



# 2017 SEWER ACTIVITY REPORT



*Prepared by*

*Justin Swinford, P.E. - Civil Engineer II*

*Adam Shaw - Civil Engineering Technician II*



## MEMORANDUM

DATE: February 20, 2018

TO: Sanitary Sewer Technical Committee

FROM: Justin Swinford, P.E., Civil Engineer II  
Adam Shaw, Civil Engineering Technician II

RE: Sewer Activity in the City of Urbana from January 1, 2017 to December 31, 2017

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### I. INTRODUCTION

The City of Urbana owns, operates, and maintains 538,197 linear feet (101.9 miles) of sanitary sewer and 755,525 linear feet (143.1 miles) of storm sewer. The sanitary sewer system includes 2,315 manholes while the storm sewer system includes 8,238 storm manholes or inlets. Based on the U.S. Environmental Protection Agency's estimated infrastructure replacement cost of one million dollars per mile of sewer pipe Urbana's sanitary and storm sewer infrastructure would be valued at almost one quarter of a billion dollars.

The sanitary and storm sewer budgets for the 2017-2018 fiscal year include:

- \$800,099 for sanitary sewer operation and maintenance activities
- \$400,000 for sanitary sewer rehabilitation projects
- \$13,500 for the overhead sanitary sewer program
- \$50,000 for the sewer lateral pavement reimbursement program
- \$8,000 for the illegal connection reimbursement program
- \$25,000 for the private to public sanitary conversion program
- \$22,000 for the sewer GIS data system and sanitary sewer modeling
- \$560,772 for storm sewer operation and maintenance activities
- \$300,000 for storm sewer rehabilitation projects
- \$40,000 for Boneyard Creek maintenance
- \$18,750 for stream gauge flow monitoring
- \$150,000 for storm sewer cleaning and televising
- \$20,000 for hazardous sump pump discharge abatement
- \$300,000 for Green Street MCORE Project storm sewer improvements

## II. SEWER REHABILITATION ACTIVITIES

### A. Point Repairs

Point repairs to the sanitary sewers were made at 16 separate locations. Approximately 62 linear feet of repairs were performed on the sanitary sewer system, as well as construction or replacement of 13 sanitary sewer manholes. Similarly, point repairs to the storm sewers were made at 29 separate locations. Approximately 45 linear feet of repairs were performed on the storm sewer system, as well as 21 storm sewer structure repairs and 16 new or replacement storm sewer structures.

Locations of sanitary and storm sewer repairs completed in 2017 are presented in Figures 1 and 2. Histories of sewer repairs from 2012 to 2017 are presented in Figures 3 and 4. Sanitary and storm sewer repair locations from 1988 to 2017 are presented in Figures 5 and 6.

### B. New Sewer Construction

As part of the 2016-2018 Miscellaneous Sewer Repair contract, 160 linear feet of new storm sewer and 12 new storm sewer manholes or inlets were constructed to address localized drainage issues. Additionally, 8,040 linear feet of storm sewer and 129 storm manholes or inlets were constructed as part of various transportation projects.

210 linear feet of new sanitary sewer and two new sanitary sewer manholes were constructed as part of the Green Street Sanitary Sewer Extension. Additionally 37 linear feet of new sanitary sewer were constructed as part of the MCORE Project. See Figure 7 for projects and quantities of new storm and sanitary sewer installations.

### C. Cured-in-Place Sewer Lining

As part of the 2017 Sewer Lining Project full length (manhole to manhole) cured-in-place sewer lining was performed on 5,802 linear feet (1.1 miles) of sanitary sewer and 1,449 linear feet (0.3 miles) of storm sewer at various locations throughout the City. Locations of sanitary and storm sewer lining completed in 2017 are presented in Figures 8 and 9. The City anticipates completing another sanitary and storm sewer full length cured-in-place lining project in 2018.

The City has completed full length cured-in-place lining on 127,980 linear feet (24.2 miles) of sanitary sewer to date, which represents 23.8% of the sanitary sewer system. The City has completed full length cured-in-place lining on 25,183 linear feet (4.8 miles) of storm sewer to date, which represents 3.3% of the storm sewer system. A history of sewer lining completed by the City from 2012 to 2017 is presented in Figure 10. Sanitary and storm sewer lining locations from 1998 to 2017 are presented in Figures 11 and 12.

### **III. MAINTENANCE ACTIVITIES**

Various maintenance activities were undertaken by the City in 2017 including root removal, sewer cleaning, televising, manhole cleaning, manhole inspections, and chemical treatment for grease. Figures 13 and 14 show the progress of the systematic cleaning programs for storm and sanitary sewer systems.

The 2016 Storm Sewer Cleaning & Televising Project was completed in late 2017. 25,727 linear feet of storm sewer was cleaned and televised. The next cleaning and televising project is planned to start in spring of 2018. Public Works staff continues to perform emergency storm sewer cleaning and televising as needed.

Highlights from the 2017 maintenance activities include 128,620 linear feet (24.4 miles) of sanitary sewer cleaning, 6,474 linear feet (1.2 miles) of storm sewer cleaning, 9,764 linear feet (1.8 miles) of sanitary sewer televising, 6,192 linear feet (1.2 miles) of storm sewer televising, 391 hours of manhole/inlet cleanings, and 39,206 linear feet of chemical grease treatment (chemical grease treatment linear footage is also included in the sanitary sewer cleaning quantity). 937 linear feet of mechanical root treatment was performed on sanitary sewers in 2017. Histories of sewer cleaning and televising completed by the City from 2012 to 2017 are presented in Figures 15 and 16.

### **IV. SANITARY SEWER BACK-UP CALLS AND RESPONSES**

The City of Urbana Operations Division responded to a total of 68 sanitary sewer back-ups in 2017. Of the 68 back-ups, 34 were in private lines while the remaining 34 were in city-owned sewers. These back-ups did not result from surcharging during heavy rainfall events.

A history of sewer back-up complaints in the City from 2012 to 2017 is presented in Figure 17. The locations of sanitary sewer back-ups reported in 2017 are presented on Figure 18. Locations of sanitary sewer back-ups reported from 2010 to 2017 are shown in Figure 19.



## **V. SANITARY SEWER SURCHARGES AND RESPONSES**

Sixteen sanitary sewer back-ups were reported throughout the year as a result of eight separate heavy rainfall and sanitary sewer surcharge events. The back-up complaints were not concentrated to any particular area, indicating that the sewer back-ups were more likely the result of overwhelmed sanitary sewers than sewer blockages or broken pipes. In response to these complaints, the City typically sends each property owner an Overhead Sewer Program information packet and a letter urging them to contact the Public Works Department to discuss their complaint.

## **VI. SEWER SYSTEM INVESTIGATIVE STUDIES**

Dye water testing was done as needed to determine which sewer systems buildings or drainage structures were tributary to. More dye water testing is planned for 2018 in order to identify private sanitary sewers that serve multiple properties. No smoke testing was done in 2017.

## **VII. OVERHEAD SEWER PROGRAM**

There were no overhead sewer installations completed in 2017. Information on the Overhead Sewer Program was distributed to many eligible property owners and is also available on the City's website. A history of overhead sewer program participation from 2012 to 2017 is presented in Figure 20.

## **VIII. ILLEGAL CONNECTIONS AND DISCHARGES**

The City adopted an illegal connection reimbursement program in December 2007. Under this program property owners are reimbursed for 50% of the cost to eliminate an illegal sanitary connection to the storm sewer, up to \$4,000. No properties participated in the illegal connection reimbursement program in 2017.

## **IX. PAVEMENT REPLACEMENT REIMBURSEMENT PROGRAM**

The City adopted a pavement replacement reimbursement program for sewer service laterals in December 2007. Under this program property owners were reimbursed for 50% of the costs for pavement replacement within City right-of-way for sewer service lateral repairs, up to \$3,000. In 2013, the program was expanded to include reimbursement for 100% of the costs for pavement replacement within City right-of-way, up to \$5,000. Property owners at 11 separate locations participated in this program in 2017. Figure 21 summarizes the pavement replacement reimbursement program participation in 2017. A history of program participation from 2012 to 2017 is presented in Figure 22. This program was revised in January 2018, with implementation of a unit price program taking immediate effect.

## **X. HAZARDOUS SUMP PUMP DISCHARGE ELIMINATION PROGRAM**

When a hazardous sump pump is reported to the City, the property owner is notified and is asked to take action to abate the hazard. This can be done by moving the sump pump discharge to a different location or by connecting to the City's storm sewer system.

Two hazardous sump pump discharges were identified in 2017. In both cases, the property owners chose to participate in the Hazardous Sump Pump Discharge Elimination Program, through which the City provides a public storm sewer within the right-of-way adjacent to the property and the sump pump discharge is connected directly to the new storm sewer. This program involves a cost share by the homeowner of 50% of construction costs, up to a maximum share of \$500.00. \$20,000 is budgeted for this program each year.

## **XI. PRIVATE TO PUBLIC SEWER CONVERSION PROGRAM**

The City adopted a private to public sanitary sewer conversion program in March 2010 and funded the program with \$25,000 from the Sewer Benefit Tax revenues. Under this program the City assumes ownership of private sanitary sewers which have undergone necessary infrastructure upgrades, serve two or more properties, and have been designated as priorities per the Department of Public Works criteria. The City pays for the cost of required infrastructure repairs. There was one private to public sewer conversion completed in 2017, and the City continues to identify properties that are served by shared private sanitary sewer laterals, with conversions taking place as deemed necessary by the condition of those sewers.

## **XII. NEW EQUIPMENT AND TECHNOLOGIES**

The Engineering Division continued to develop the Geographical Information System (GIS) for the sanitary and storm sewer systems in 2017. GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. With a GIS database, it is possible to link information (attributes) to location data, such as sewer complaints to addresses, maintenance records to sewer pipes or manholes within a system.

The Engineering Division also maintains a GIS map-based database of sewer inspections that provides an efficient organization of over 3,000 inspection videos and a pipe evaluation and rating system that allows for prioritization of sewer projects and repairs.

The City has also implemented the use of computer tablets in the field by sewer crews and electrical crews. These tablets contain map files that provide much more information than a traditional paper map and allow for more frequent updates to the map.

The Engineering Division is also planning to begin a sanitary sewer system modeling effort in conjunction with the Intergovernmental Joint Sanitary Sewer Technical Committee. Sewer modeling would provide each entity with a much better analysis of their sewer system capacities and assist in master planning for future projects.

### **XIII. SEWER WORK PLANNED FOR 2018**

#### **A. Sanitary Sewer Work**

The following sanitary sewer projects are tentatively scheduled for 2018:

- Sanitary Sewer Lining Project ~ \$200,000
- Sanitary Sewer Repair Project ~ \$100,000
- Amber Lane Sanitary Sewer Extension ~ \$100,000
- Smith Road Sanitary Sewer Extension ~\$85,000

#### **B. Storm Sewer Work**

The following storm sewer projects are tentatively scheduled for 2018:

- Storm Sewer Repair Project ~ \$175,000
- Storm Sewer Lining Project ~ \$125,000
- Storm Sewer Cleaning & Televising ~ \$150,000

The City continues to set aside \$100,000 annually to help pay for the costs of extending interceptor sanitary sewers to undeveloped areas outside of the existing city sewer service area.

Figure 23 summarizes future sanitary and storm sewer work identified by the City.

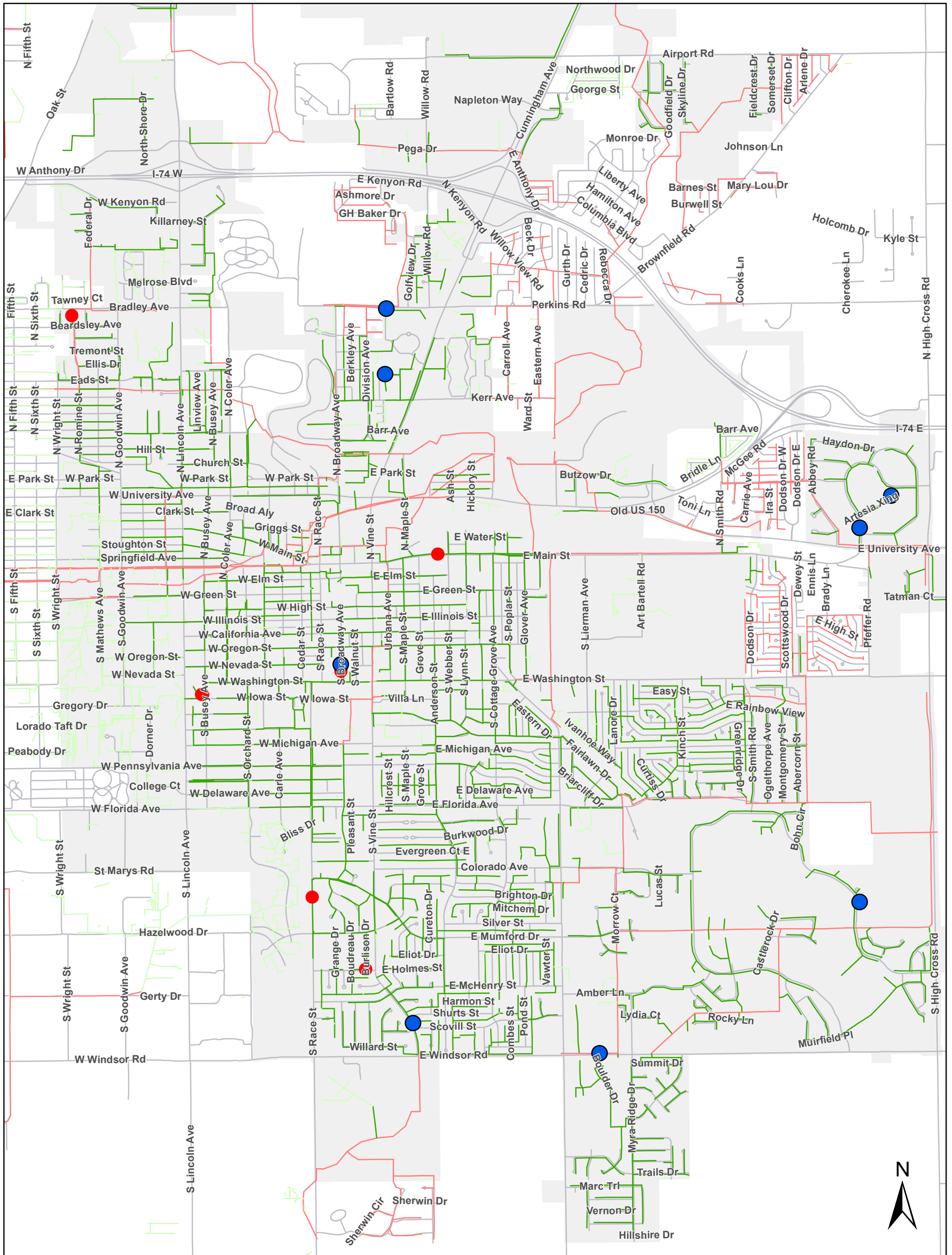
## 2017 SEWER ACTIVITY SUMMARY TABLE

	Quantity	Comments
<b>Rehabilitation Activities:</b>		
Sanitary Sewer Pipe Point Repairs	62 l.f.	
Sanitary Sewer Manhole Repairs	10 ea.	
New Sanitary Sewer Manhole Construction	2 ea.	
Storm Sewer Point Repairs	45 l.f.	
Storm Sewer Manhole/Inlet Repairs	21 ea.	
New Storm Sewer Manhole/Inlet Construction	12 ea.	
Sanitary Sewer Full Length Lining	5,778 l.f.	
Storm Sewer Full Length Lining	1,447 l.f.	
<b>Maintenance Activities:</b>		
Sanitary Sewer Cleaning	70,450 l.f.	
Storm Sewer Cleaning	32,426 l.f.	
Sanitary Sewer Television Inspection	11,371 l.f.	
Storm Sewer Television Inspection	30,232 l.f.	
Inlet and Manhole Cleaning	216 hrs	
Chemical Grease Treatment	29,328 l.f.	Included in sewer cleaning totals
Mechanical Root Treatment	570 l.f.	
<b>Sanitary Sewer Blockages:</b>		
In Private Service Lines	34 ea.	
In City Owned Mains	34 ea.	
<b>Sanitary Sewer Surcharges:</b>		
Reports of Sanitary Sewer Surcharges	16 ea.	
<b>Storm and Sanitary Sewer Programs:</b>		
Overhead Sewer Program	0 ea.	
Illicit Connections & Discharges	1 ea.	
Pavement Reimbursement Program	11 ea.	
Hazardous Sump Pump Discharge Elimination	2 ea.	2 corrected in 2017
Private to Public Sewer Conversion	1 ea.	

Attachments:

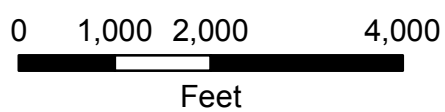
- Figure 1 - 2017 Sanitary Sewer Repair Locations
- Figure 2 - 2017 Storm Sewer Repair Locations
- Figure 3 - History of Sewer Pipe Repairs from 2012-2017
- Figure 4 - History of Sewer Manhole/Inlet Repairs from 2012-2017
- Figure 5 - Sanitary Sewer Point Repair Locations 1988-2017
- Figure 6 - Storm Sewer Repair Locations 1988-2017
- Figure 7 - 2017 New Sewer Construction
- Figure 8 - 2017 Sanitary Sewer Full Length Lining Locations
- Figure 9 - 2017 Storm Sewer Full Length Lining Locations
- Figure 10 - History of Sewer Lining from 2012-2017
- Figure 11 - Sanitary Sewer Full Length Lining Locations 1998-2017
- Figure 12 - Storm Sewer Full Length Lining Locations 1998-2017
- Figure 13 - Systematic Storm Sewer Cleaning Progress Map 2017
- Figure 14 - Systematic Sanitary Sewer Cleaning Progress Map 2012-2017
- Figure 15 - History of Sewer Cleaning from 2012-2017
- Figure 16 - History of Sewer Televising from 2012-2017
- Figure 17 - History of Sanitary Sewer Back-Up Complaints from 2012-2017
- Figure 18 - 2017 Public Sanitary Sewer System Back-Up Locations
- Figure 19 - History of Sanitary Sewer System Back-Up Locations 2012-2017
- Figure 20 - History of Overhead Sewer Program Participation from 2012-2017
- Figure 21 - 2017 Pavement Replacement Reimbursement Program Participation
- Figure 22 - History of Pavement Replacement Reimbursement Program 2012-2017
- Figure 23 - Proposed Sewer Projects in Capital Improvement Plan





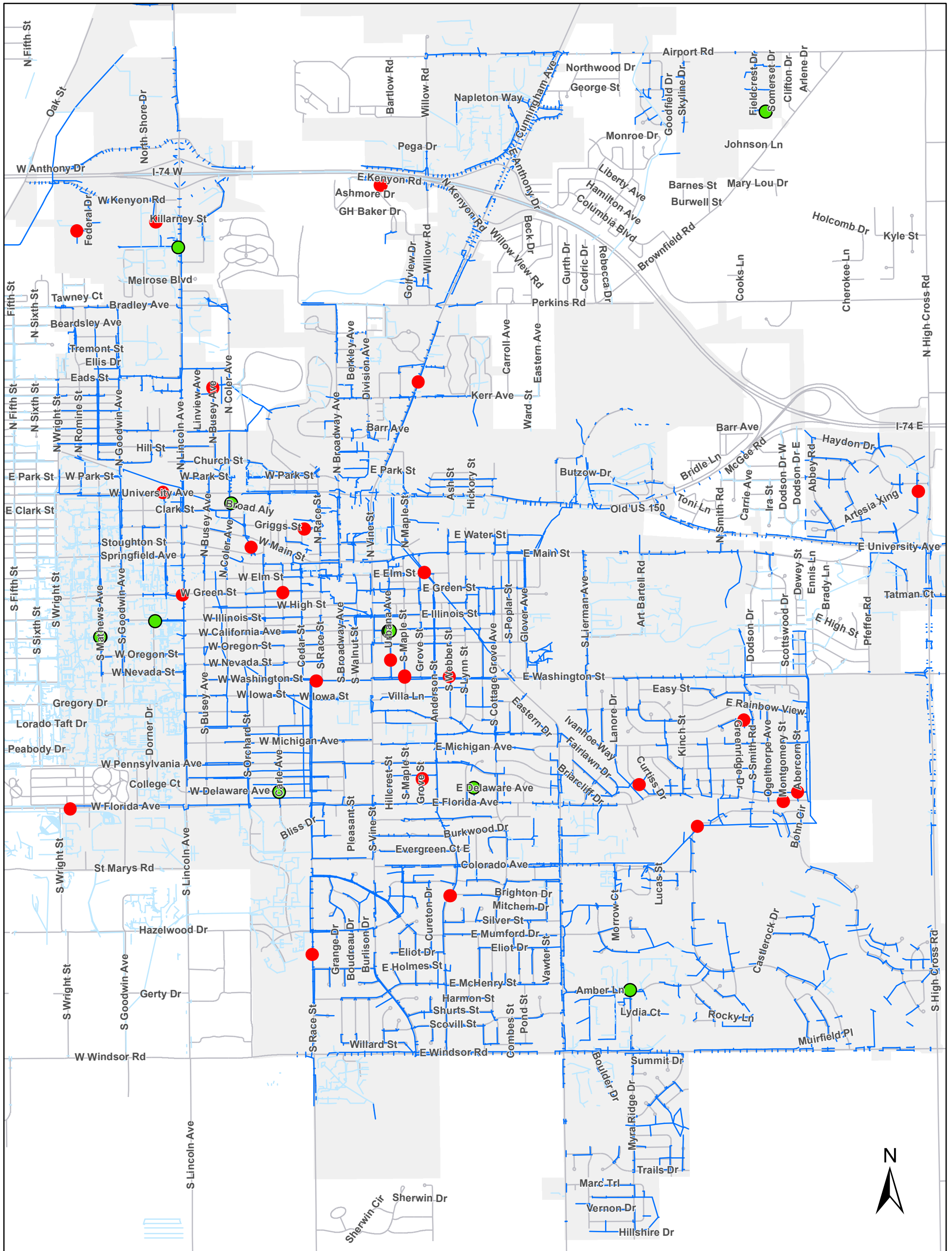
**Legend**

<b>Sanitary Sewers</b>	<b>Sanitary Manhole Repairs</b>
<span style="color: green;">—</span> City of Urbana	<span style="color: blue;">●</span> 2017
<span style="color: red;">—</span> UCSD	<b>Sanitary Sewer Pipe Repairs</b>
<span style="color: lightgreen;">—</span> Private	<span style="color: red;">●</span> 2017
<b>Corporate Limits</b>	
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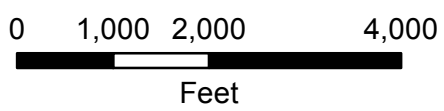
**2017 SEWER ACTIVITY REPORT**

**FIGURE 1**  
2017 SANITARY SEWER REPAIR LOCATIONS



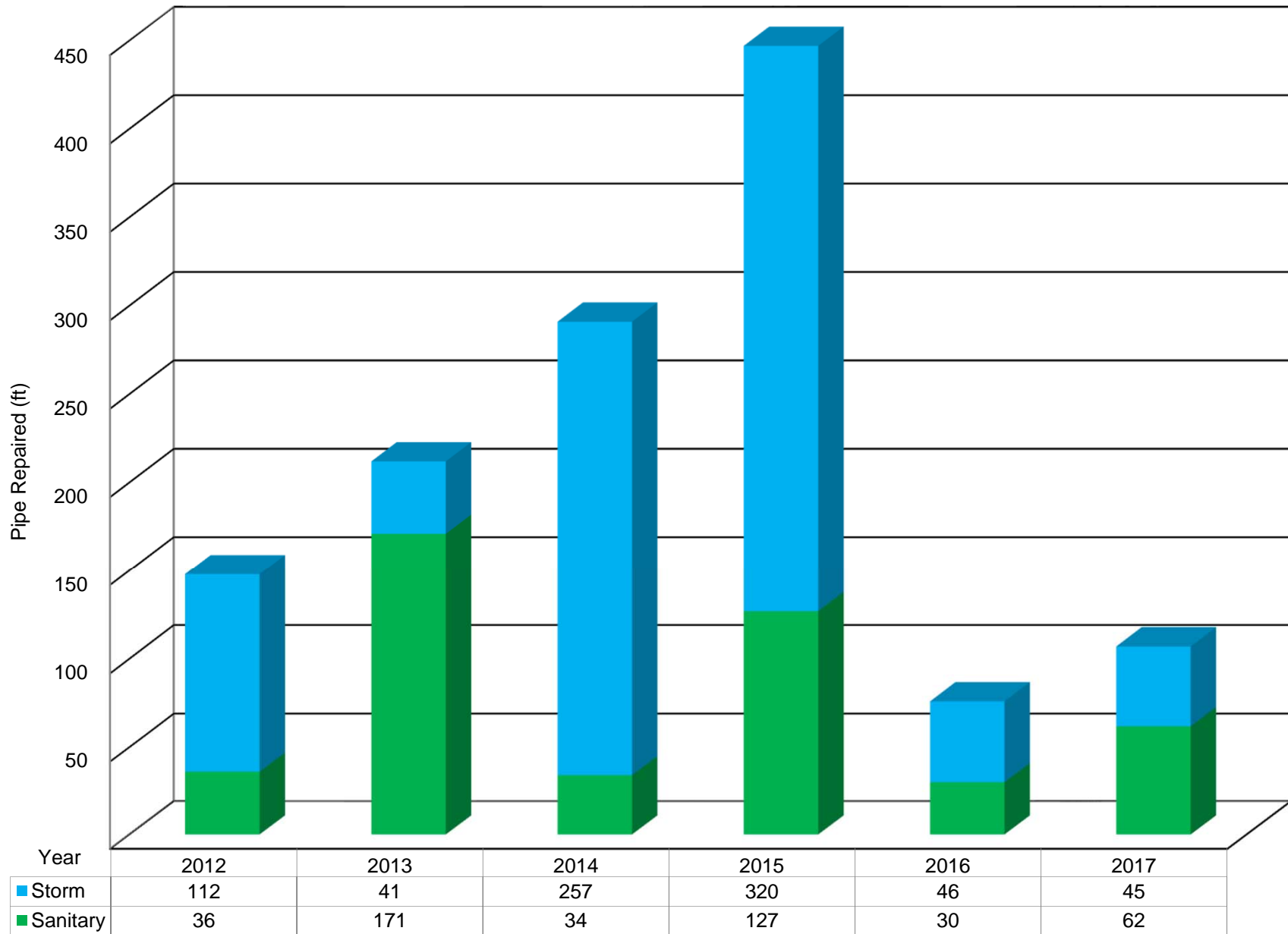
**Legend**

<b>Storm Sewers</b>	<b>Storm Manhole and Inlet Repairs</b>
— Private	● 2017
— City of Urbana	<b>Storm Sewer Pipe Repairs</b>
	● 2017
	<b>Corporate Limits</b>
	■ City of Urbana



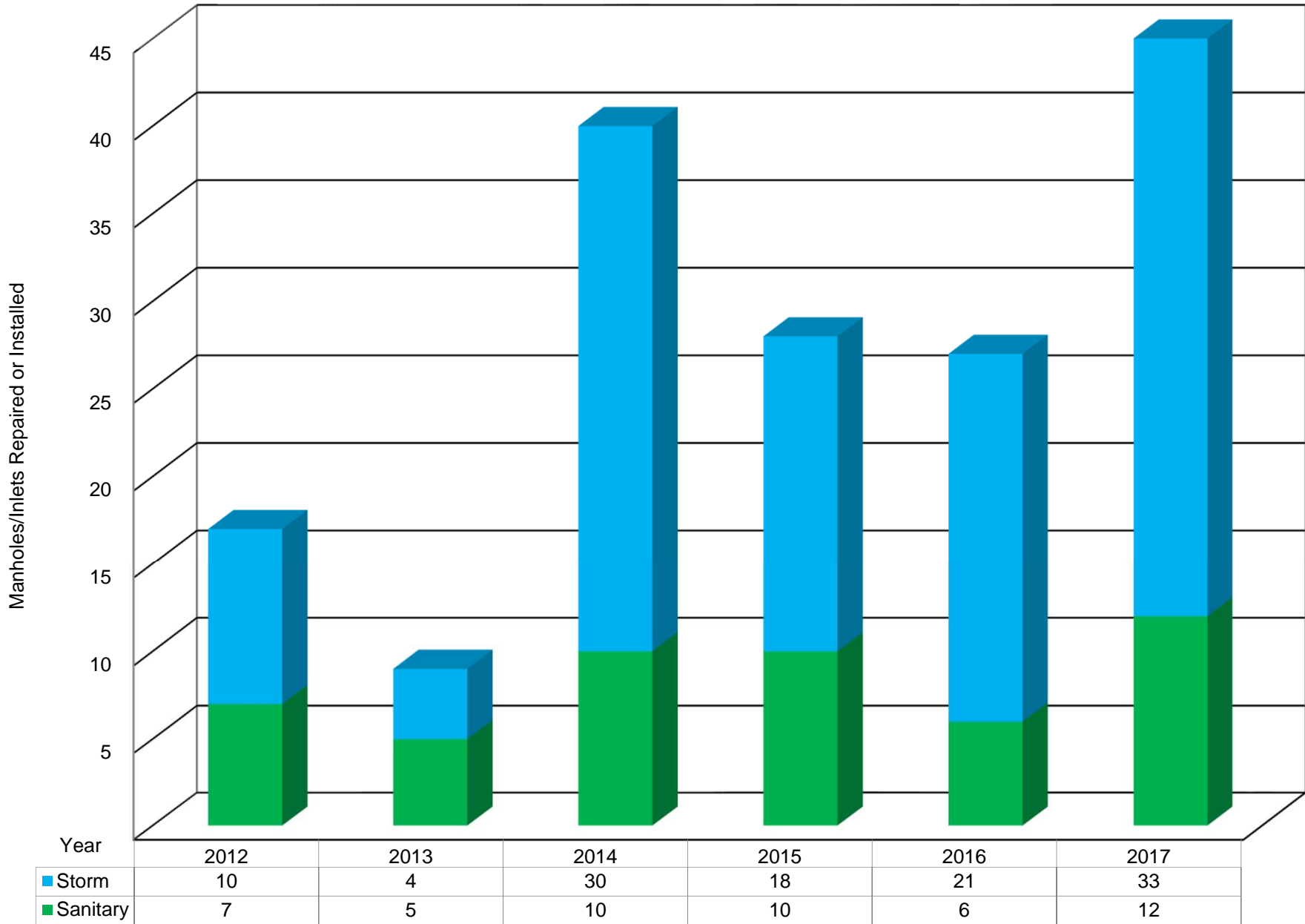
**2017 SEWER ACTIVITY REPORT**

FIGURE 2  
2017 STORM SEWER REPAIR LOCATIONS

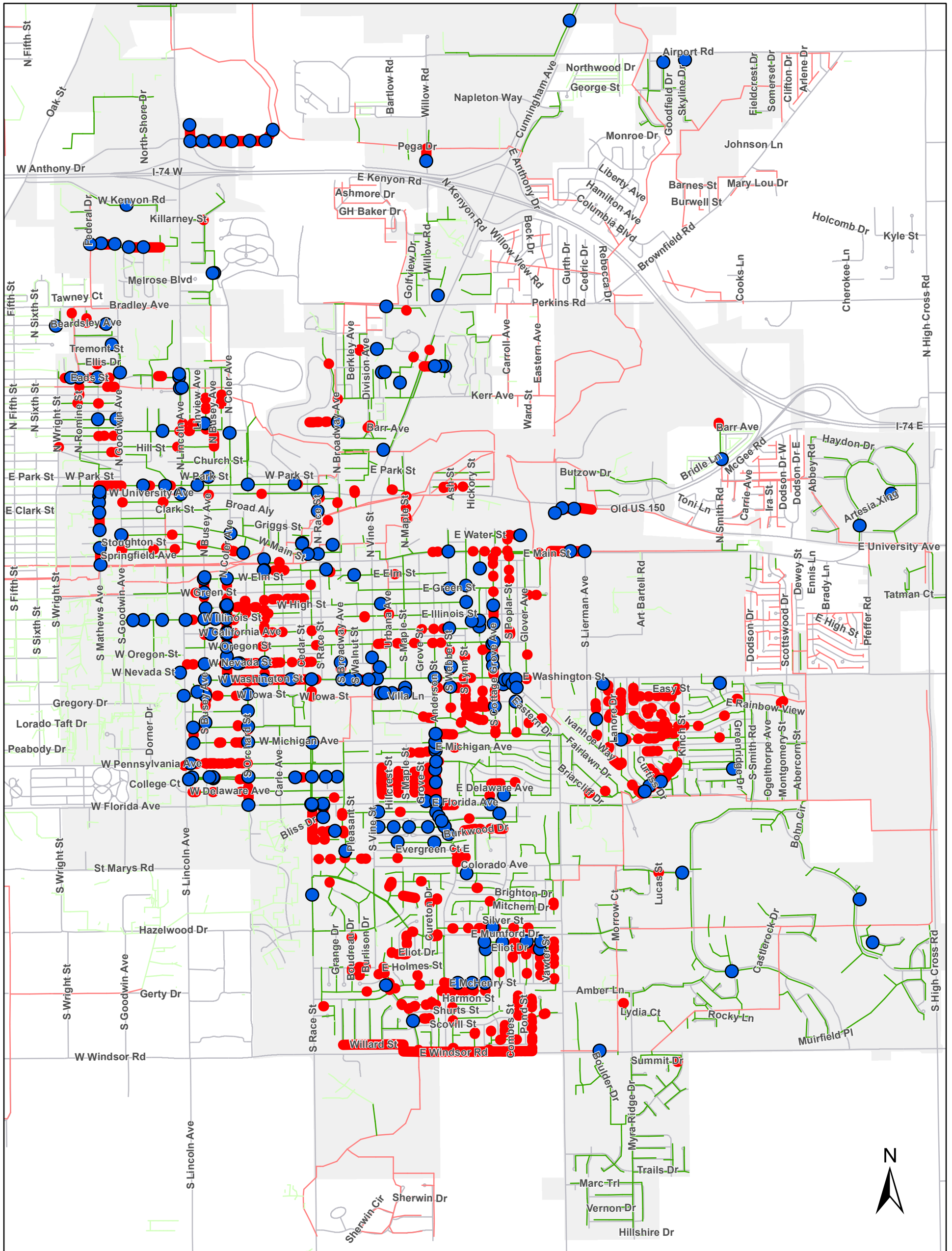


**Figure 3**  
**Sanitary and Storm Sewer Pipe Repair History**



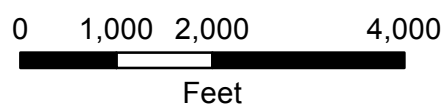


**Figure 4**  
**Sanitary and Storm Sewer Manhole/Inlet Repair and Installation History**



**Legend**

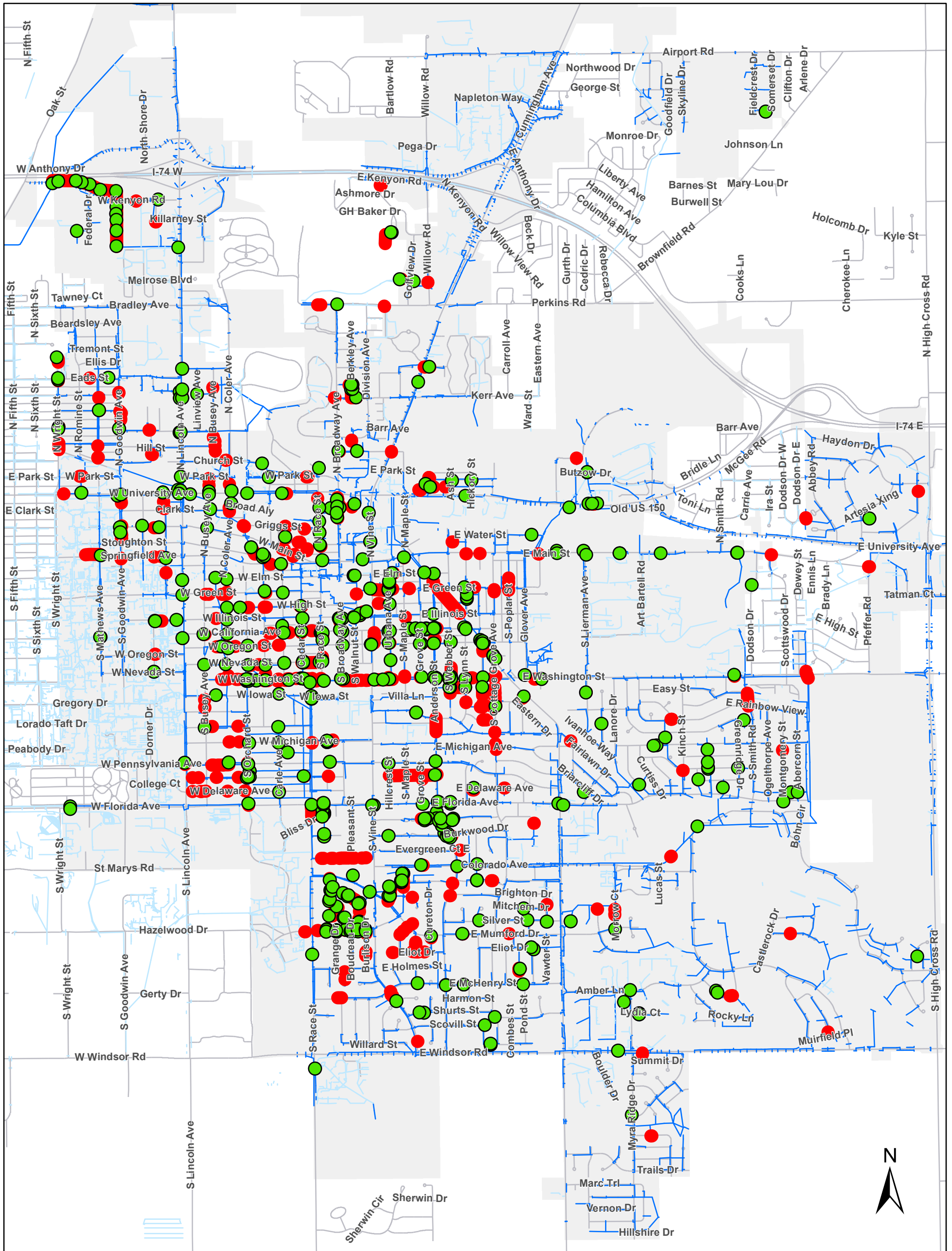
Sanitary Sewers City of Urbana	Sanitary Manhole Repairs 1988-2017
UCSD	Sanitary Sewer Pipe Repairs 1988-2017
Private	Corporate Limits City of Urbana



**2017 SEWER ACTIVITY REPORT**

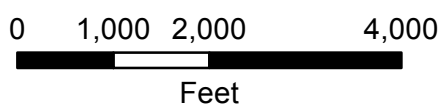
**FIGURE 5**  
SANITARY SEWER REPAIR LOCATIONS  
1988 - 2017





**Legend**

<b>Storm Sewers</b>	<b>Storm Manhole and Inlet Repairs</b>
— Private	● 1988-2017
— City of Urbana	<b>Storm Sewer Pipe Repairs</b>
	● 1988-2017
<b>Corporate Limits</b>	
■ City of Urbana	



**2017 SEWER ACTIVITY REPORT**

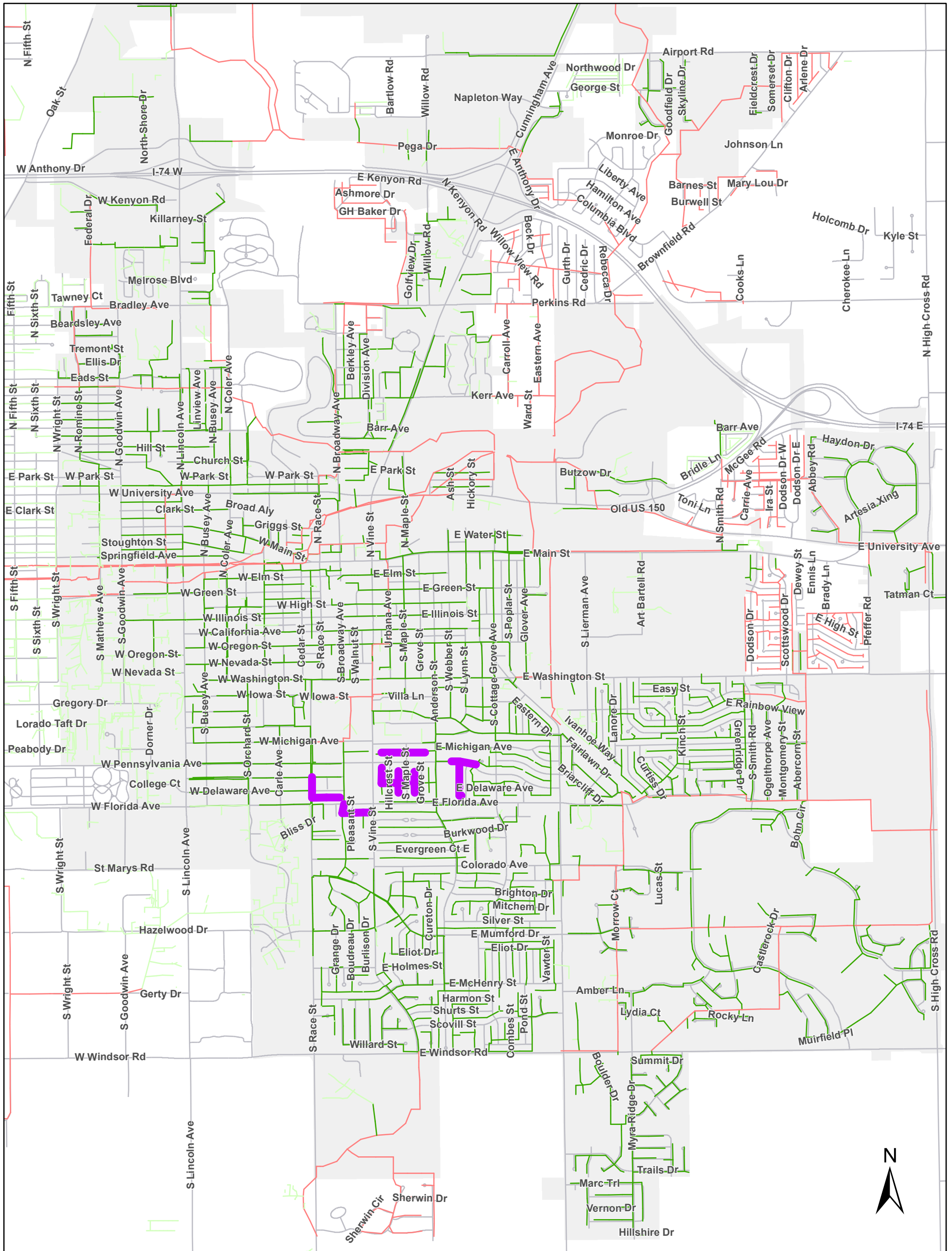
FIGURE 6  
STORM SEWER  
REPAIR LOCATIONS  
1988 - 2017

<b>Sanitary Sewer Project</b>	<b>Pipe Length (ft)</b>	<b>Diameter (in)</b>	<b>Manholes</b>
Green Street Sanitary Sewer Extension	210	8	2
MCORE Project	37	8	
<b>Sanitary Sewer Totals:</b>	<b>247</b>		<b>2</b>

<b>Storm Sewer Project</b>	<b>Pipe Length (ft)</b>	<b>Diameter (in)</b>	<b>Manholes</b>	<b>Inlets</b>
Miscellaneous Sewer Repair Contract	160	8	8	4
MCORE Project	2,430	12	14	58
	153	15		
	243	18		
Airport Road West Reconstruction Project	1,419	12	19	38
	877	15		
	856	18		
	527	24		
	110	36		
North Lincoln Avenue Project	100	15		
	108	18		
	679	24		
	164	30		
	374	84		
<b>Storm Sewer Totals:</b>	<b>8,200</b>		<b>41</b>	<b>100</b>

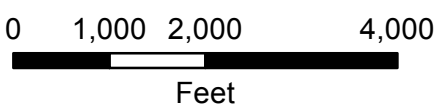
**Figure 7**  
**2017 Sewer Construction Projects**





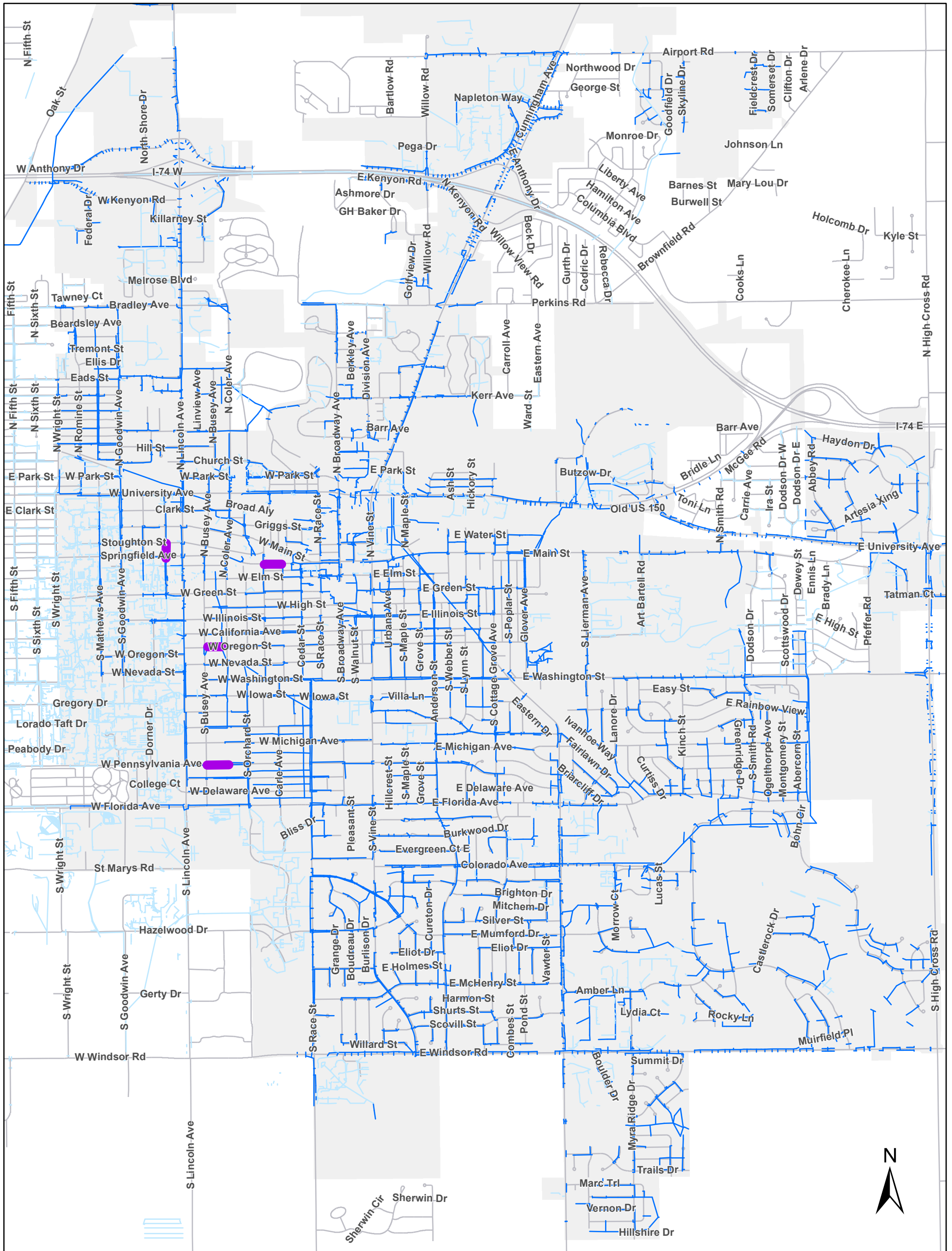
**Legend**

<b>Sanitary Sewers</b>	<b>Sanitary Sewer Lining</b>
<span style="color: green;">—</span> City of Urbana	<span style="color: purple;">—</span> 2017 Sewer Lining Project
<span style="color: red;">—</span> UCSD	<span style="background-color: gray;"> </span> Corporate Limits
<span style="color: lightgreen;">—</span> Private	<span style="background-color: gray;"> </span> City of Urbana



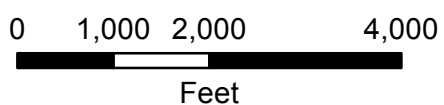
**2017 SEWER ACTIVITY REPORT**

**FIGURE 8**  
SANITARY SEWER LINING - 2017 PROJECT



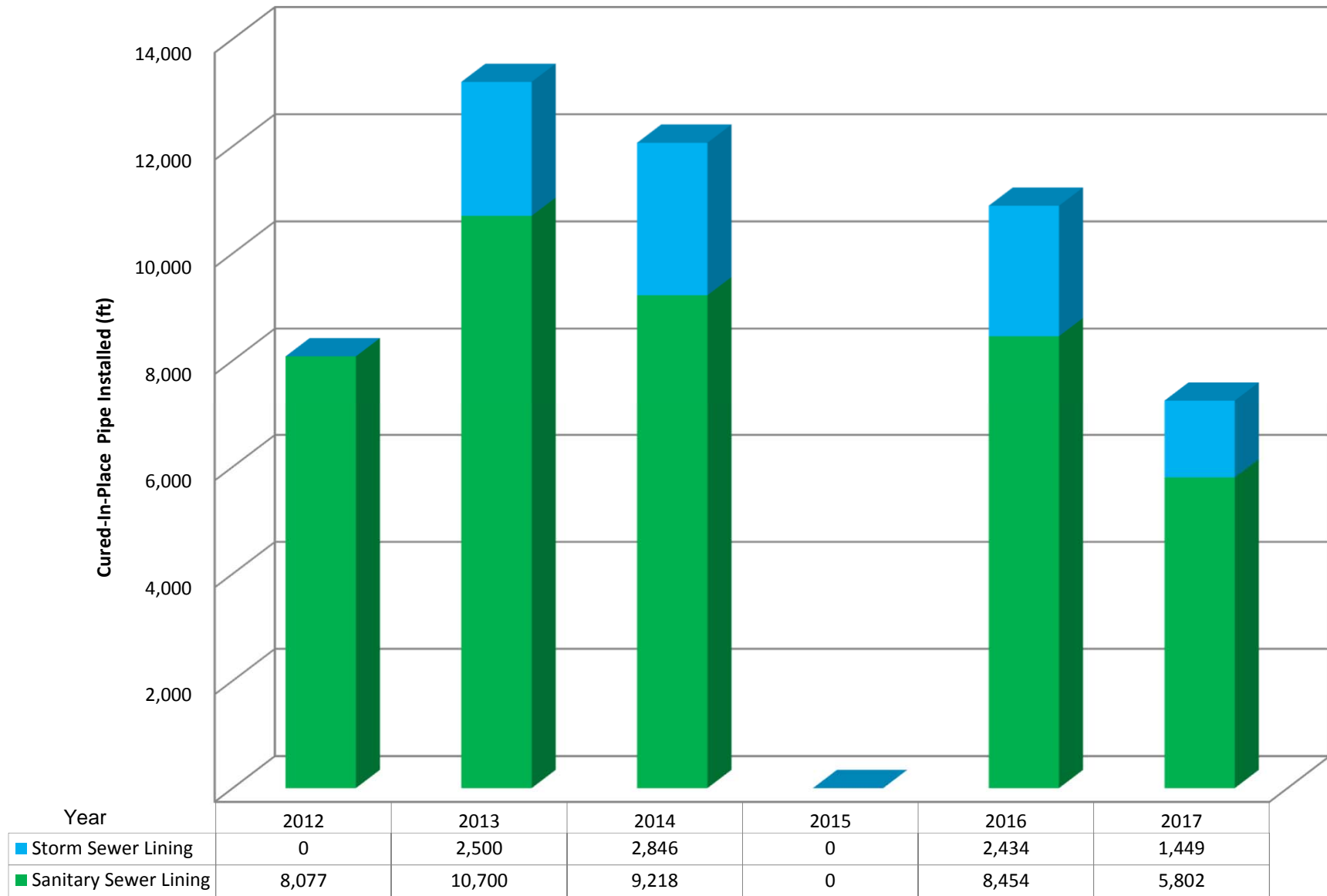
**Legend**

Private Storm Sewers	Storm Sewers 2017 Sewer Lining Project
City of Urbana Storm Sewers	Corporate Limits City of Urbana



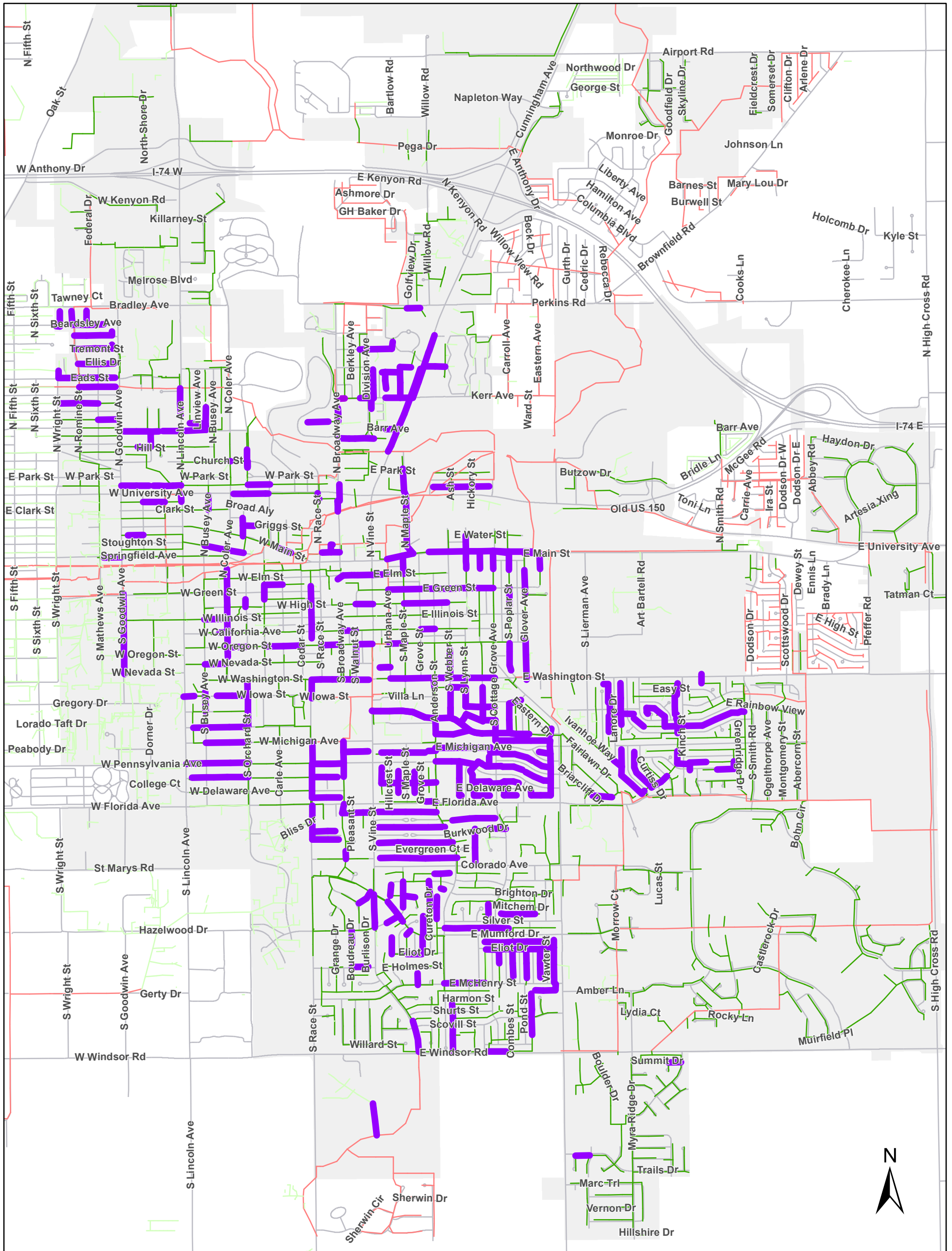
**2017 SEWER ACTIVITY REPORT**

FIGURE 9  
STORM SEWER LINING - 2017 PROJECT



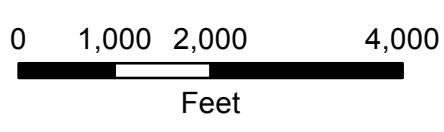
**Figure 10**  
**Sanitary and Storm Sewer Cured-In-Place Pipe Sewer Lining History**





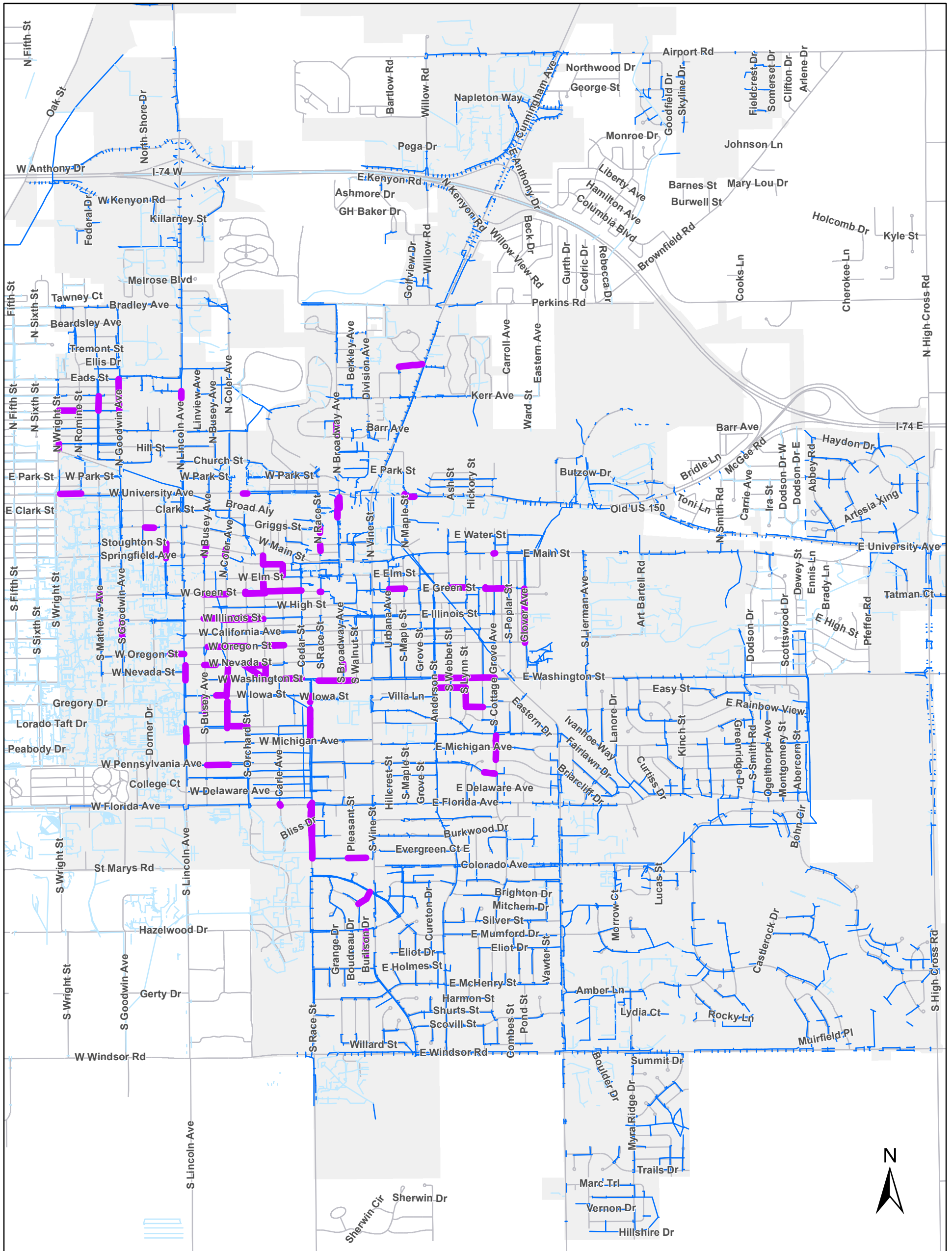
**Legend**

Sanitary Sewers	Private	Corporate Limits
City of Urbana	Sanitary Sewer	City of Urbana
UCSD	Lined Sewers	



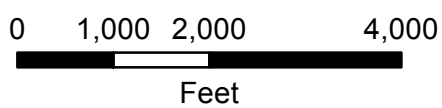
**2017 SEWER ACTIVITY REPORT**

FIGURE 11  
SANITARY SEWER LINING  
1998-2017



**Legend**

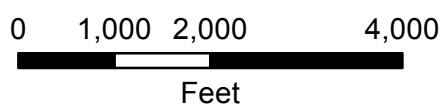
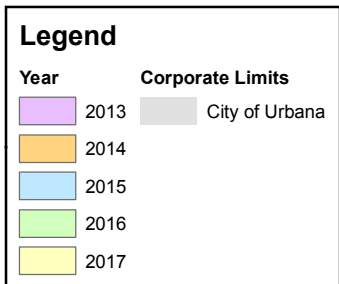
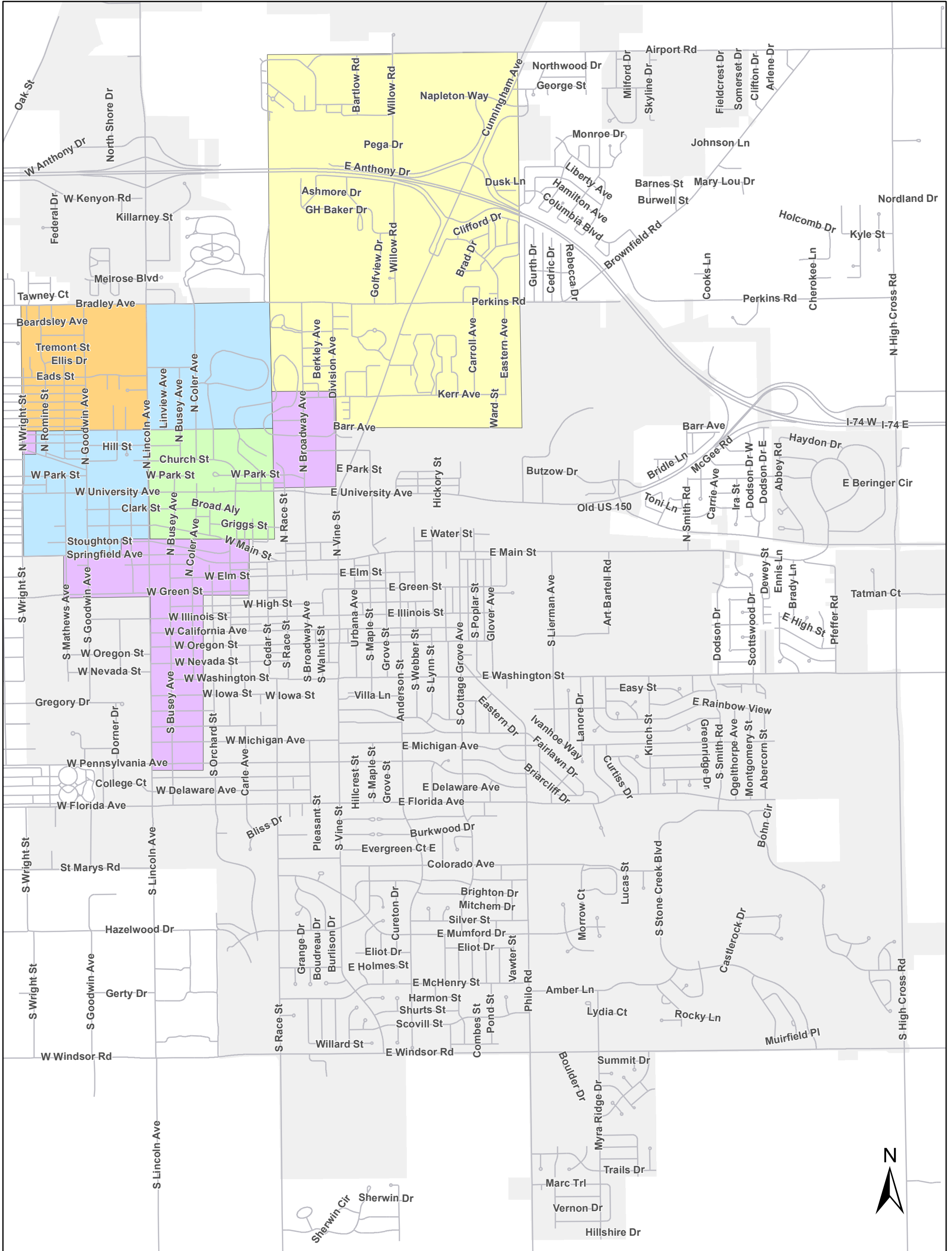
Private	Storm Sewers
City of Urbana	Corporate Limits
	City of Urbana



**2017 SEWER ACTIVITY REPORT**

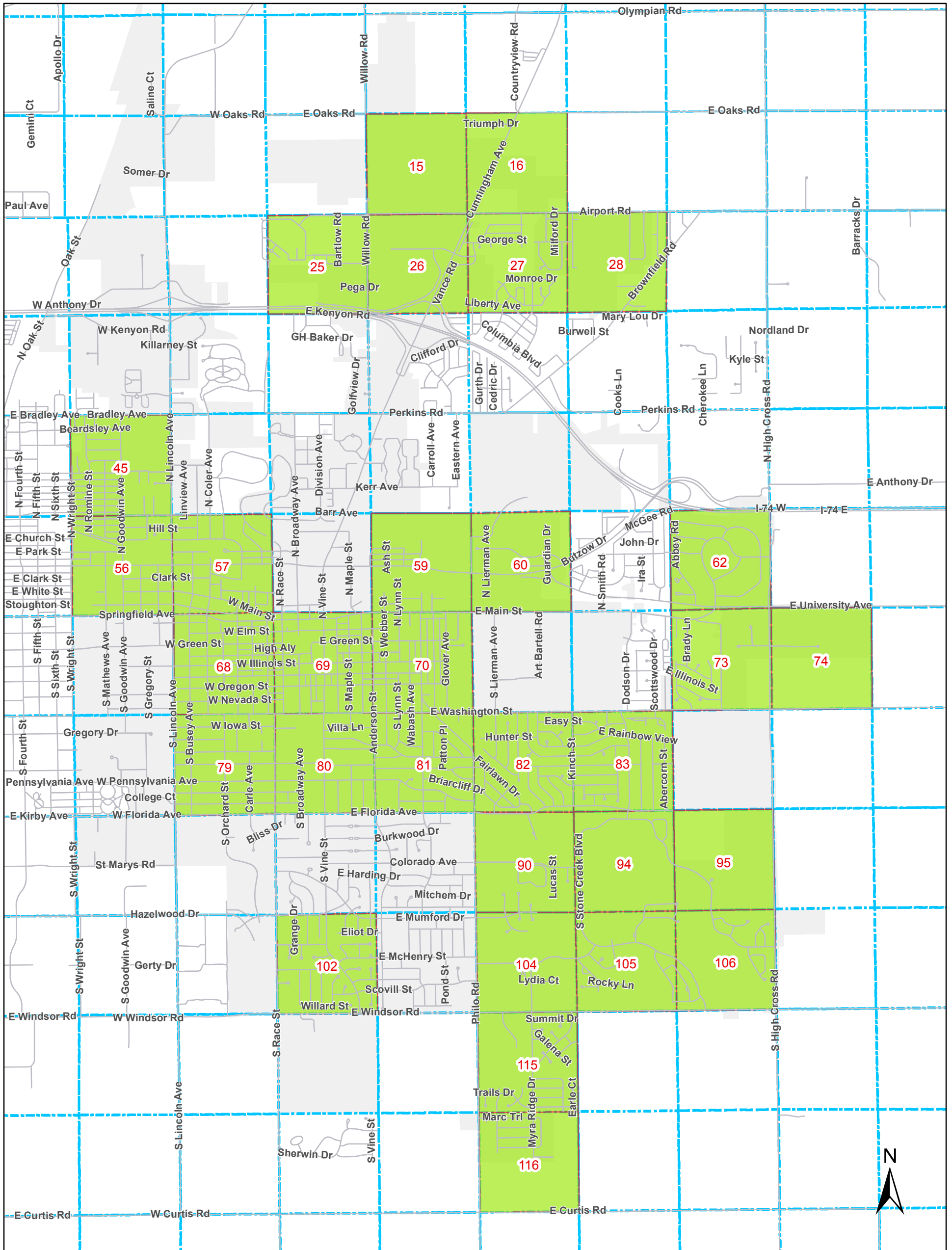
FIGURE 12  
STORM SEWER LINING  
1998 - 2017





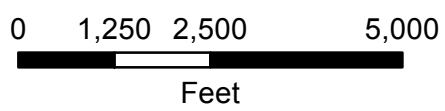
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FIGURE 13  
2017 SYSTEMATIC STORM  
SEWER CLEANING AND  
TELEVISION



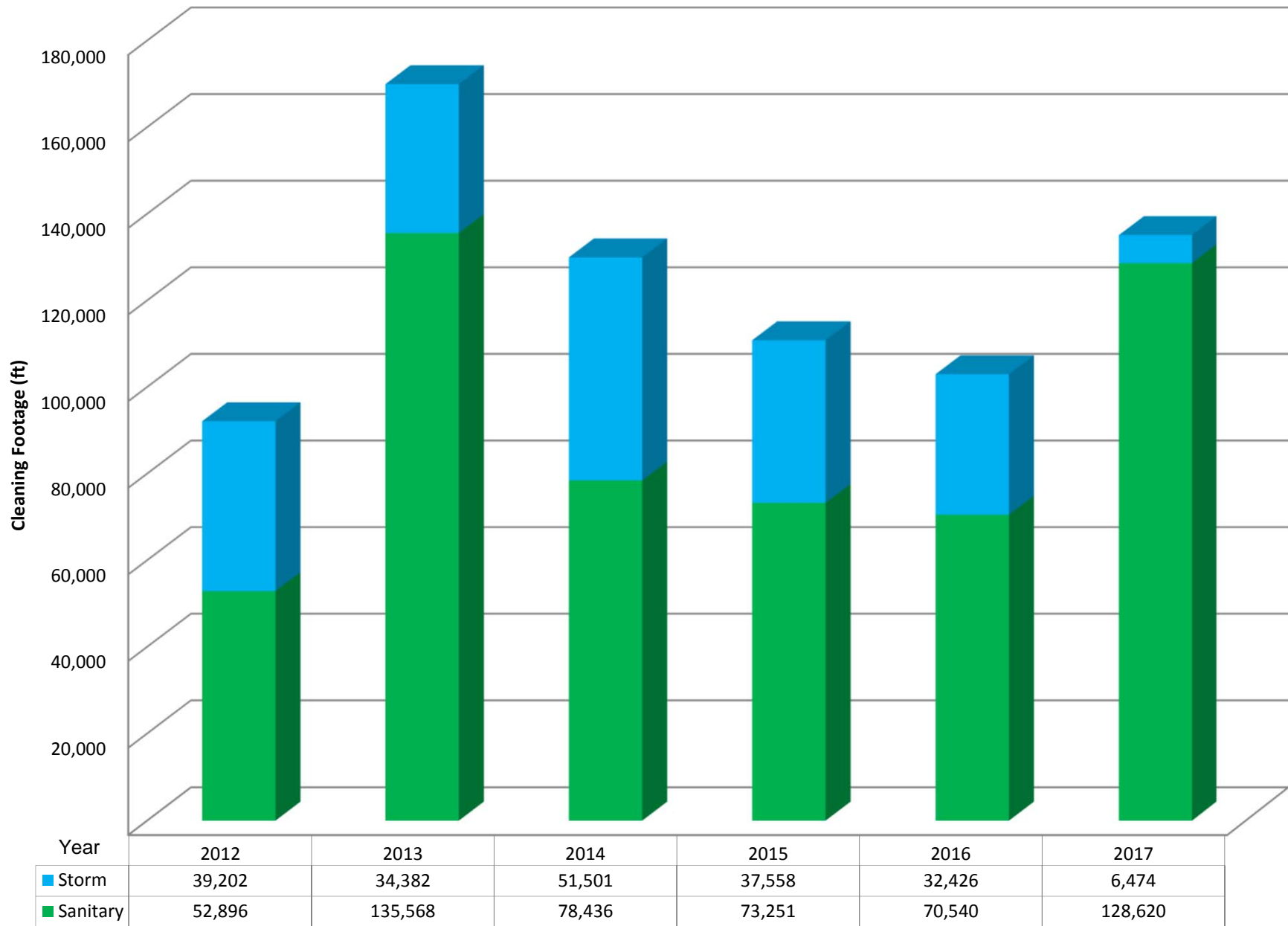
**Legend**

City Sections	Corporate Limits
<span style="display:inline-block; width:15px; height:10px; background-color:lightgreen; border:1px solid black;"></span> Systematic Cleaning	<span style="display:inline-block; width:15px; height:10px; background-color:lightgray; border:1px solid black;"></span> City of Urbana



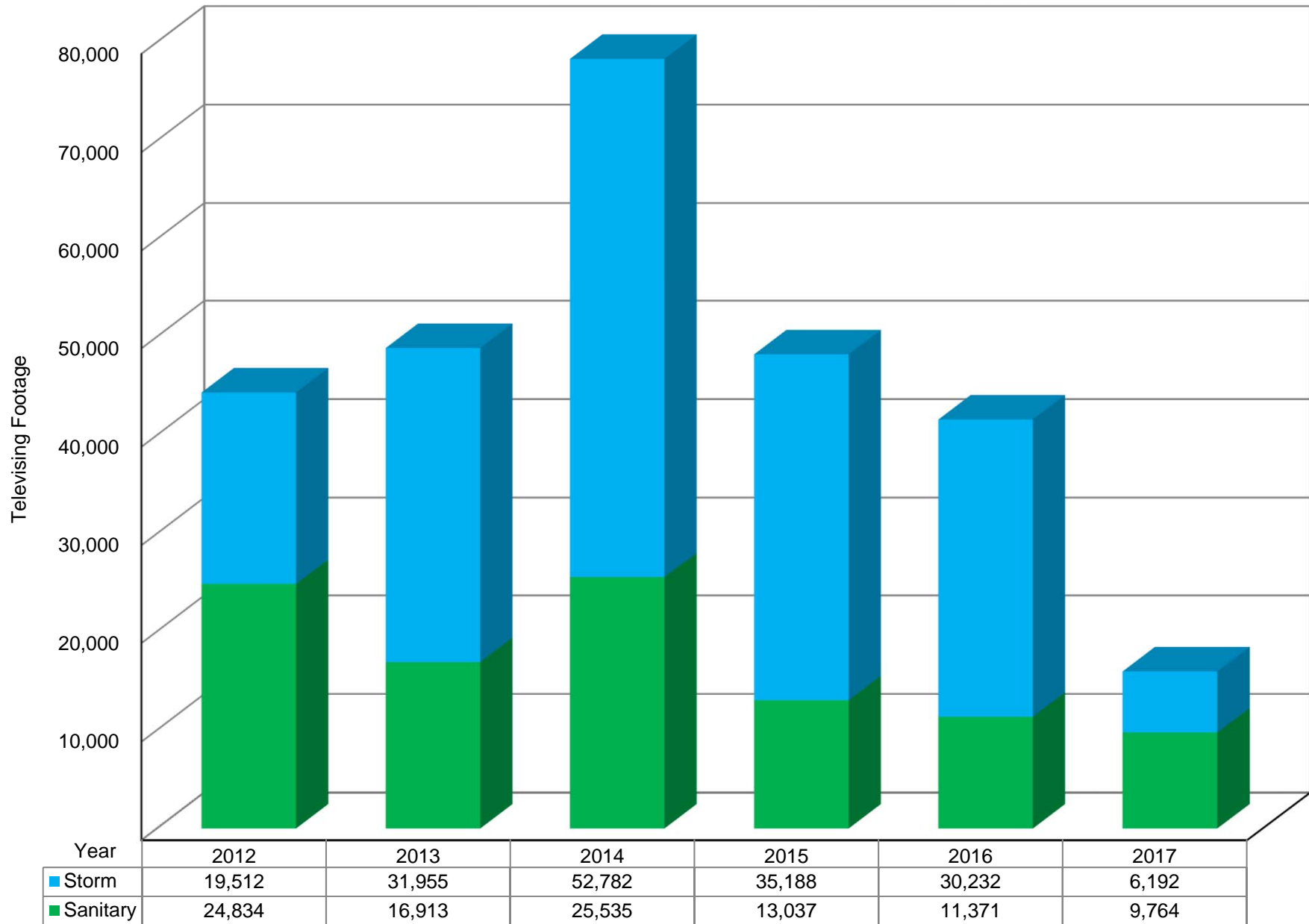
**2017 SEWER ACTIVITY REPORT**

FIGURE 14  
 SYSTEMATIC SANITARY  
 SEWER CLEANING  
 2012-2017

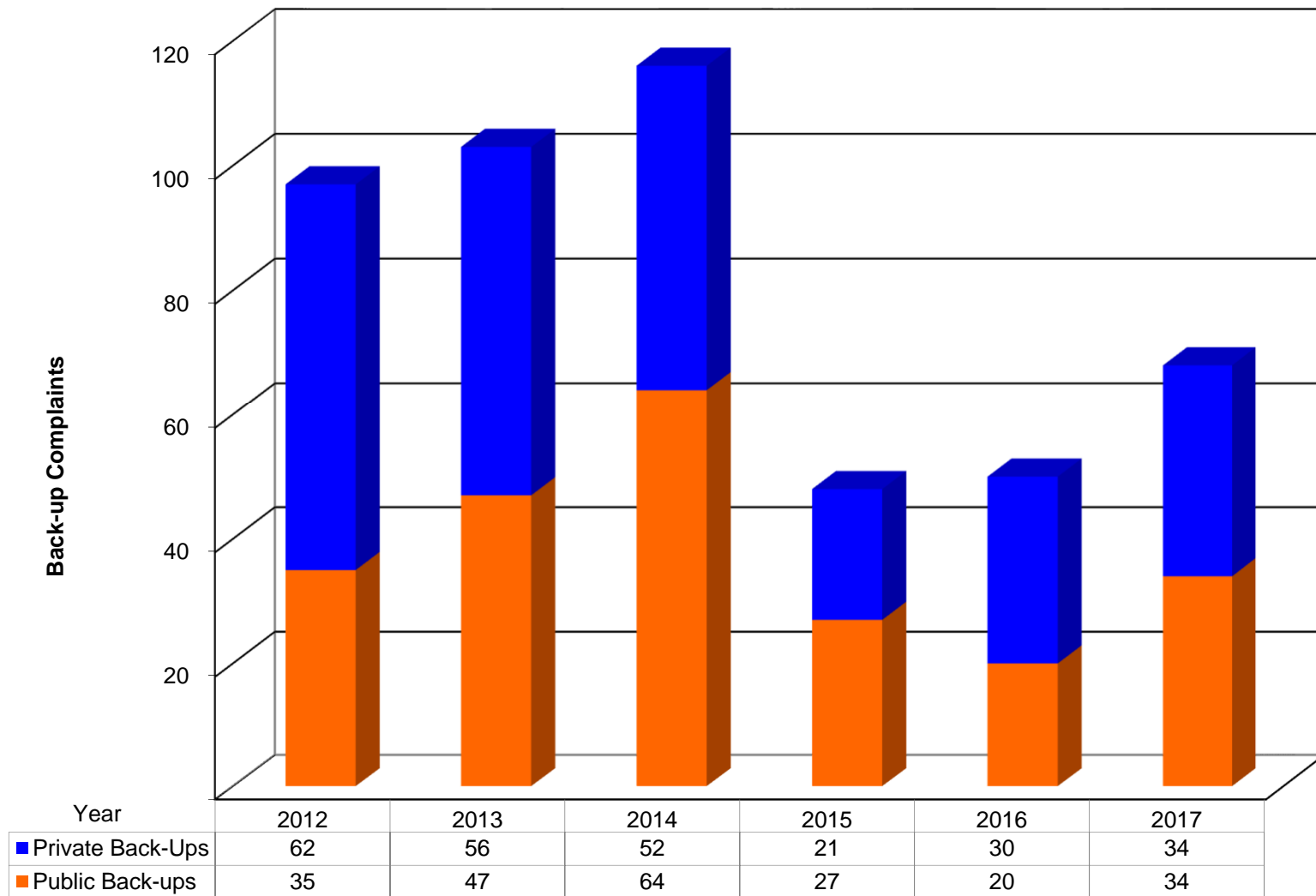


**Figure 15**  
**Sanitary and Storm Sewer Cleaning History**





**Figure 16**  
**Sanitary and Storm Sewer Televising History**



**Figure 17**  
**Dry Weather Sanitary Sewer Back-Up Complaint History**



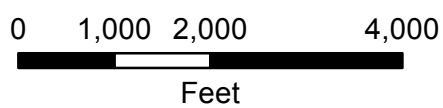
**Legend**

2017 Sanitary Sewer Back-Ups

■ 2017

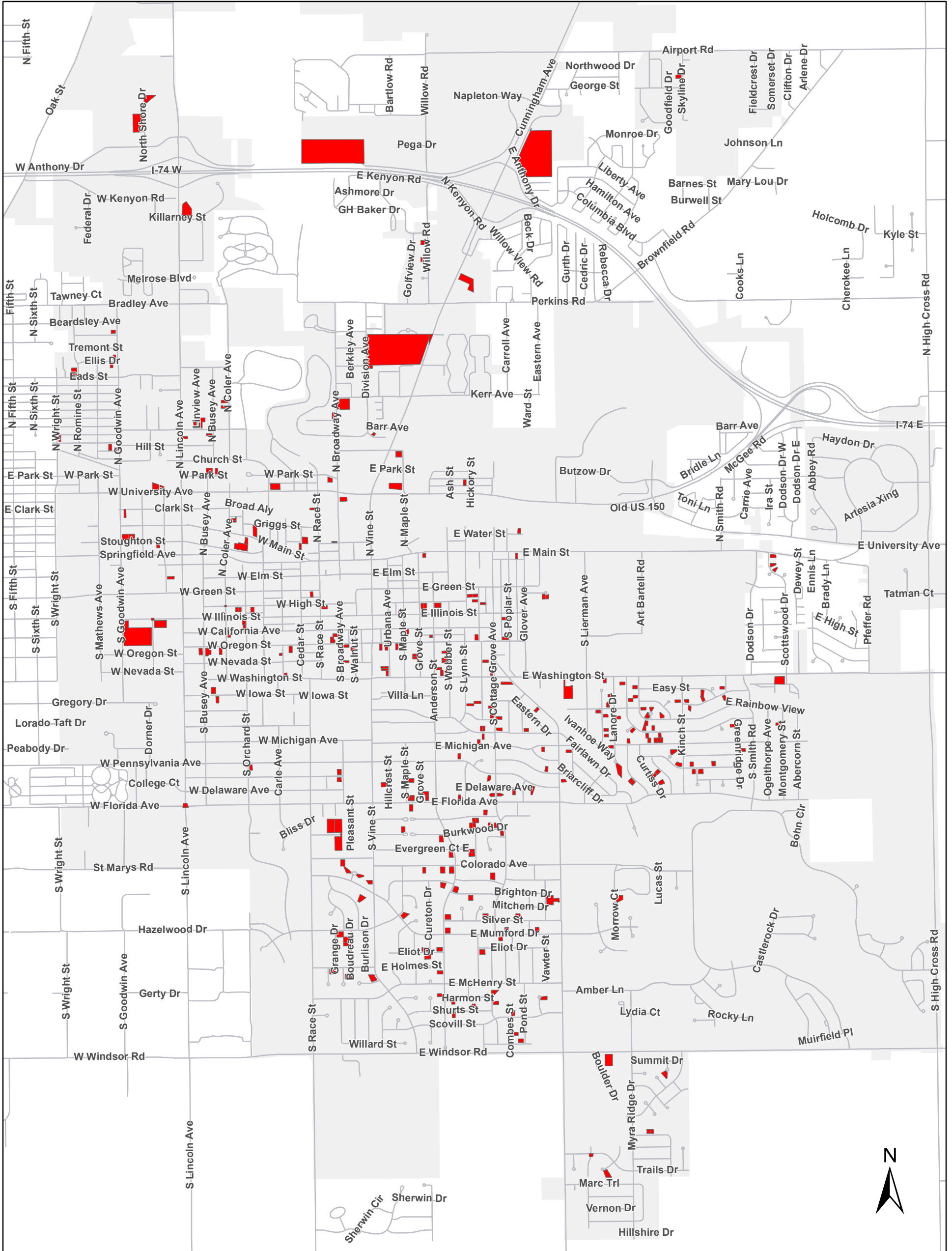
Corporate Limits

City of Urbana



**2017 SEWER ACTIVITY REPORT**

FIGURE 18  
PUBLIC SANITARY SEWERS  
DRY WEATHER BACK-UPS  
2017



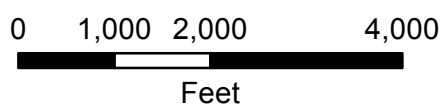
**Legend**

Sanitary Sewer Back-Ups

■ Back-Up Location

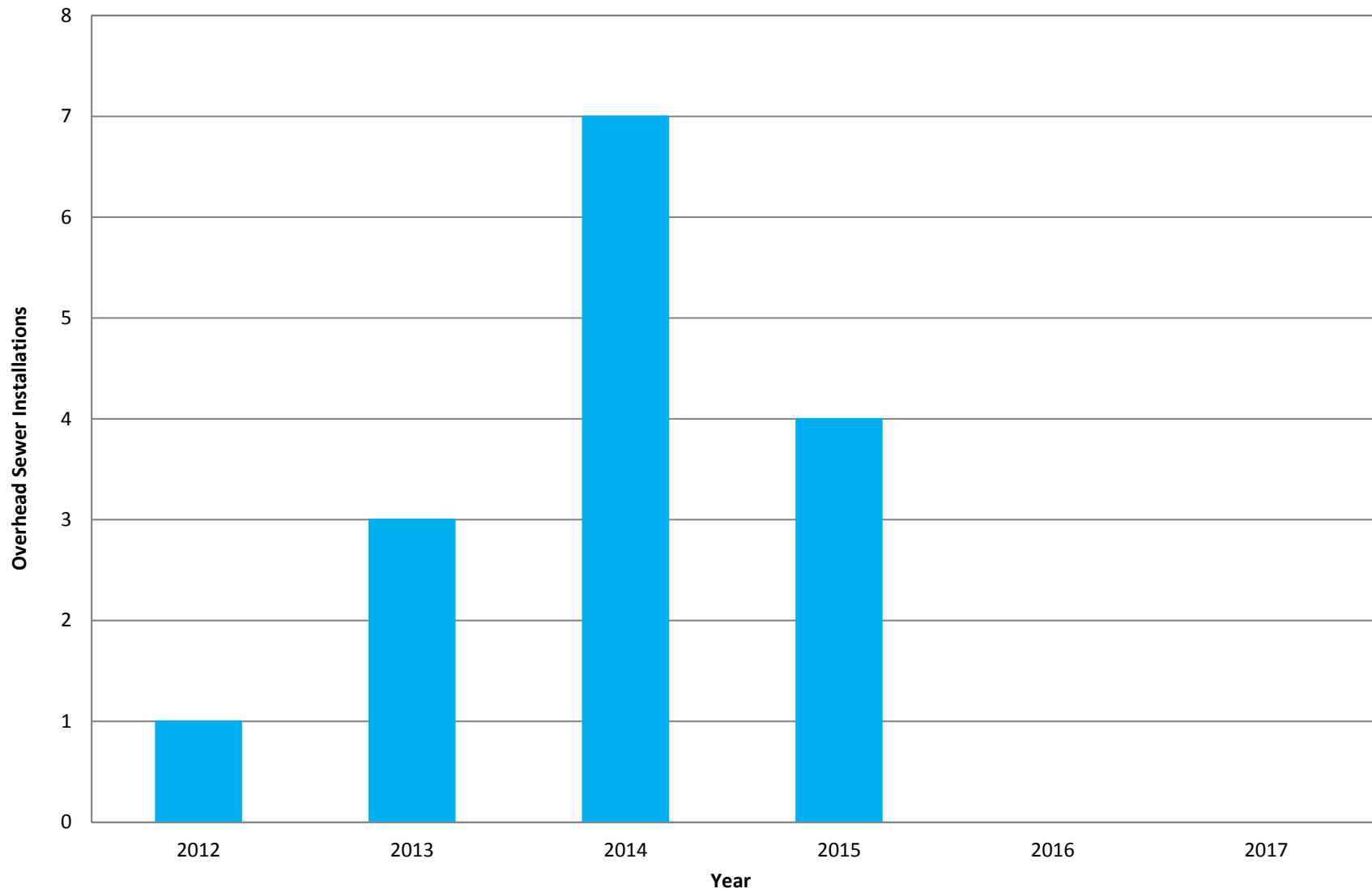
Corporate Limits

City of Urbana



**2017 SEWER ACTIVITY REPORT**

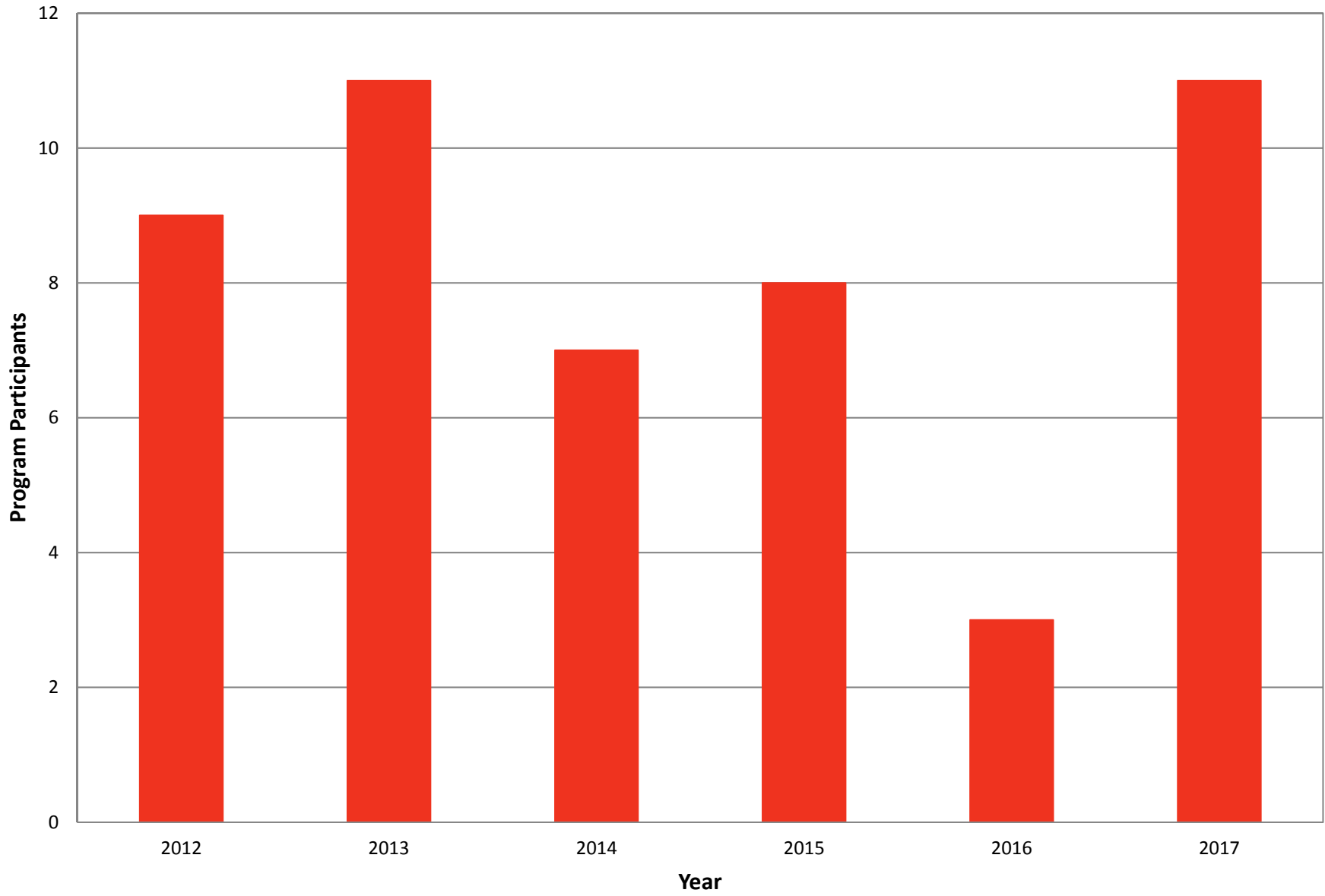
FIGURE 19  
PUBLIC SANITARY SEWERS  
DRY WEATHER BACK-UPS  
2010 - 2017



**Figure 20**  
**Overhead Sanitary Sewer Installation History**  
**Overhead Sewer Installations 2012-2017**

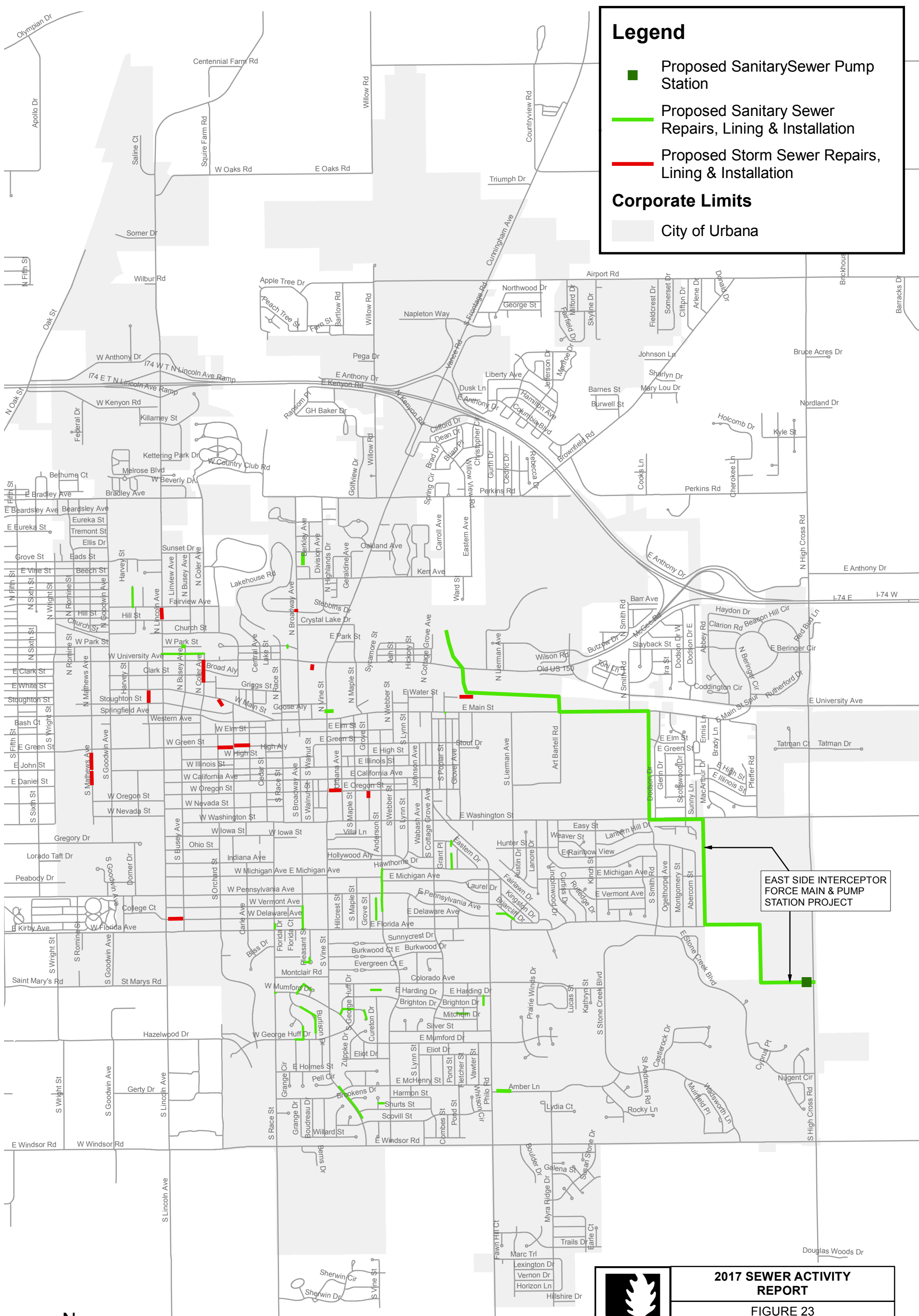
#	Address	Date	Reimbursement	Description
1	211 E. Green St.	4/21/2017	\$2,150.00	Collapsed Sewer Lateral Pipe
2	309 S. Poplar St.	4/25/2017	\$5,000.00	Severe Root Intrusion to Sewer Lateral
3	1001 E. Water St.	5/17/2017	\$5,000.00	Collapsed Sewer Lateral Pipe
4	705 S. Anderson St.	5/31/2017	\$5,000.00	Collapsed Sewer Lateral Pipe
5	507 E. Oregon St.	7/7/2017	\$2,868.00	Collapsed Sewer Lateral Pipe
6	206 S. Poplar St.	7/18/2017	\$350.00	Root Intrusion and Collapsed Sewer Lateral Pipe
7	401 S. Johnson Ave.	8/17/2017	\$5,000.00	Collapsed Sewer Lateral Pipe
8	1011 S. Lynn St.	8/21/2017	\$3,915.92	Root Intrusion and Collapsed Sewer Lateral Pipe
9	1206 E. Main St.	9/8/2017	\$1,764.00	Collapsed Sewer Lateral Pipe
10	402 S. Johnson Ave.	11/27/2017	\$5,000.00	Collapsed Sewer Lateral Pipe
11	110 S. Cottage Grove Ave.	11/27/2017	\$5,000.00	Collapsed Sewer Lateral Pipe
Total			\$41,047.92	

**FIGURE 21**  
**2017 SEWER LATERAL PAVEMENT REIMBURSEMENT PROGRAM PARTICIPATION**



**Figure 22**  
**Sewer Lateral Pavement Reimbursement Program**





### Legend

- Proposed Sanitary Sewer Pump Station
- Proposed Sanitary Sewer Repairs, Lining & Installation
- Proposed Storm Sewer Repairs, Lining & Installation

### Corporate Limits

City of Urbana

**EAST SIDE INTERCEPTOR FORCE MAIN & PUMP STATION PROJECT**



**2017 SEWER ACTIVITY REPORT**

**FIGURE 23**  
**PROPOSED SEWER PROJECTS**  
**IN CAPITAL IMPROVEMENT PLAN**