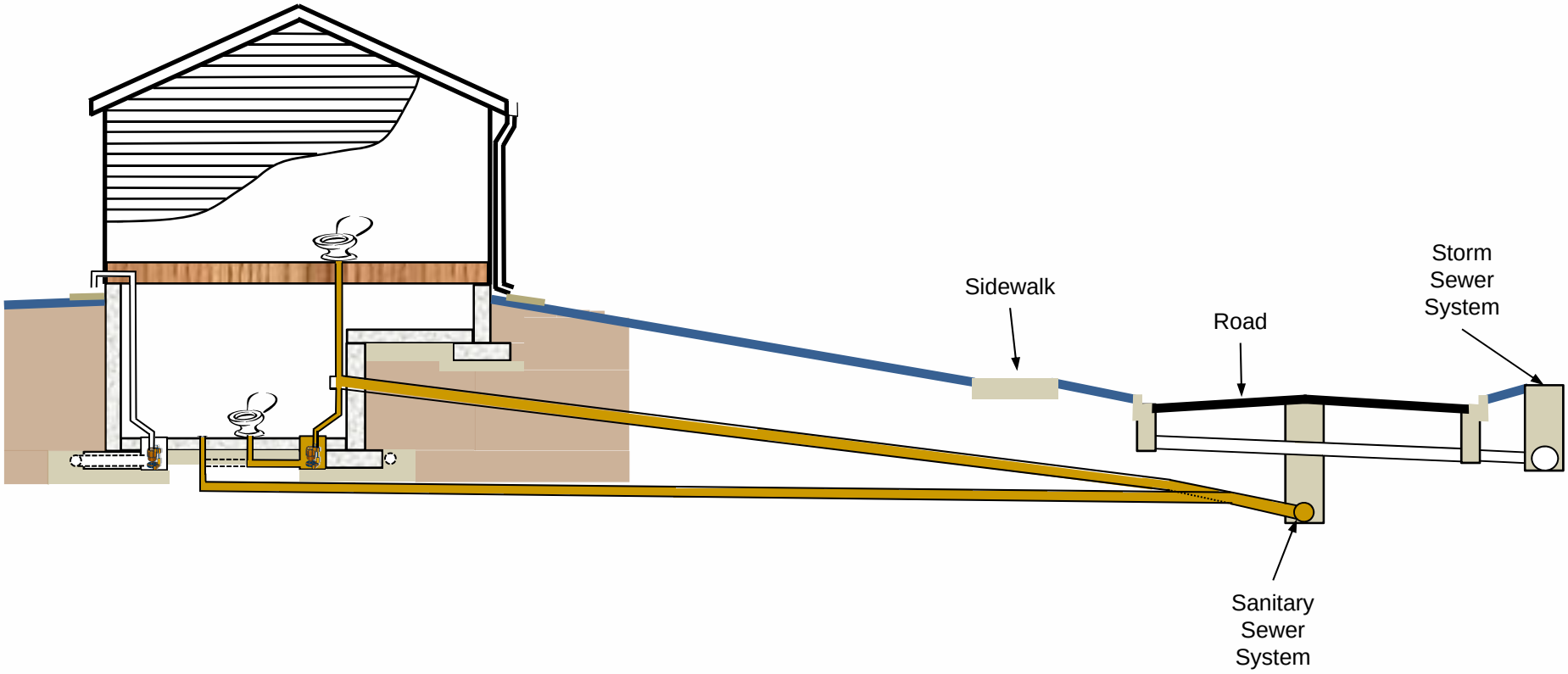
Sewer System Operation

Typical House Plumbing Overview



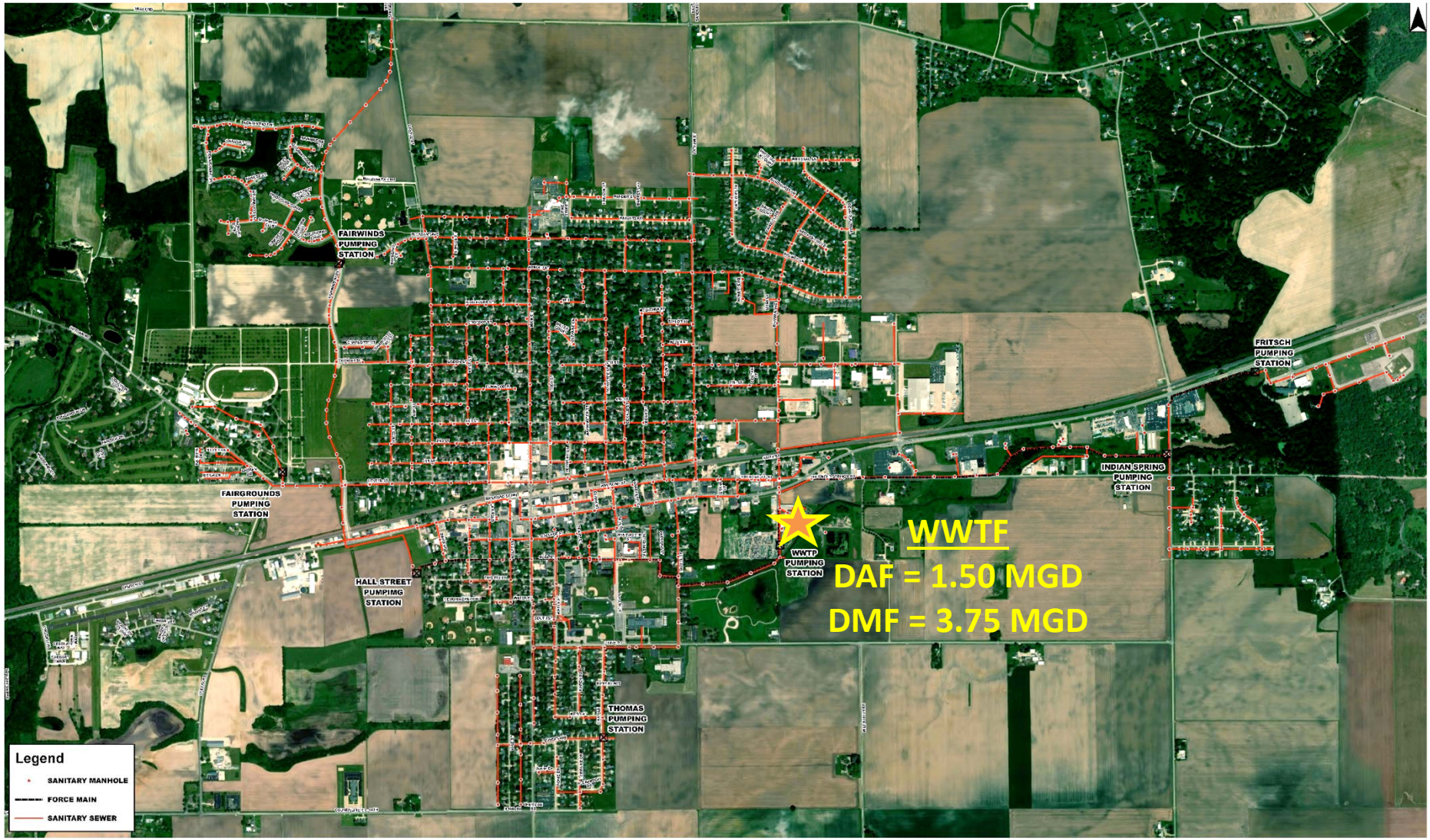
Sewer System Operation

Home Drainage & City Sanitary and Storm Sewer Systems Cross Section



Sewer System Operation

City of Sandwich Sanitary Sewer Network



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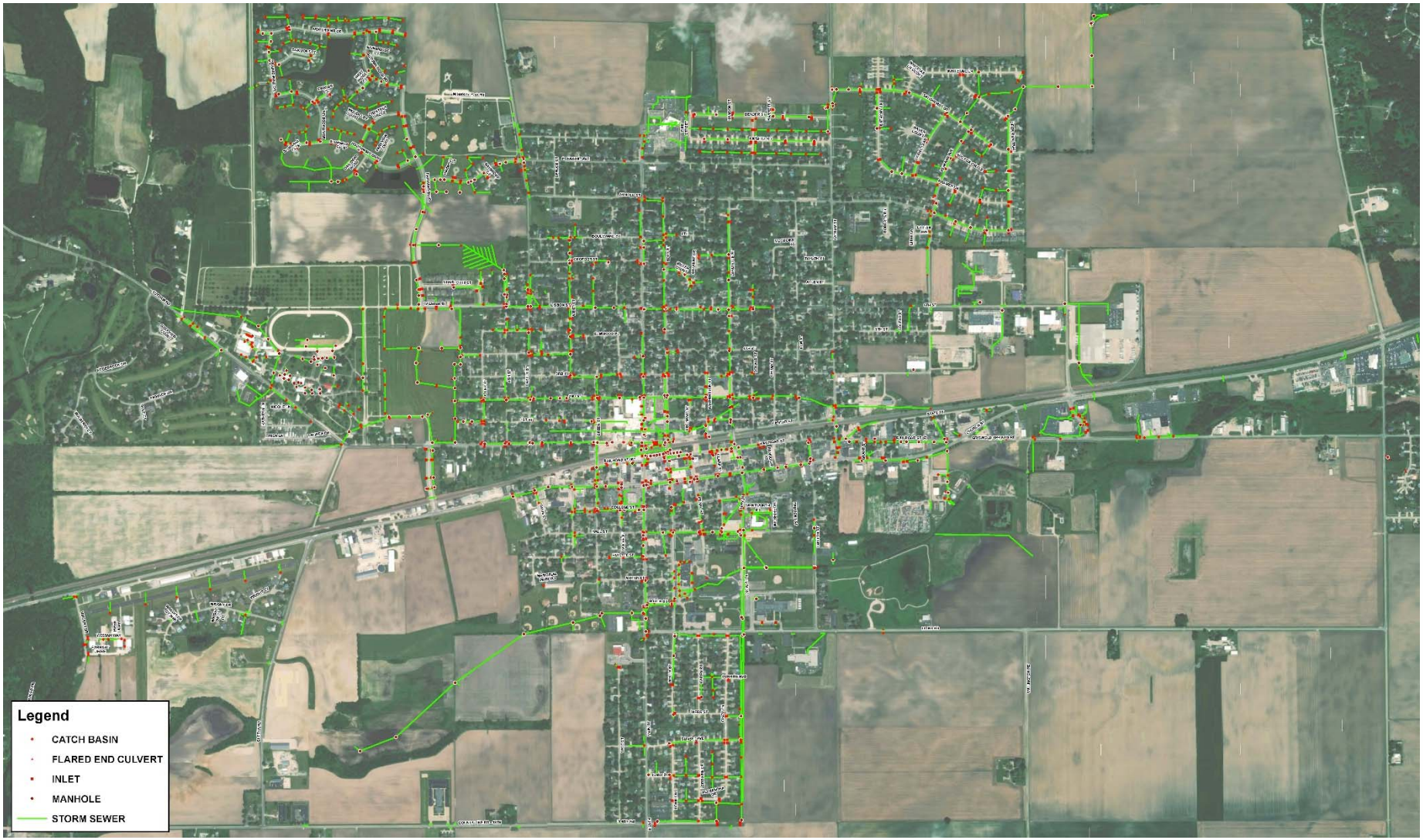
Sewer System Operation

City of Sandwich Storm Sewer Network



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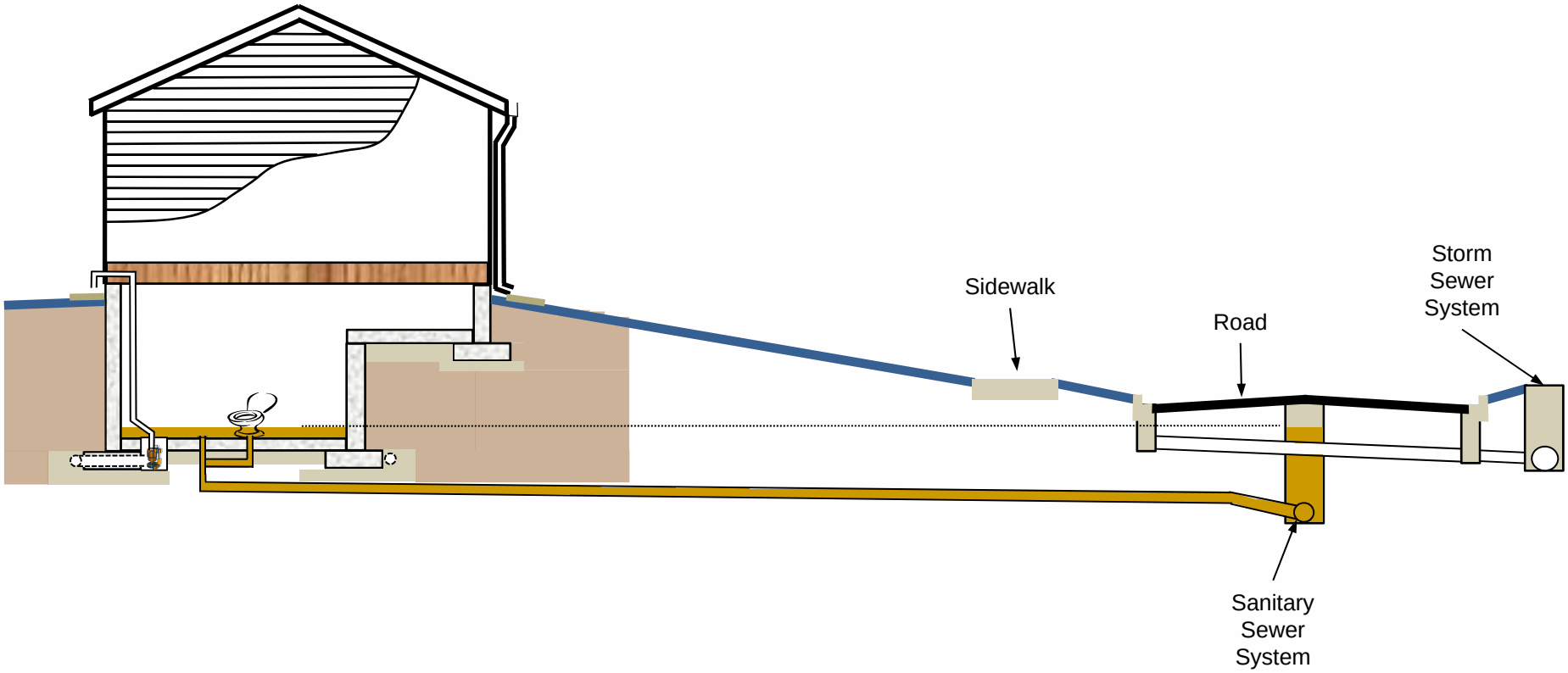
Sewer System Operation

Surcharged Sanitary Sewer System Causing Basement Backup (No Overhead Sewer)



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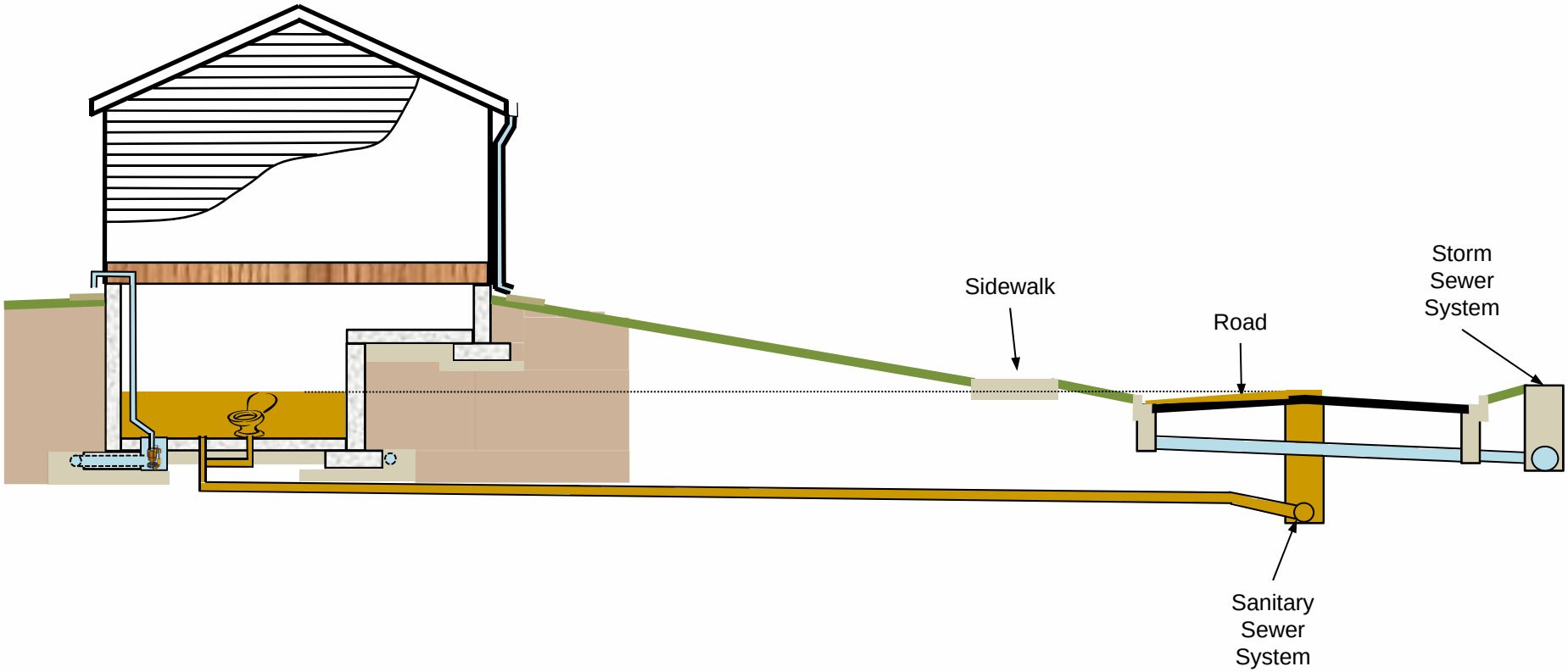
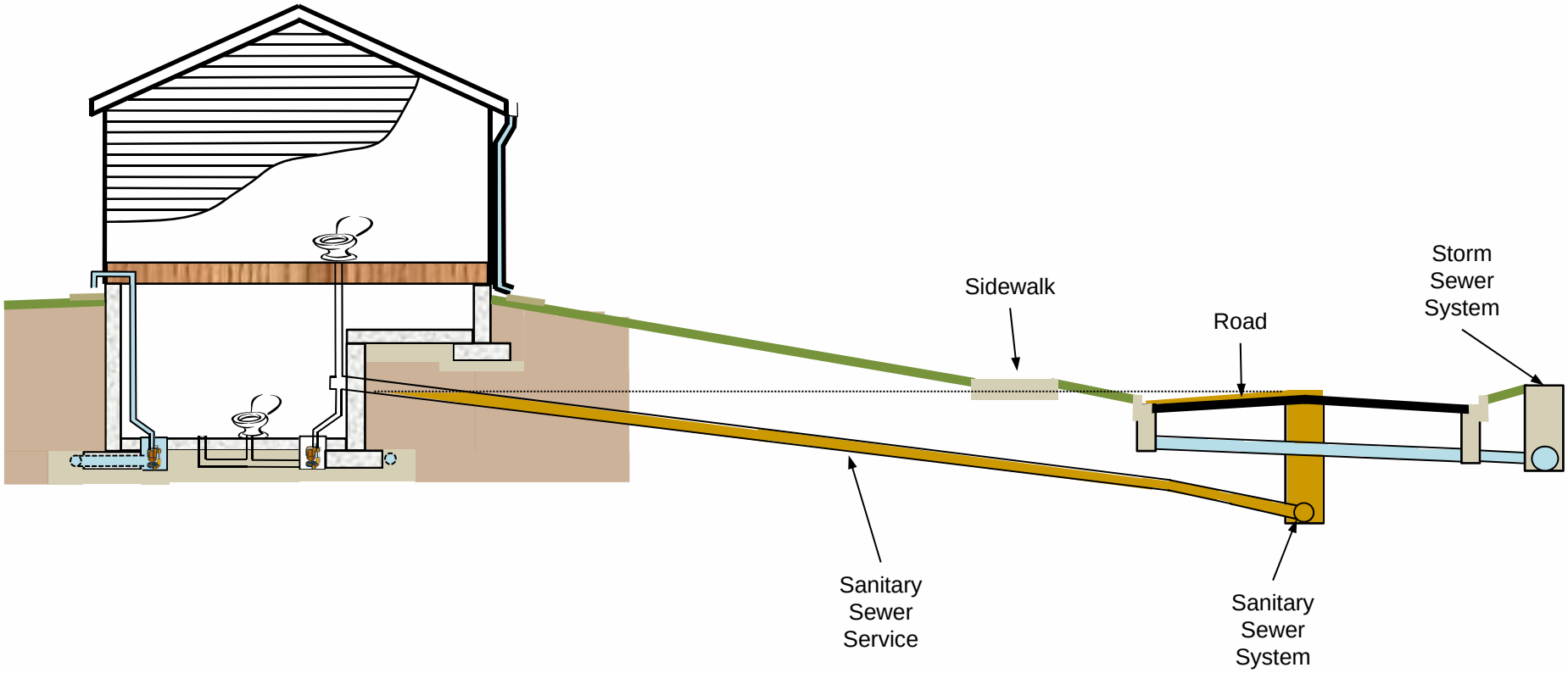


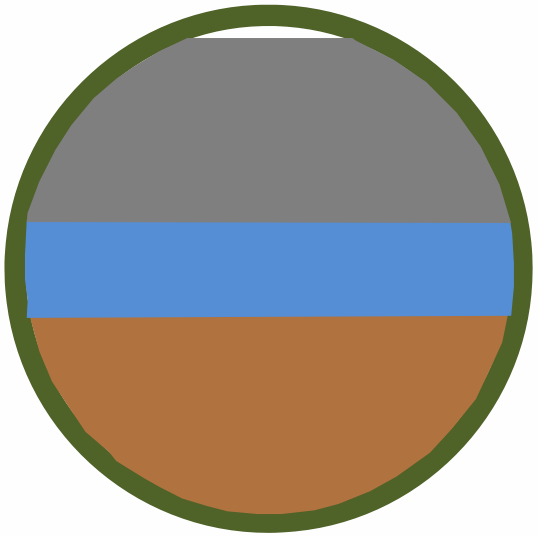
Sewer System Operation

Surcharged Sanitary Sewer System (Overhead Sewer)



I/I Background

- Typical Components of Sanitary Sewer Flow
  - ➔ Wastewater Baseflow
  - ➔ Infiltration
  - ➔ Inflow



Sanitary Sewer Pipe
Cross Section

I/I Background

- Infiltration – water entering a sewer system and service connections through the ground, through such means as, but not limited to:
  - ➔ Defective pipes
  - ➔ Pipe joints
  - ➔ Connections
  - ➔ Manhole walls

Infiltration does not include, and is distinguished from inflow.

I/I Background

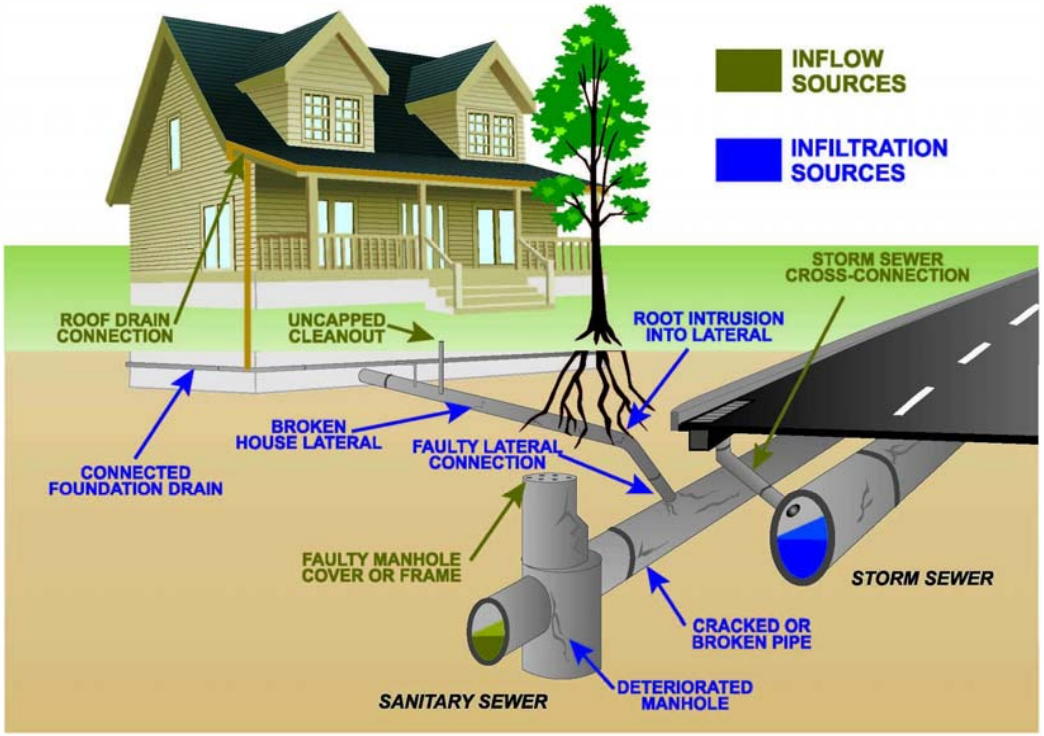
- Inflow – water discharged into a sewer system, including service connections, from such sources as, but not limited to:
  - ➔ Roof leaders
  - ➔ Cellar
  - ➔ Yard and area drains
  - ➔ Foundation drains
  - ➔ Drains from springs and swampy areas
  - ➔ Manhole covers
  - ➔ Cross connections from storm sewers and combined sewers
  - ➔ Surface run-off
  - ➔ Street wash waters

Inflow does not include, and is distinguished from infiltration.

I/I Background

- Infiltration & Inflow (I/I) – the total quantity of water from both infiltration and inflow without distinguishing the source.

Common Inflow and Infiltration Sources



Source: http://www.oregonohio.org/Engineering/inflow-infiltration.html

I/I Background

- Potential Effects Of Excessive I/I:
  - ➔ Reduced Sanitary Sewer Conveyance Capacity
  - ➔ Sanitary Sewer System Damages
  - ➔ Sanitary Sewer System Surcharging, Potentially Leading To:
    - Combined Sewer Overflow (CSO)
    - Sewer System Overflow (SSO)
  - ➔ Additional Flows To Treat At Wastewater Treatment Facility (WWTF), Potentially Leading To:
    - Additional Costs of Treatment
    - Inundation of Treatment Processes
  - ➔ NPDES Permit Violations

I/I Background

I/I Reduction Planning

Phase 1: Infiltration/Inflow (I/I) Analysis

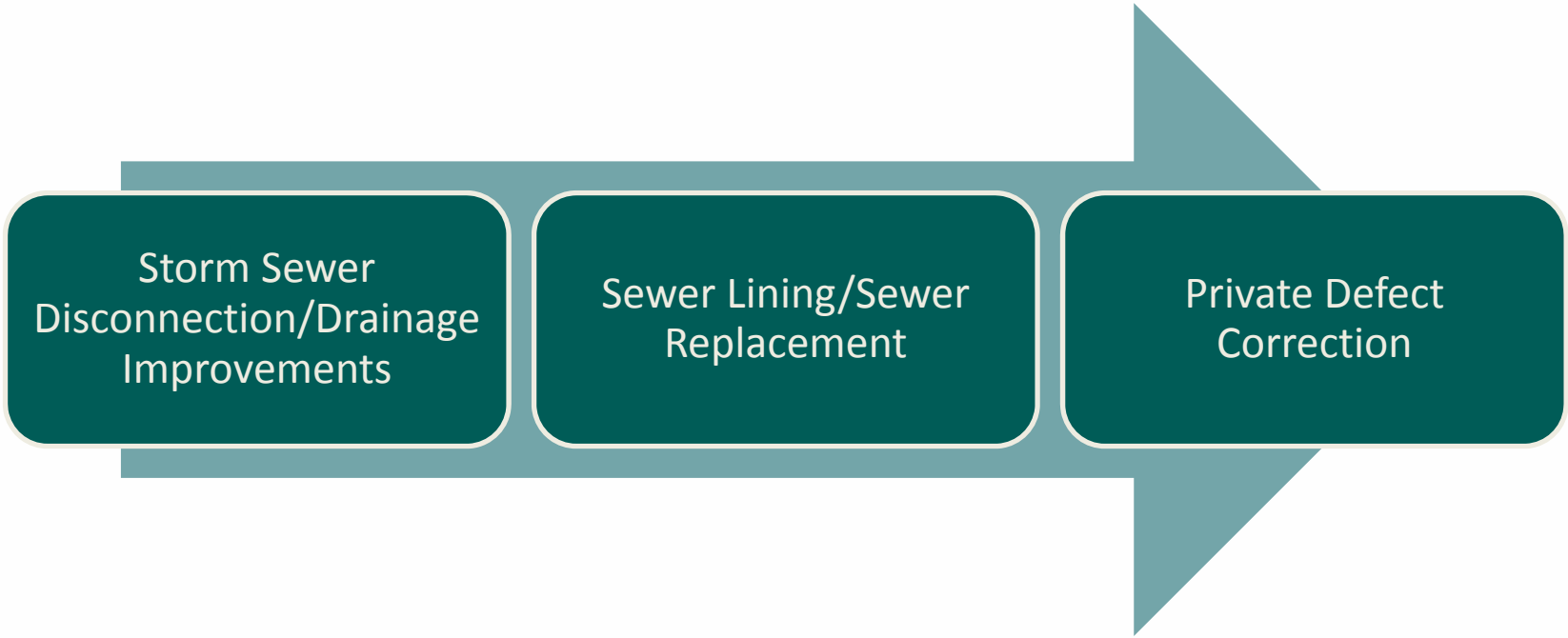
I/I Background

I/I Reduction Planning

Phase 2: Sewer System Evaluation Survey (SSES)

I/I Background

I/I Reduction Planning
Phase 3: Rehabilitation



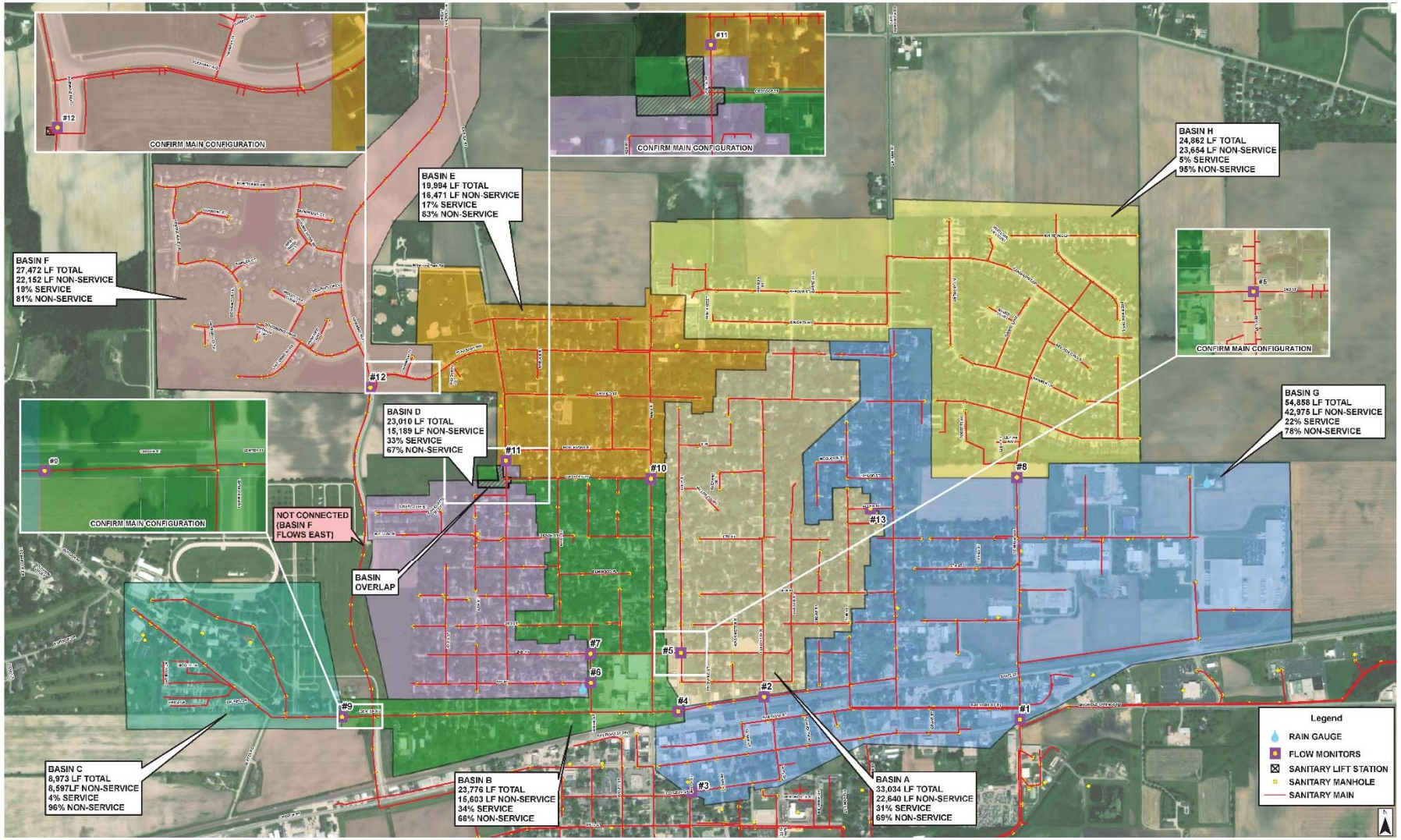
Project Approach

North Sandwich Flow Monitoring Study

- Base Mapping Updates
- Stakeholder Outreach
- Basin Delineation
- Monitor Rainfall & Sanitary Sewer Flows
- Analyze Flows & Determine I/I Severity By Basin
- Ordinance Review
- Report

Project Approach

North Sandwich Flow Monitoring Study



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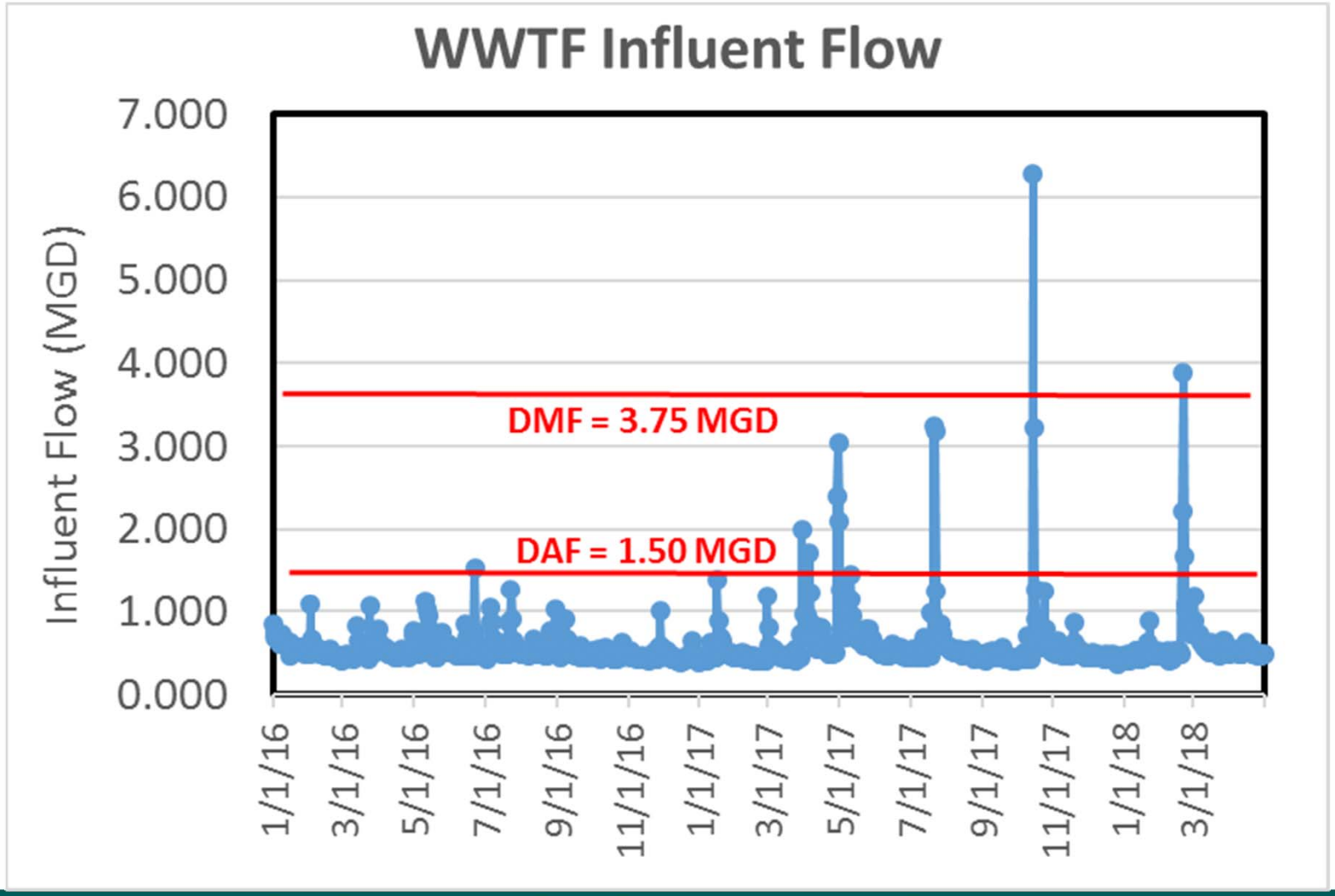
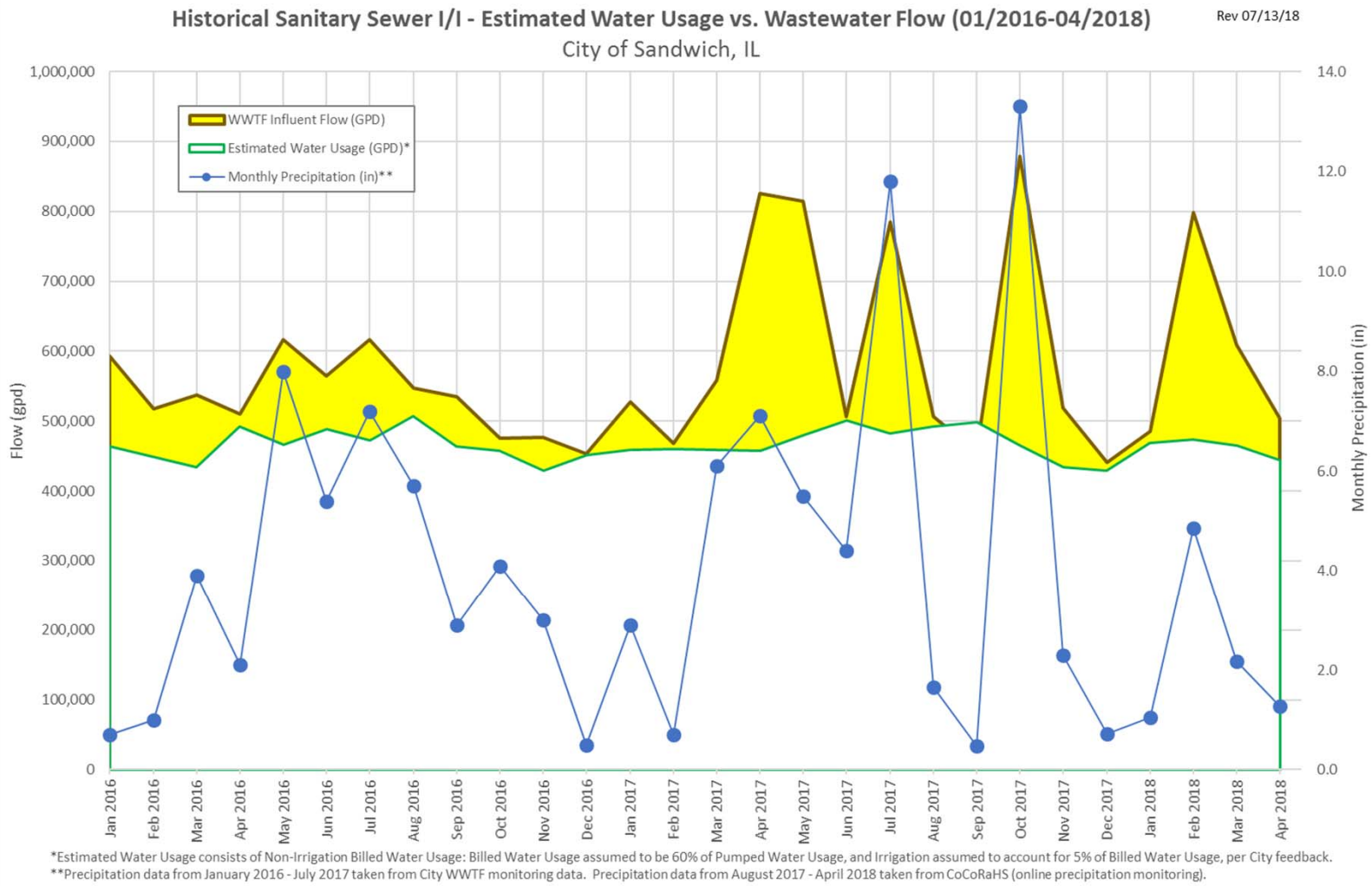
Project Approach

North Sandwich Flow Monitoring Study



Project Approach

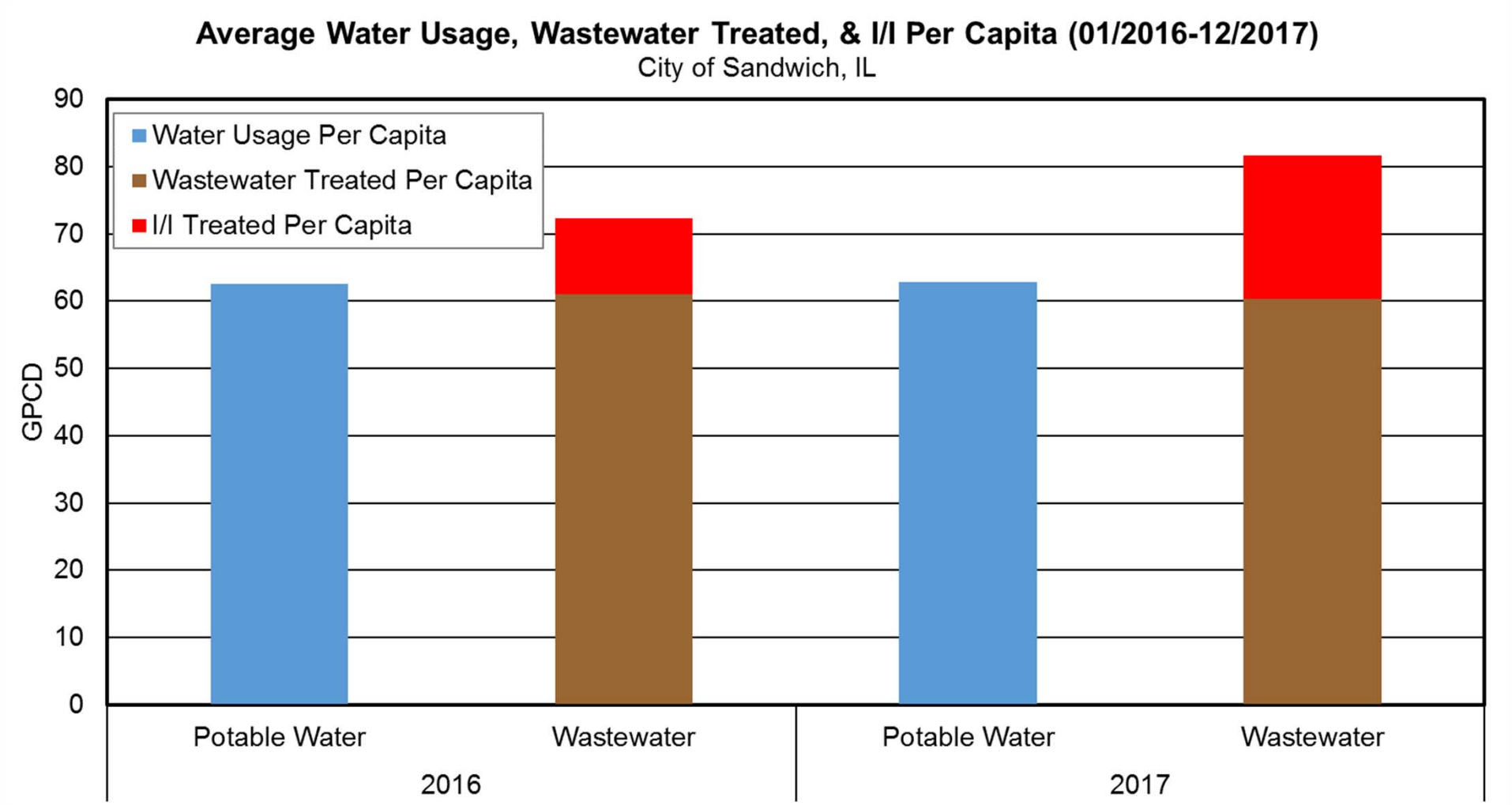
North Sandwich Flow Monitoring Study



*Estimated Water Usage consists of Non-Irrigation Billed Water Usage: Billed Water Usage assumed to be 60% of Pumped Water Usage, and Irrigation assumed to account for 5% of Billed Water Usage, per City feedback.
**Precipitation data from January 2016 - July 2017 taken from City WWTF monitoring data. Precipitation data from August 2017 - April 2018 taken from CoCoRaHS (online precipitation monitoring).

Project Approach

North Sandwich Flow Monitoring Study



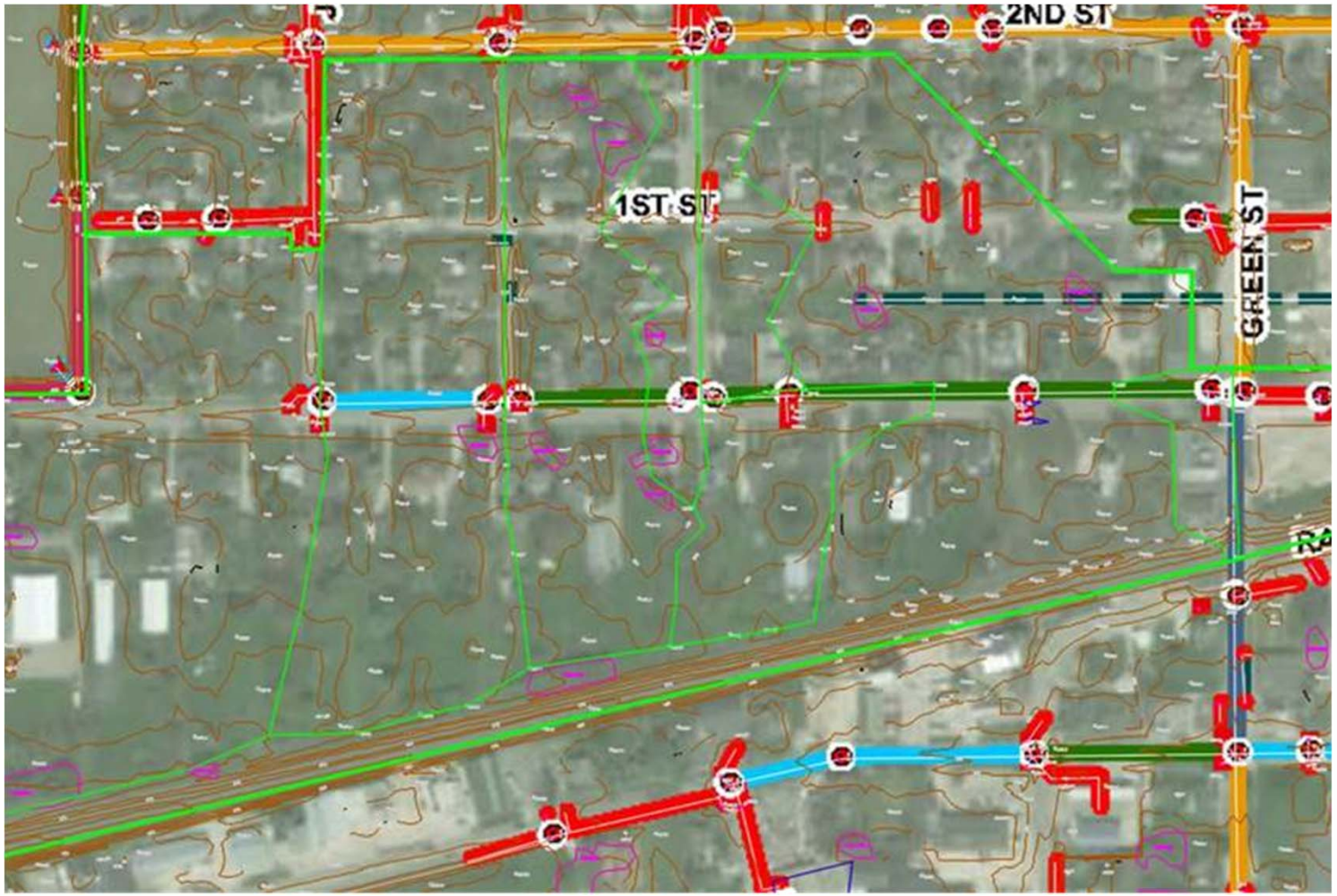
Project Approach

Stormwater System Conveyance Analysis

- Base Mapping & Surveying
- Stakeholder Outreach
- Sub-Watershed Delineations
- Existing Conditions Model
- Overland Flow Route Analysis
- Proposed Conditions Model
- Cost Estimates
- Implementation Plan
- Ordinance Review
- Report

Project Approach

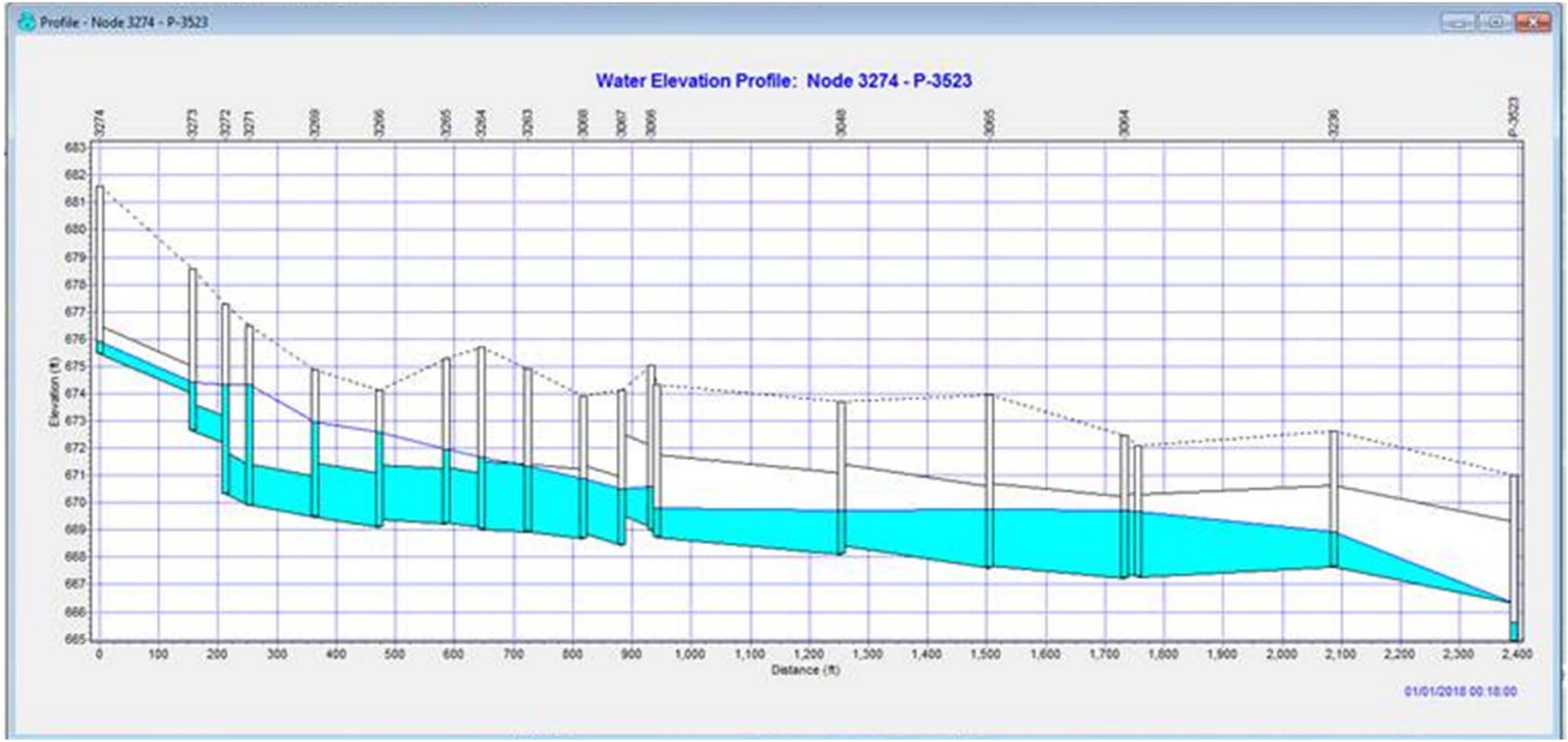
Stormwater System Conveyance Analysis



Sub-Watersheds Along Center St.

Project Approach

Stormwater System Conveyance Analysis



Bayberry Ct. to Fairwinds Blvd. Storm Sewer Profile (10 yr, 2 hr Event)

Project Approach

Overall Schedule

Project Initiation	May 2018
Flow Monitoring	May 15 – July 15, 2018
Storm Sewer Model Development	May 15 – July 15, 2018
Stakeholder Meeting No. 1	July 16, 2018
I/I Data Analysis	August 1 – August 20, 2018
Proposed Storm Sewer Modeling	July 15 – August 15, 2018
Cost Estimates	August 1 – August 15, 2018
Progress Review Meeting	August 24, 2018
Stakeholder Meeting No. 2	September 17, 2018 +/-
Report Submittal	November 1, 2018

Resident Survey Review

City of Sandwich Public Works Department
Resident Flooding Survey

Purpose: The purpose of conducting this survey is to collect pertinent information to be considered during the professional engineering evaluation of the surface water and basement flooding issues in the City of Sandwich. This initial focus of the study will be generally north of the railroad tracks, but surveys from all locations are being requested.

Instructions: Please provide accurate responses to the questions regarding the flooding issues associated with your residence. Please reference the diagram on the back side of this form when completing the form. In the space provided, include additional information that you would like the engineering consultant to be aware of and consider during the analysis. Once you have completed the survey, please deliver the completed form to the following location:

City of Sandwich
144 E. Railroad Street
Sandwich, IL 60548

Questions: If you have any questions relative to this form, please contact Tom Horak, Director of Public Works, at (815) 786-8802 or city.engineer@sandwich.il.us .

Meeting: The City intends to hold a stakeholders' meeting on Monday, July 16, 2018 at 7:00 P.M. at 128 E. Railroad Street as part of the normal Committee-As-A-Whole Council Meeting to discuss the existing sanitary and storm systems and to answer questions regarding the evaluation process. The public is encouraged and invited to attend.

Name: _____

Address: _____

Contact Information:

Telephone:_____ **Email Address:**_____

1. **Has storm or sewage water ever flooded your property?** **Yes:**_____ **No:**_____

   If so, what were the limits of the flooding? **Yard:**_____ **Street:**_____ **Basement:**_____ **Other:**_____

2. **In the past ten years, how many times has your home flooded?**

   Never:_____ **1 time:**_____ **2 times:**_____ **3 times:**_____ **4 times:**_____ **5 or more times:**_____

   If you have experienced flooding, how did the flood water enter your home (check all that apply)?

   Sewer Drain:_____ **Door:**_____ **Window:**_____ **Cracks in Wall:**_____ **Other:**_____ **N/A:** _____

3. **Have you experienced sanitary sewer backups (through drain, toilet, etc.)**

   Yes:_____ **No:**_____ **If yes, how deep was the basement flooding?** _____

(Please complete the back side of the survey, also.)

Resident Survey Review

4. During the flood events that occurred on June 21/22, 2017 and/or October 16/17, 2017, what area of your home flooded (check all that apply)?

   No Flooding:_____ Crawl Space:_____ Basement:_____ First Floor:_____ Garage:_____

5. Do you have a basement? Yes:_____ No:_____

   If so, please provide the measurement from the floor slab, to the top of your foundation (Dimension "A" in the diagram): _____

6. Do you have a crawl space? Yes:_____ No:_____

   If so, please provide the measurement from the floor slab, to the top of your foundation (Dimension "B" in the diagram): _____

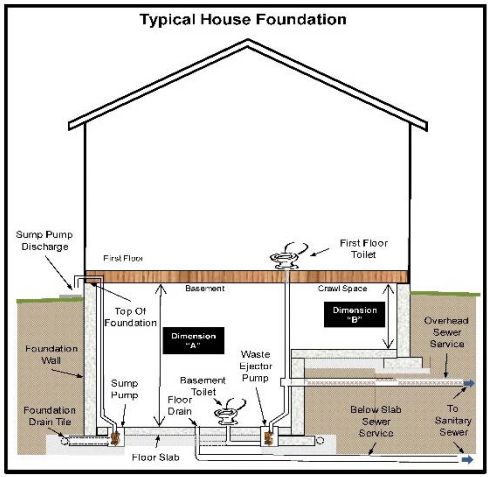
7. Do you have a sump pump? Yes:_____ No:_____ Not Sure:_____

   If so, where does the sump pump discharge? Yard:_____ Plumbing:_____
   Not Sure:_____ Other:_____

8. Do you have a waste (sewer) ejector pump? Yes:_____ No:_____ Not Sure:_____

9. Do you employ any of the following sanitary sewer backup protections?

   Floor Drain Plug:____ Standpipe:____ Overhead Sewer:____ Check Valve:____ Other: _____



Additional Comments:

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Thank you for taking the time to complete the survey!

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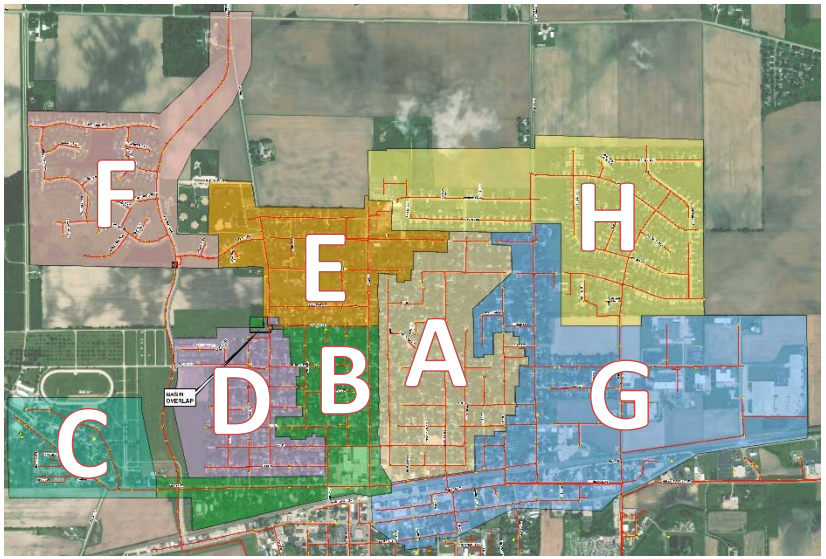
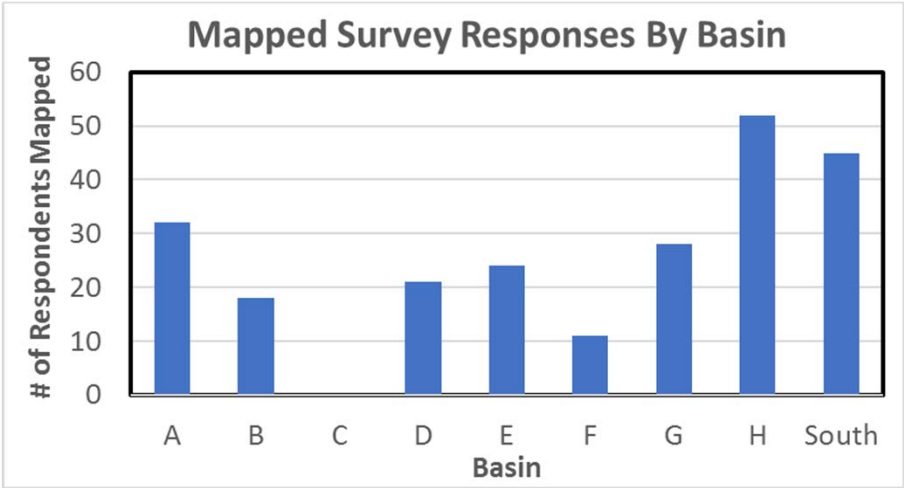
Survey Results To Date



Survey Statistics (7/15/18)

- 1,855 Delivered
- 310 Respondents
- 231 Currently Mapped
- 16.7% Return Rate



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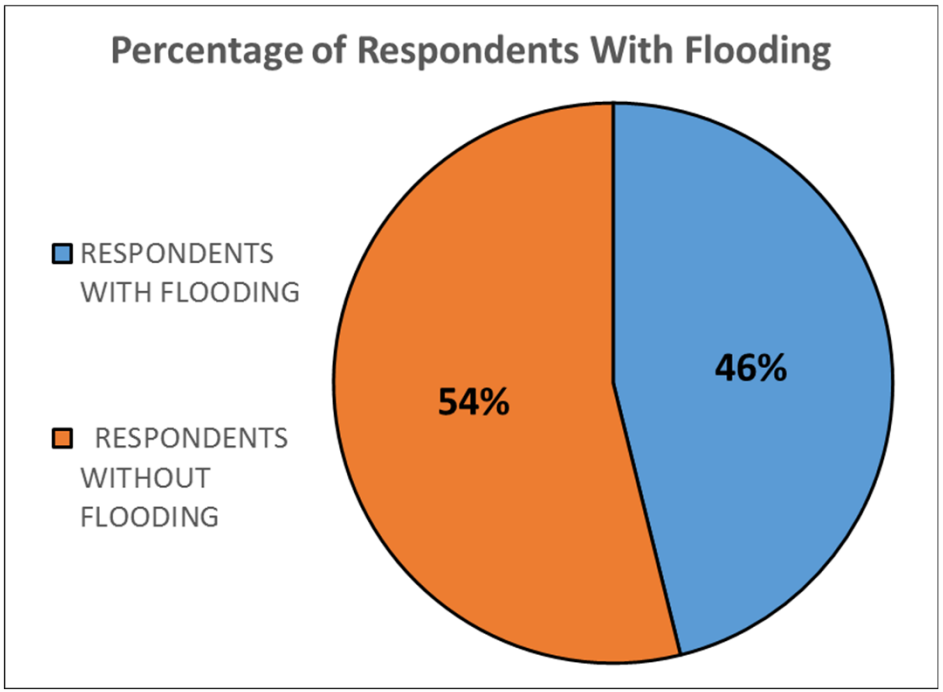

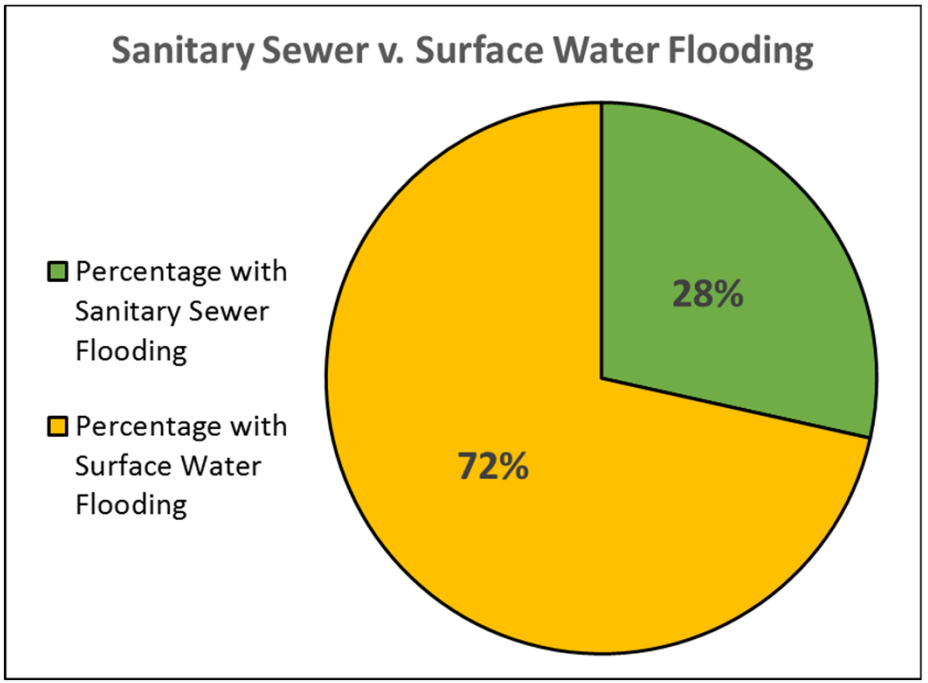

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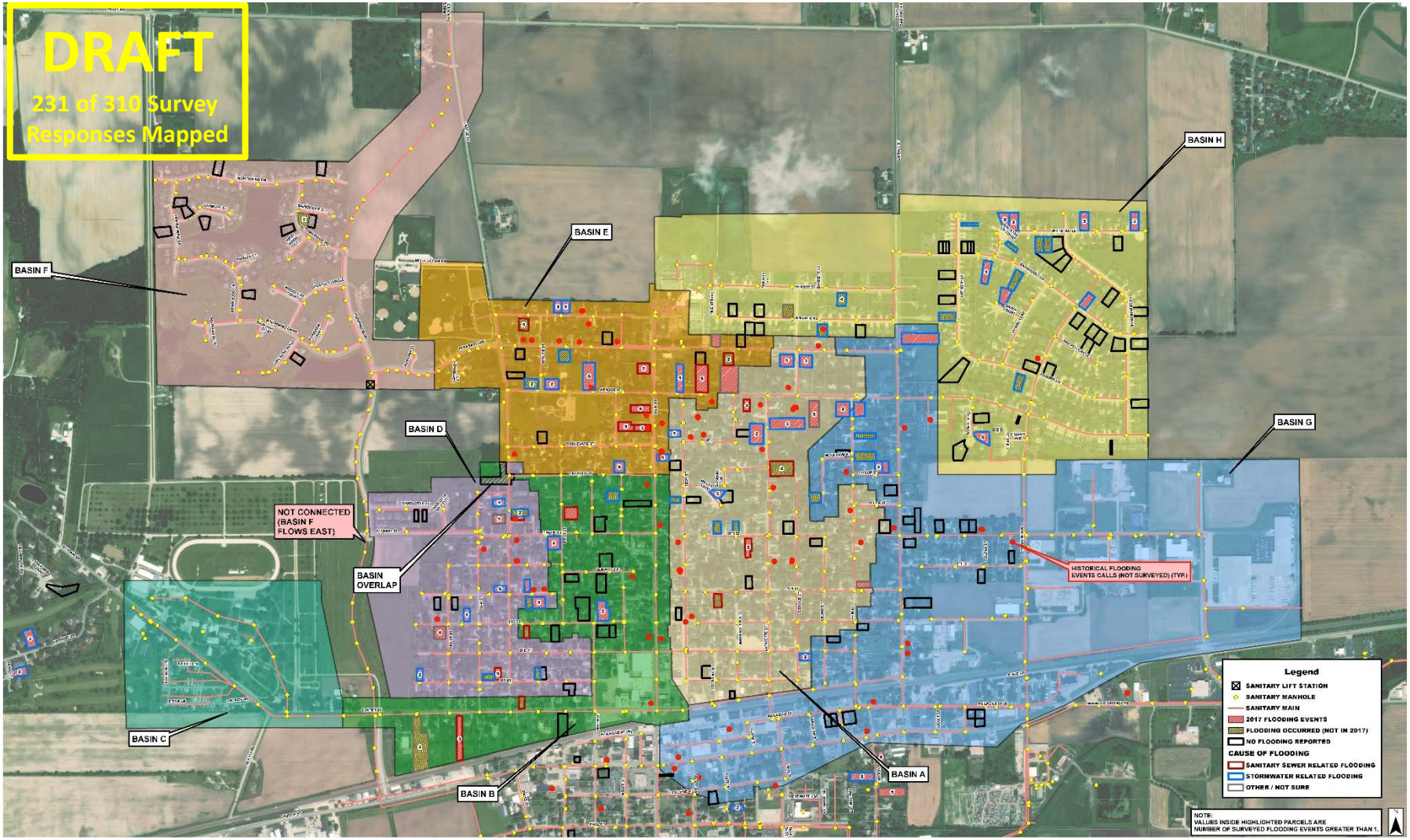

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Q&A

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