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April 30, 2018
Water Quality Submittals Center
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Subject: ***Combined Sewer Bypasses and Overflows: Annual Report - 2017***
Metropolitan Council/City of Minneapolis Combined Sewer Overflow (CSO)
NPDES/SDS Permit No. MN0046744

To Whom It May Concern:

As required by Part II.A.3 of the above-referenced permit, enclosed is the Annual Report on the Combined Sewer System in Minneapolis.

Should you have any questions, please feel free to contact Ms. Mary Gail Scott, Environmental Compliance Manager, at (651) 602-1073.

Sincerely,

Leisa Thompson
General Manager

LT/tg

Enclosure

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2017 Annual Report

Combined Sewer System in Minneapolis

April, 2018

METROPOLITAN COUNCIL

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Section I. Summary

A. *Purpose of Report*

The purpose of this report is to meet the requirements of Part II.A.3 of the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permits issued to the City of Minneapolis, and Metropolitan Council, (Permit No. MN0046744).

The report contains information regarding permit administration, regulator monitoring results, maintenance of the regulators, outfalls, and combined sewers, improvements to the interceptor system, optimization of combined sewer overflow control, city sewer separation programs, rain leader elimination programs, progress in meeting other permit requirements, and a summary of special problems encountered during this reporting year. The report is intended to consolidate the activities of each of the joint Permittees.

B. *NPDES/SDS Permits*

The Combined Sewer Overflow (CSO) NPDES/SDS Permits MN0046744 and MN0025470 were reissued on February 26, 1997; these permits expired on June 30, 2001. Applications for reissuance of the permits were submitted on December 28, 2000 and to date have not been acted on by the Minnesota Pollution Control Agency (MPCA). MN0025470 was terminated in October, 2014 at the request of both the City of St. Paul and the Metropolitan Council.

C. *Metropolitan Council Environmental Services*

Metropolitan Council Environmental Services (MCES) monitored seven regulators in Minneapolis during this year. Additionally, MCES continued with previously required interceptor and regulator maintenance functions during 2017. Overflow duration and volume at the regulators and overflow sites, as well as the interceptor and regulator maintenance activities, are reported monthly and summarized herein. Efforts have continued on rehabilitating the Interceptor System in Minneapolis during 2017 thereby reducing I/I intrusion into the system, maximizing conveyance capacity and reliability.

D. *City of Minneapolis*

See Section III of this Report for the complete portion detailing the Combined Sewer Overflow (CSO) Program in the City of Minneapolis.

Section II. Metropolitan Council Environmental Services Activities and Progress

A. *Operational Plan*

General operation of the Combined Sewer System is described in the operational plan, which was approved by the MPCA on May 11, 1987. An amendment to the plan was submitted to MPCA in April 1991. A second amendment to the plan was submitted to MPCA on May 11, 2004. This Plan remains in effect under the continuing NPDES/SDS permits.

B. *Regulators Eliminated in 2017*

No regulator was eliminated in 2017, but improvement work was completed in 2017 on regulators R06 (Northwest Meters), R10 (Southwest Meters) and R12 (East Meters). The work completed on said regulators will eliminate the passive overflows and replace with gates that must be opened for an overflow to the river to occur.

C. *Monitoring Summary*

All regulators in Minneapolis are monitored continuously by means of level sensing systems and are visually inspected during rain seasons and after every 0.2" rainfall event. Given the performance of the collection system and these regulator sites over the past several years it is the intention of the MCES to reduce the inspection intervals to once per month March through November and after every 0.26" rainfall event. A list of the monitored sites is provided below:

1. R04 (1-37) Minnehaha Parkway & 39th Ave. S.
2. R06 (5-34) Northwest Meters
3. R07 (20-17) Portland Ave. S. & Washington Ave
4. R08 (7-33) E. 26th & Seabury
5. R10 (4-34) Southwest Meters
6. R12 (6-48) East Meters
7. R14 (2-35) East 38th St. & 26th Ave.

Telemetry systems at the remotely monitored regulators send the level signal to a computer system located at the MCES Regional Maintenance Facility (RMF) in Eagan. Data is stored, collected, and analyzed at RMF to compute overflow duration and volume for each event. Estimated overflow volume is computed using hydraulic formulas applicable to the geometry of each regulator. Monthly regulator reports have been submitted to the MPCA in accordance with Part I.C.1 of the Minneapolis CSO permit.

Caution is advised regarding use of the flow data. The instrumentation and weir configurations at the monitored sites are hydraulically unsuitable for highly accurate flow measurement; the error at any site may therefore be in the magnitude of 10% to 15%. Reported volumes are approximate calculations.

Ten (10) recording-type rain gauges are operated in the area tributary to the respective regulators. Rainfall data from these sites are telemetered to the computer system at RMF.

D. Maintenance Program

Each NPDES/SDS permit requires routine inspection of regulators and/or outfalls. Attachment A to each permit specifies inspection frequency and responsible party (MCES or City). Inspection frequency for the regulators and/or outfalls is based on a combination of factors including overflow volume, overflow frequency, and maintenance history.

Every MCES regulator is inspected after each 0.2-inch rainfall event but not less every other month: inspections made during 2017 are indicated in Table 1, below. During each inspection, the level-sensing instrument in the monitored regulators is inspected. Repairs and/or removal of obstructions are completed as needed.

Table 1. Inspections Completed in 2017

January	February	March	April	May	June
1/27/2017	2/9/2017	3/8/2017	4/4/2017	5/18/2017	6/1/2017
	2/21/2017		4/17/2017	5/23/2017	6/12/2017
			4/28/2017		

July	August	September	October	November	December
7/5/2017	8/14/2017	9/20/2017	10/4/2017	11/14/2017	12/5/2017
7/13/2017	8/18/2017		10/19/2017		12/27/2017
7/18/2017	8/25/2017				
7/20/2017					
7/27/2017					

E. Inflow/Infiltration(I/I) Surcharge Program

The Metropolitan Council has established I/I goals for all communities discharging wastewater to the Metropolitan Disposal System (MDS) based on the design peak-hour capacity of the interceptor(s) serving the community. Communities that have excessive I/I in their sanitary sewer systems are required to eliminate the excessive I/I within a reasonable time period.

Since June of 2004, each community that experienced flow rates in excess of its maximum allowable rate in any of its metersheds has received a surcharge payable to MCES under this program. The communities had the option to commit to I/I reduction programs and expend

funds, equal to or greater than the amount of the surcharge they were assigned. All communities deemed to have excessive I/I chose to commit to perform I/I reduction in lieu of paying MCES.

F. *Capital Improvements and Studies*

A number of capital improvements and studies were completed during 2013 -2017 or are currently underway to reduce CSO overflows, as described in this section and the following 'Minneapolis Capital Projects' map and project listing.

(1) Construction was completed on the R20 Regulator and R05 Regulator in 2014, effectively closing them.

(2) Construction was completed on the 3rd and Commercial (R02) regulator in 2013. The work of this project consists of installing new sluice gates, electrical equipment, a standby generator and restoration of concrete surfaces. The R02 overflow weir was closed in 2014.

(3) Improvements, similar to the R02 2013 work, were completed in 2017 for regulators R06, R10 and R12.

(4) Design on the R04 regulator improvements under Project 807629 is undergoing a Facility Plan Amendment, then the plan is to complete the design by Fall 2018, projected bid before May 2019, and construction in 2019 – 2021. This work is planned to allow R04 facilities to function effectively as CSO regulators in the near term and as emergency relief structure locations in the long term.

(5) Several rehabilitation, improvement or relocation projects continue to occur. The rehab involves cured-in-place pipe (CIPP) and manhole rehabilitation to reduce Inflow/Infiltration and assure structural reliability.

   a. Improvements to south Minneapolis interceptors 1-MN-344 including manhole rehabilitation, pipe replacement and CIPP lining were completed in 2016 (under 807628).

   b. Improvements involving CIPP lining portions of 1-MN-320 in Bassetts Creek Valley Park just west of Penn Avenue North and also west of BNSF railroad will occur in 2017-2018 under Project 807635. This will include MH 44 through MH 50 (Site 1) and MH 1 of 1-GV-460 to MH 60 (Site 2).

(6) Inspections of deep tunnels in Minneapolis utilizing closed circuit television and sophisticated analysis equipment was performed on 1-MN-300, 1-MN-310,1-MN-340, 1-MN-344, Minneapolis East Interceptor (MEI) tunnel, 1-SP-250 and the Joint Interceptor 1-MS-100 to identify I/I and structural issues. This effort was completed in 2014. Improving access and cleaning stretches of these deep sewers is currently in construction in 2017 - 2018. This includes the following (also see Figure 2):
   a. 1-MN-300 MH 10 to MEI Site 18 (Site 1), shaft 3 to drill hole 2 (Site 2), and upstream of the Eustis St. shaft (Site 3).
   b. 1-MN-310 shaft 7 REM to shaft 4 (Site 1) and upstream of shaft B (Site 2).

c. 1-MN-320 Currie & Dupont MH 37 to the Dupont & TH 55 structure (Site 1), Lyndale to MH 11A (Site 2), MH 6 to MH 8 (Site 3) and MH 1 to MH 4A (Site 4). Note: cleaning work at site 1 was partially completed in 2017 (MH 37 to MH 31).
d. Also, some areas of 1-MS-100 and 1-SP-250. Areas of 1-MN-340 have been delayed until after Regulator R04 work (Project 807629) is completed.

(7) Design is at 90 percent complete for relocation of the end 6,500-feet of Plymouth Forcemain, which part of this is due to the Blue Line – LRT project. The Council is currently in negotiations with BNSF for property acquisition. Note that the final 4,000-feet of the relocation is being designed to be a gravity sewer, which will ease future operation, maintenance and inspections. A new odor control facility will also be designed and constructed.

(8) Facility Planning for an interconnect between 1-MN-310/320 on the west side of the river and MEI on the east side was initiated, is currently on hold due to competing priorities. Future construction of this facility would allow further optimization of conveyance capacity, reliability and allow future rehabilitation of 1-MN-310 and 1-MN-320. Also, Facility Planning for 1-MN-340 improvements and/or parallel sewer was initiated, but placed on hold. Due to the need to protect groundwater resources that feed federally protected Camp Coldwater Springs, it is important to reevaluate matters to help assure that protection. Work on Project 807629 (Regulator R04) will proceed and thereafter work associated with 1-MN-340 will follow.

(9) Design of 4th Street (1-MN-310 & 320) Access Improvements is underway with biding in the spring and construction in 2018. Work is being scheduled to be completed by December 31, 2018.

G. *Annual Regulator Performance*

Last year there were zero overflows to the river recorded from the seven monitored regulator Minneapolis sites. By comparison, in 1984 at the start of the separation program there were 18 monitored regulator sites, which recorded 77 overflow events and over 1 billion gallons of overflow. An average of 0.20 overflow events from telemetered sites have occurred per year over the last 10 years; however, zero overflow events occurred in 2008, 2009, 2011 and 2012, 2013, 2014, 2015, 2016, 2017. The two overflow events which occurred in 2010 resulted from abnormal conditions associated with storm tunnel breaches allowing storm water to directly enter the sanitary system. These have been corrected.

Based on system performance, maintenance and capital improvements, CSO outfall status has been updated, as shown in Table 2, below.

Table 2. Proposed Regulator Removal Schedule

NPDES Outfall No.	Regulator Code	MCES No.	Name and/or Location	Removal Status
Minneapolis Regulators				
001	1-37	R04	**Minnehaha Tunnel Outfall** Minnehaha Pkwy. & 39th Ave S.	B
002	2-35	R14	**East 38th St. Outfall** East 38th St. & 26th Ave. S.	A
004	4-34	R10	**Southwest Interceptor Outfall** Southwest Meters Diversion	B
005	5-34	R06	**Northwest Interceptor Outfall** Northwest Meters Diversion	B
006	6-48	R12	**Eastside Interceptor Outfall** East Meters Diversion	B
007	7-33	R08	**East 26th St. Outfall** East 26th St. & Seabury Ave.	A, C
020	2-17	R07	**Chicago Ave. S. & N. Mpls Tunnel Outfall** Portland Ave. S. & Washington	B
012	12-28b*	R20	**Oak St. Southeast Outfall** Oak St. & 5th St. SE	Closed in 2014

***Replaced Original 12-28BRemoval Status for Combined Sewer Overflow Regulators: A: Monitoring is required before elimination can be scheduled. B: Additional monitoring is required; may be necessary to remain as an emergency outfall. C: R08, originally scheduled for closure in 2014 but because of some uncertainty it has been decided to continue monitoring R08 prior to closing**

MCES CAPITAL PROGRAM IN MINNEAPOLIS
April 2018

No.	Project Description	Construction Schedule
1	Mpls Deep Tunnel Access & Cleaning (Site 1 partially completed in 2017)	2018
2	Hopkins Forcemain Replacement (East Isles)	2020-2021
3	Replacement of 1-MN-344 Tunnel and R04; Odor Control	2019 - 2021
4	Replacement or Elimination of R08 & R14	TBD
5	4th Street (1-MN-310 & 320) Access Improvement	2018
6	Rehabilitation of Maintenance Access Structures (those not included in foregoing projects)	2017 - 2020
7	1-MN-310/320 Diversion Sewer to MEI (study on hold)	TBD
8	Parallel Conveyance Sewer for 1-MN-340 (study on hold)	TBD
9	Rehabilitation (CIPP Lining) of 1-MN-320 (Sites 1 & 2)	2018
10	East Meters & MEI Site 18 Odor Control (in preliminary design)	TBD
11	Plymouth Forcemain Relocation (associated work on 1-MN-320 at Olson Highway completed in 2017).	2019-2020
12	MEI Rehab Sluice Gates / Stop Log Renewal (in preliminary design)	2019-2020

TBD = To Be Determined
See Figure 1 for items 2 through 11. See Figure 2 for item 1 sites. See Figure 3 for item 12 sites.

Notes on completed projects:

1. East & West Meters Regulator Improvements (R06, R10 & R12); West Meters Odor Control; SCADA Improvements – all completed in 2017.
2. Deep interceptor inspections completed in 2014. These may lead to additional capital projects during 2015 to 2020.
3. Elimination of R20 in April 2014.
4. Elimination of R05 in September 2014.
5. Elimination of R02 passive overflow in September 2014.
6. CIPP Lining 1-MN-341 through Lyndale Park to Bryant Avenue completed in 2015.
7. Rehabilitation (CIPP lining) of 1-MN-344 (MH 73R to 151) completed in 2016.

Minneapolis Capital Projects

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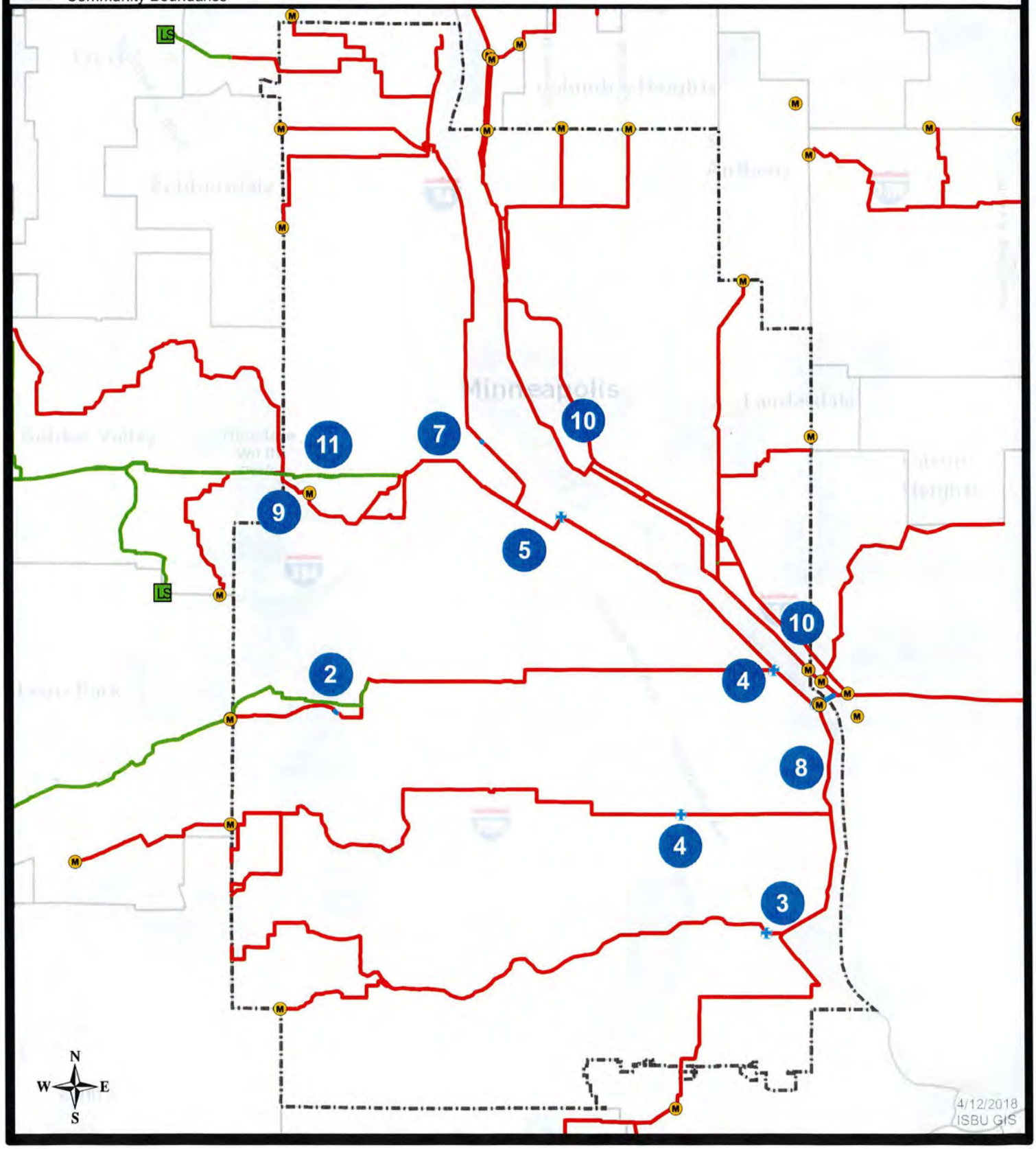
Interceptor Facilities
- Gravity
- Forcemains
- Siphon
- New Interceptor Construction
- Lift Stations
- Meters
- Regulators
- Minneapolis City Boundary
- Community Boundaries

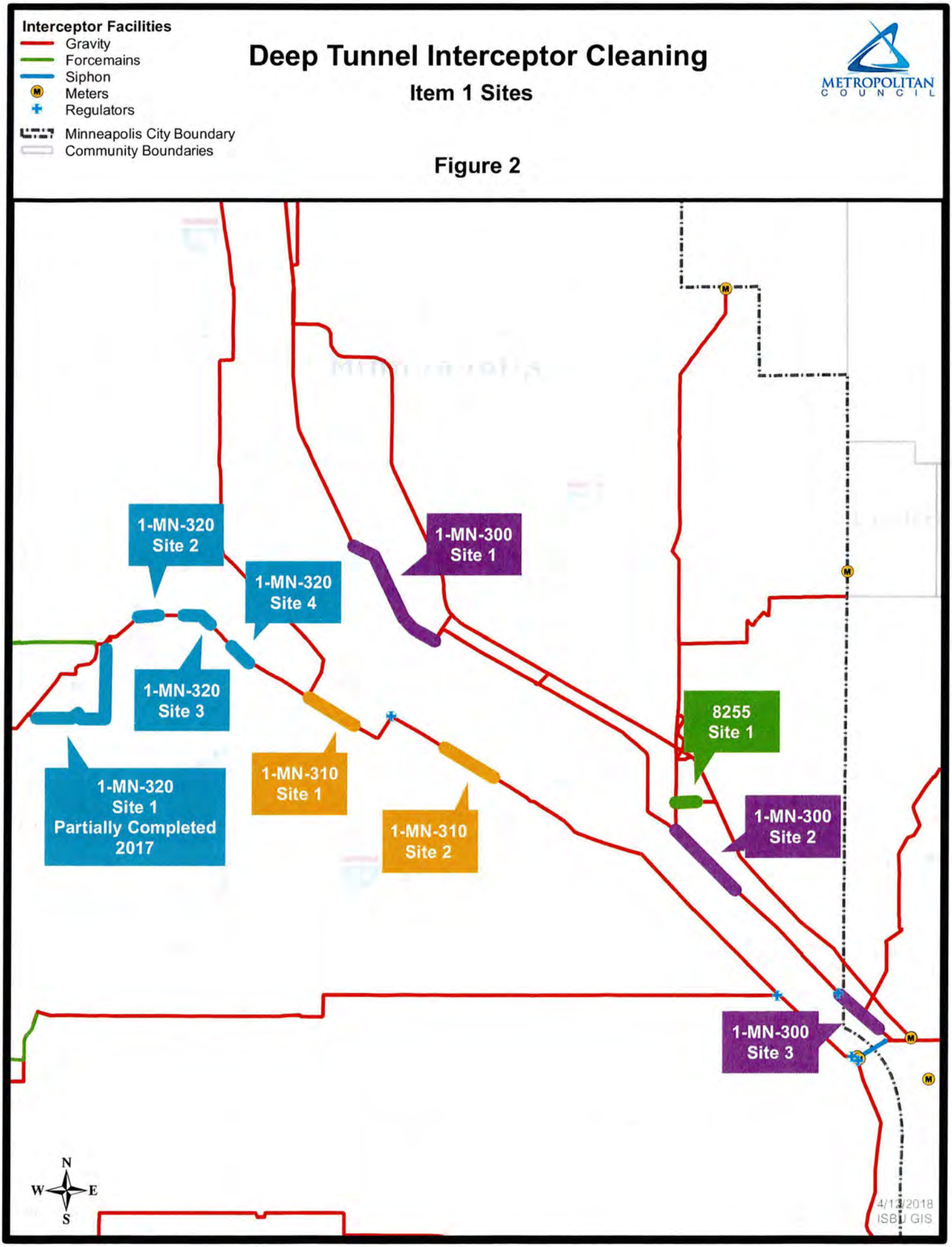
Figure 1



Deep Tunnel Interceptor Cleaning

Item 1 Sites

Figure 2



MEI Rehab Sluice Gates / Stop Log Renewal

Item 12 Sites

Figure 3

Interceptor Facilities
- Gravity
- Forcemains
- Siphon
- Meters
- Regulators
- Minneapolis City Boundary
- Community Boundaries

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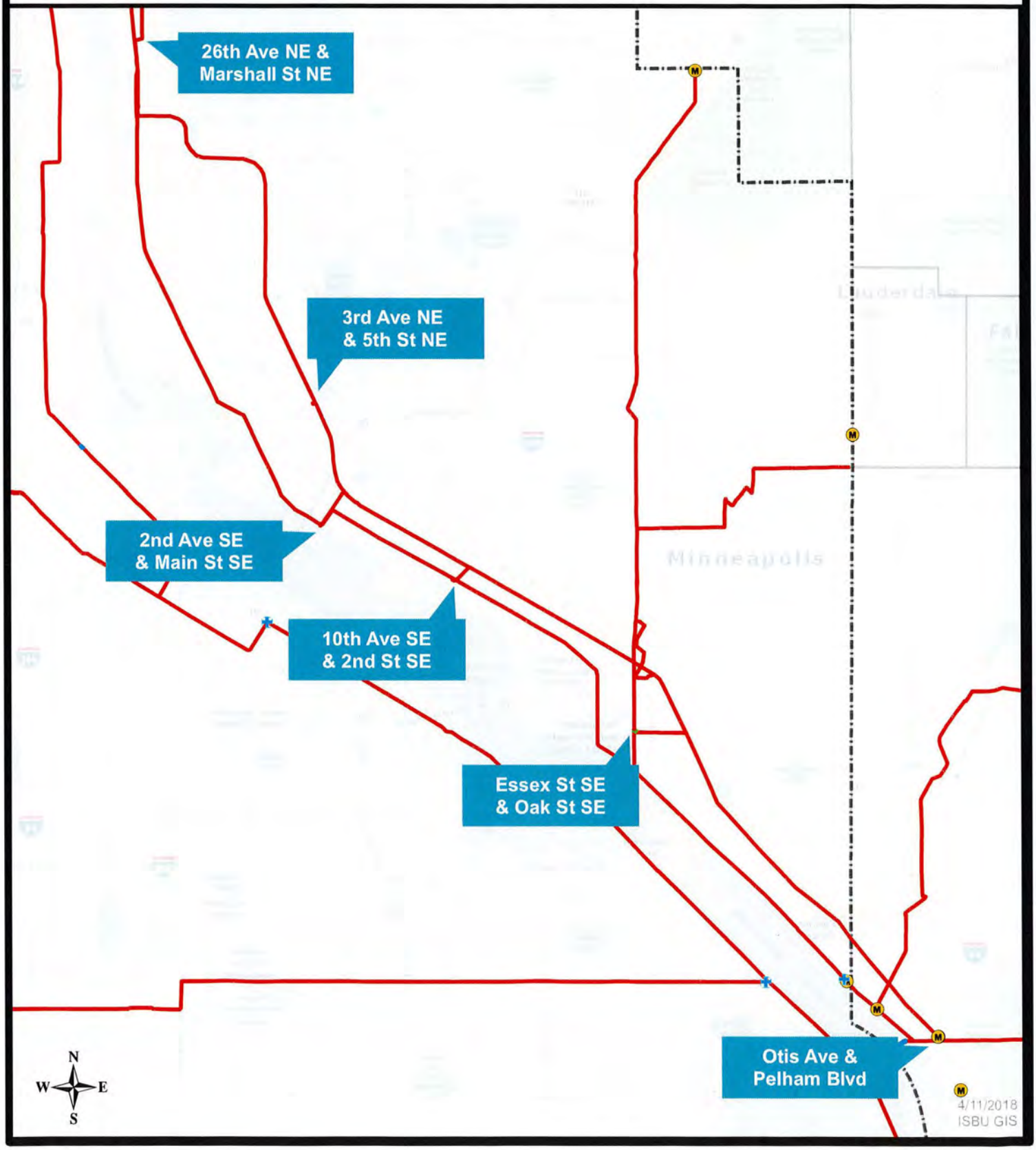

Section III. City of Minneapolis Activities and Progress

Minneapolis
City of Lakes

ANNUAL REPORT ON 2018 MINNEAPOLIS COMBINED SEWER OVERFLOW PROGRAM & 2017 ACTIVITIES

APRIL 17, 2018

I hereby certify that this plan, specification, or report, was prepared by me or under my direct Supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Katrina Kessler

Katrina Kessler, PE

Minneapolis Public Works, Surface Water & Sewers
Registration No. 45463

NPDES/SDS Combined Sewer Overflow Permit

The 1972 amendments to the Federal Water Pollution Control Act (also known as the Clean Water Act) provided the statutory basis for the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES program is designed to regulate the discharge of pollutants from point sources to waters of the United States. The Minnesota Pollution Control Agency (MPCA) has issued joint NPDES Combined Sewer Overflow (CSO) permits to the City of Minneapolis (City) and Metropolitan Council Environmental Services (MCES) since 1985.

These permits regulate CSOs by defining certain conditions that should be followed if an overflow event from the sanitary system occurs, including:

- Keeping detailed records of the number of CSO events
- Maintaining overflow volume data
- Maintaining operation and maintenance data for overflow events and elimination efforts
- Cooperation of joint permittees

A series of separate inter-agency agreements between the City and MCES details each permittee's responsibilities with respect to operation of the collection system, and notification in the event of a CSO from the sanitary sewer system. The most recent agreement reaffirms the shared commitment to invest in, operate, and maintain the respective systems to minimize releases, to reduce inflow and infiltration, and to protect public and environmental health.The most recent CSO permit was issued on February 26, 1997 and expired on June 30, 2001 (Permit MN 0046744). The City and MCES applied to renew this permit in December of 2000, and began negotiating with the MPCA regarding the terms for a new permit. The City has continued to operate under the expired permit requirements, and has developed a plan to control CSOs, including an aggressive approach to eliminate connected drainage areas and appropriate operation and maintenance of the system(s). Ongoing work includes partnering with MCES to study the regional wastewater system within the City of Minneapolis. The study will further the understanding of flow conditions and facilitate a work plan to address system impacts related to system hydraulic capacity, continued reliability, and risk reduction for system overflow.

Sewer Separation History in Minneapolis

The oldest Minneapolis sewers were built in 1870, and were designed to carry both sewage and stormwater. In 1922, construction started for a separate storm drain system around Minneapolis lakes, as well as newly developing areas. Older areas continued to be served by combined sewers. Sewer separation began in earnest in the 1960s, in conjunction with a citywide paving program.

In 1986, the City began an accelerated sewer separation program called *Minneapolis Combined Sewer Overflow Program - Phase I*. CSOs were greatly reduced by Phase I efforts. Phase I included the construction of storm infrastructure to disconnect stormwater runoff from 4,600 acres tributary to the sanitary sewer system. The Phase I program was supported in part by federal and state funds.

The Minneapolis Combined Sewer Overflow Program – Phase II was developed in 2002, based on a 1999/2000 comprehensive planning process and an April 2002 Brown & Caldwell study entitled *Combined Sewer Separation Evaluation*. The study identified inflow, rather than infiltration, as the major contributor to CSOs. The 2002 study recommended that Minneapolis:

- Disconnect public sector inflow sources: isolated catch basins (storm drain inlets), alley drains, and storm drains
- Disconnect private sector inflow sources: rainleader connections, area drains, or other clean water discharges
- Study and implement storage and conveyance improvements

CSO Program - Current Status and Progress

The City of Minneapolis continues efforts to remove inflow at catch basin and roof leader, and unknown sources of Inflow and Infiltration (I & I). Progress has been made, but separation is not complete (see Figures 1 and 2).

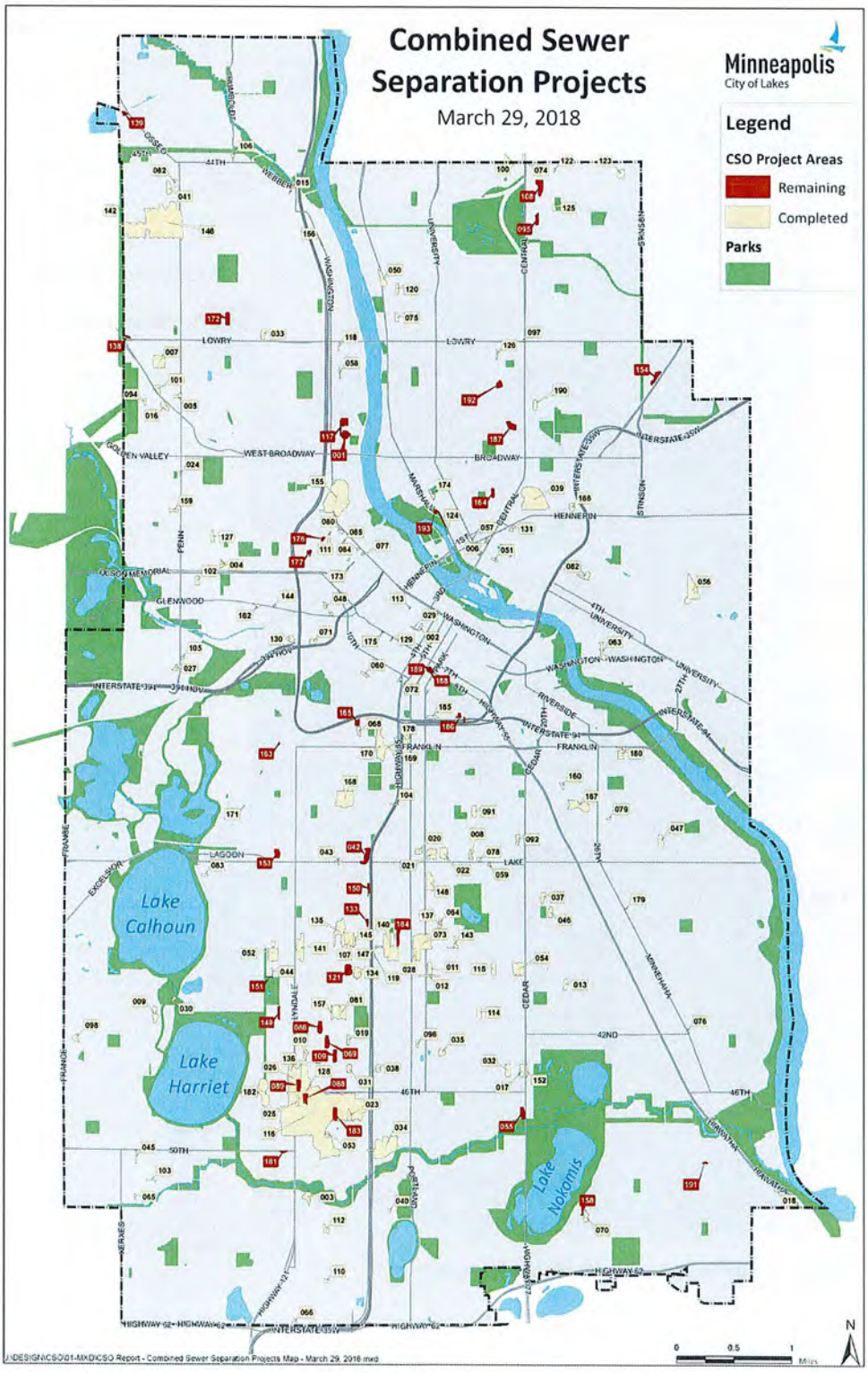

Figure 1 – Combined Sewer Separation Projects

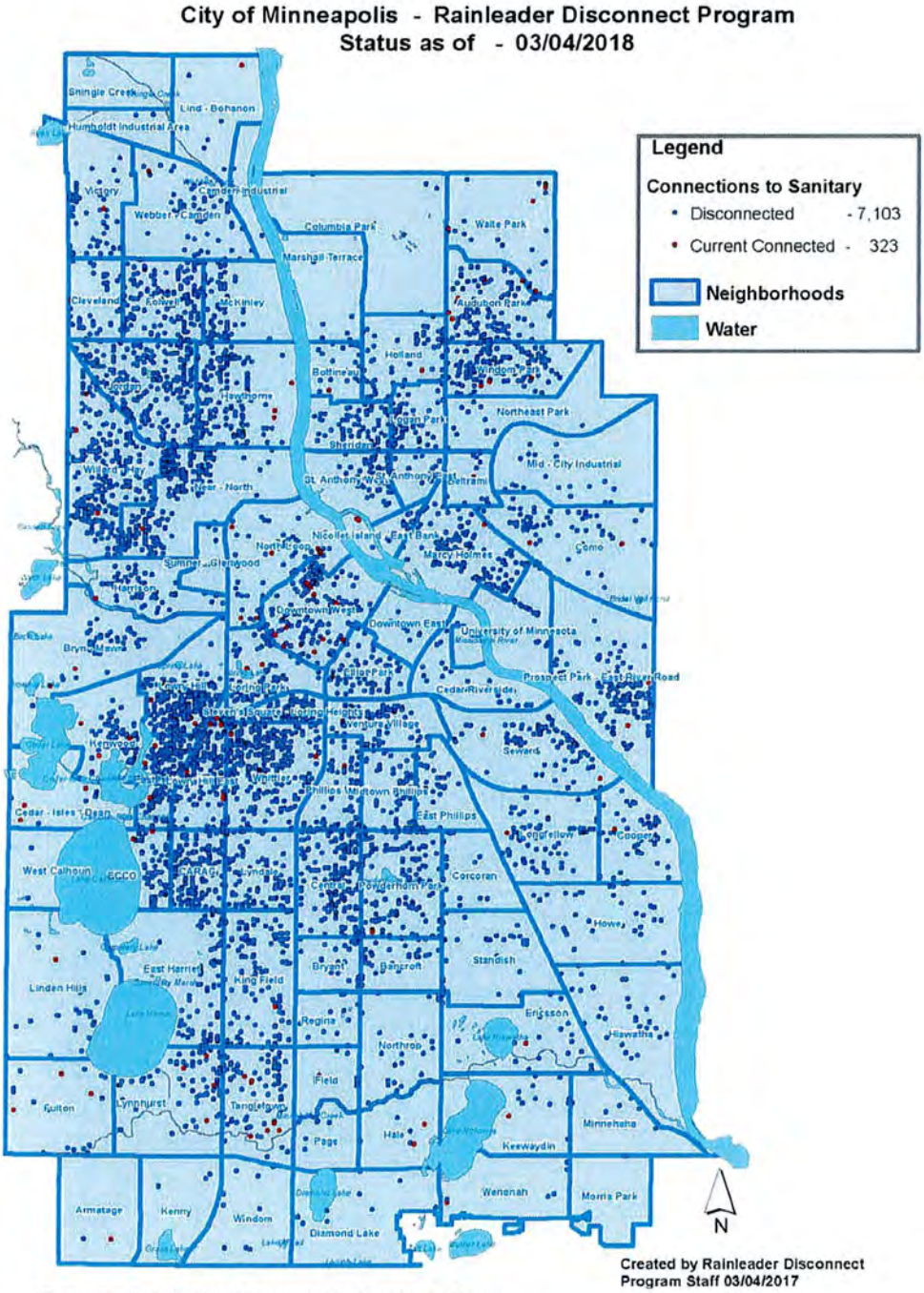

Figure 2 – Rainleader Disconnection Program Status

Progress has been dramatic throughout both Phase I and Phase II as upgrades to the system have been carried out (see Figure 3). Figure 3 indicates a very high percent capture since 1984. Frequency and volume of untreated sewage overflowing into the stormwater system during intense rainstorms and discharging into the Mississippi River have steadily diminished.

Minneapolis has had zero CSO events to the Mississippi River in nine of the past eleven years (two very small events occurred in 2010). Although combined sewer overflows can still occur, many years of dedicated efforts by Minneapolis Public Works staff have resulted in fewer CSO events. The remaining known connections are the most difficult and complex to resolve.

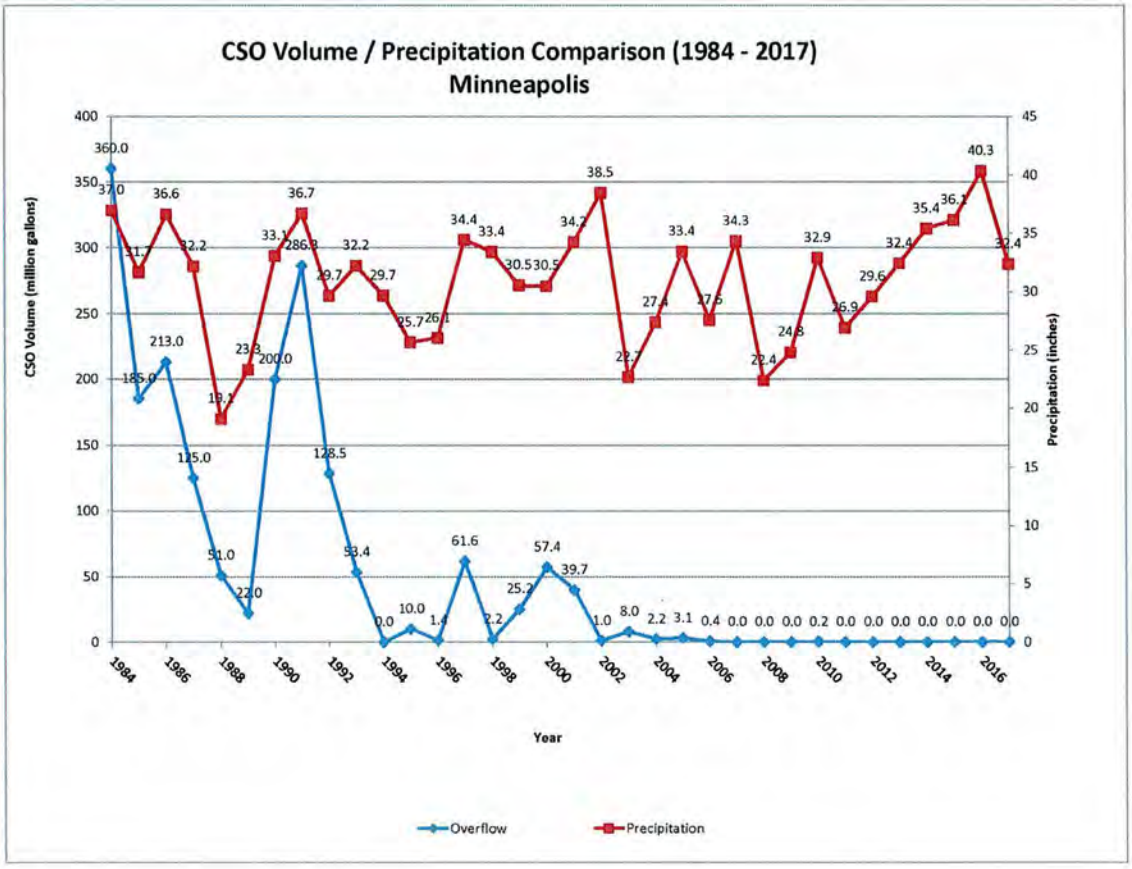

Figure 3 - Annual CSO Volume Precipitation

There are currently seven remaining overflow regulators in Minneapolis at the locations shown in Table 1. The elimination of overflow structures may not be feasible in every case without causing a public health or safety hazard. Some overflow regulators may need to remain operational for emergency relief necessitated by extreme storm or flood events, or to minimize damage due to accidents or system failures. Five of the regulators discharge to outfalls on the municipal storm drain system and two of the regulators (Southwest and Northwest meters) are direct outfalls from the MCES sanitary system. MCES is the responsible party for operation and maintenance of the regulators.

Regulator Site Location	Regulator Number	Responsible Party
39th Av S & Minnehaha Parkway	M001	MCES
38th St E & 26th Av S	M002	MCES
Southwest Meters	M004	MCES
Northwest Meters	M005	MCES
East Meters	M006	MCES
26th St E & Seabury Av	M007	MCES
Portland Av & Washington Av S	M020	MCES

Table 1 - CSO Regulators

Since its inception in 2002, Minneapolis Combined Sewer Overflow Program, Phase II, Surface Water & Sewers Division personnel have identified, categorized, and prioritized 193 "CSO areas", meaning areas in the right-of-way with a known connection of stormwater drainage to the sanitary sewer system. CSO projects are then programmed to separate these areas. Occasionally, new CSO areas are discovered by City staff. This information is a result of:

- Private sewer and water connection reviews (for possible combined connections) that are done prior to issuing any new/repair permits
- Utility and plumbing inspectors' identification of CSO areas as part of their current activities
- Continued education of City staff on the importance of identifying and disconnecting CSO areas
- Flow metering and smoke testing programs

2017 Completed CSO Projects (public separation work)

Project Name	Location	Drainage Acres
CSO142	Xerxes Ave N & 42nd Av N	1.18
CSO162	Glenwood Ave & 1123 Glenwood	0.74
CSO175	7th St S & Nicollet Mall	0.1
CSO190	18th Ave NE & Polk St NE	1.83
	Total Drainage Area Removed in 2017	3.85

Table 2- Completed CSO Separation Projects

Minneapolis initiated a program to identify and repair unknown sources of Inflow and Infiltration (I&I). The 2017 I&I program included the following components:

- Flow metering installation – 51 sites
- Smoke testing - 107 miles of smoke testing was completed in 2017. Since 2007 658 miles have been tested.
- CSO Investigations – Potential connections between the storm and sanitary sewer system are identified from record drawings as the City reviews and update the GIS database. 49 CSO investigations were completed in 2017.
- I&I Repairs – Repairs to manholes, catch basins and bulkheads are identified during I&I studies. These repairs are tracked separately from CSO projects, because the drainage to these structures is unknown. 62 I&I repairs were completed in 2017.

Unknown sources of inflow have an effect on the system demonstrated by the following meter data in Figure 4. The graph compares wet weather (black series) and dry weather flow (gray series). The difference between wet weather flow and dry weather flow is inflow (red series). These metering data reveal an immediate reaction of increased flow in the sanitary system after a rainfall event (olive).

This meter depicted by Figure 4 is located on the City's system in Minneapolis on Washington Ave SE & Huron Blvd. This is representative of inflow in a sewershed located in Southeast Minneapolis.

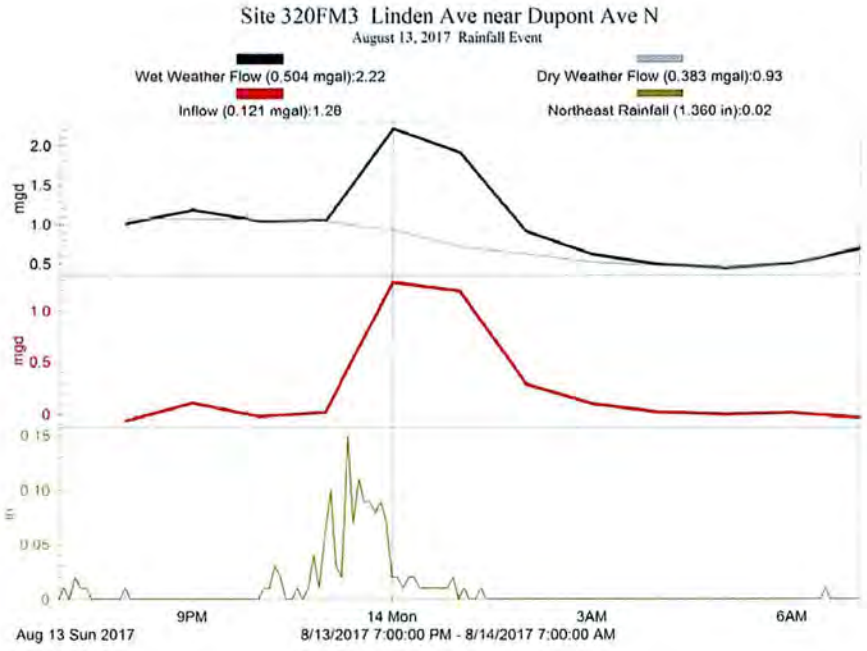

Figure 4 - Flow Metering Data

Additional CSO Program Activities

These activities directly or indirectly benefit the elimination of CSOs:

Sanitary Sewer Collection System

The sanitary sewer system within the City of Minneapolis is 852 miles in length. Of those, 777.2 miles of sewers are owned and maintained by the City, while 74.8 miles are owned and maintained by MCES.

The Sewer Operations section routinely inspects sanitary infrastructure, and performs needed maintenance to ensure proper operation. Staff has divided the City into 100 areas for their sewer main cleaning program. This program is significant to the CSO program because it uncovers and reveals inflow and infiltration (I & I). Sewer mains are cleaned by many different methods, which include jetting, discing and rodding. Annual records are kept that describe the condition, as well as the cleaning that was done for that year. City staff also utilizes GIS to create maps to better track progress.

Sanitary sewers are cleaned on a 8-24 month cycle but occasionally additional cleanings are needed. The 9 sanitary lift stations in the City are cleaned each spring, and then checked on a regular basis to determine if additional cleaning is needed. In addition to cleaning, maintenance in 2017 also included:

- 169 sanitary sewer repairs
- 6.53 miles of sanitary sewer lined with a cured-in-place
- 108 (requested by residents) possible sanitary backups were inspected.
- 41 minor sanitary repairs were addressed
- 270.1 miles of sanitary sewer were jetted with high pressure forced water
- 0 miles of sanitary sewer were rodded (cleaned)
- 170 miles of sanitary sewer were televised

Storm Drain Collection System

Minneapolis Sewer Operations section routinely inspects storm drain infrastructure, and performs needed maintenance to ensure proper operation. Inspection and maintenance frequency are event-driven, based on experience and inspection results history.

There are currently 145 grit chambers in Minneapolis that are inspected, cleaned and maintained. These grit chambers help to prevent sediment, debris and oil from entering area lakes, rivers and streams. Grit chambers inspection is based on a schedule by Minneapolis Sewer Operation personnel, and cleaned if necessary. Sediment is removed, the presence of floatables is noted, and the grit chamber cleaning dates are logged recorded in a database.

Storm drain outfalls are inspected on a five-year schedule, generating information on:

- Condition of structures
- Significant erosion
- Any necessary repairs

Grit chamber maintenance and repairs are planned within the constraints of resources and budget, as well as the schedules of other operations. Ponds and pump stations are inspected after significant rainfall events; however, other events might require a maintenance response.

Catch basins are cleaned, removing accumulated sediment, trash and debris. This prevents pollution of receiving waters and minimizes flooding problems. Employees from the Public Works division of Street Maintenance section performs annual inspections, during which they clean catch basin grates on summer street sweeping routes, removing debris and sediment from blocked structures.

Statistics from the 2017 Storm Drain Maintenance program include:

- 246 major repairs to the storm drain system
- Performed 137 minor repairs to storm drain lines, catch basins or manholes
- Televised and condition assessed 11.78 miles of storm drain pipe
- Inspected 131 and cleaned 121 grit chambers. A total of 336 cubic yards was removed from the grit chambers.
- Maintained 11 stormwater holding ponds
- Inspected 3 of 387 known storm drain outfalls. Monitored and maintained 26 pump stations
- 11.89 miles of storm drain were jetted with high pressure forced water

System Challenges

The City of Minneapolis has separated a significant amount of clear water from the sanitary sewer system to the stormwater system. The remaining sources of inflow pose both technical and financial challenges. The receiving stormwater system is at or above capacity in many locations, creating structural and operational risks with the infrastructure. Much of the City's storm system ultimately discharges into storm tunnels. During heavy rain events, pressurization occurs, creating various problems that affect the integrity of the storm tunnels. These problems include fracturing of the tunnel liner, which in turn creates voids in the sandstone surrounding the tunnel. Some of the storm tunnel system needs a significant amount of maintenance and rehabilitation before it is safe to add additional stormwater. The City has identified priority needs in the storm tunnel system and is working actively to address structural deficiencies. Ongoing work includes design of an approximately $40 million project to expand the capacity of the Central City Tunnel that underlays most of downtown Minneapolis. It is anticipated that the construction of that project will begin in 2020 and take approximately three years. In addition, there are discussions to identify funding sources to assist with the design and construction of a parallel I-35W South tunnel to provide the necessary capacity in that tunnel system.

There are also approximately 150 known areas across the City with localized flooding. Directing additional clear water to a storm system that is already capacity limited may exacerbate flooding problems. In these situations, we cannot just separate the clear water, but must also respond to the risk of property damage.

In some instances, removing routing additional clear water to the storm drain system is met by challenges from watershed organization rules or impaired water status.

Removal of I&I from the sanitary system contributes to increasing operating and maintenance costs because when flows are reduced, increased sedimentation occurs in some previously combined pipes. The sedimentation is also causing methane gas build up and increased corrosiveness in the system. This puts added stress on resources necessary to maintain an aging system.

Future Improvements

The City of Minneapolis is committed to continuing to make further reasonable progress to maintain and rehabilitate the historically combined sewer system and the storm sewer system, and increase the performance of those systems. In consideration of system performance, diminished risk of CSOs, and a continued commitment to make progress, in March 2018 the City of Minneapolis City Council authorized the appropriate City representative to coordinate with MCES to request termination of the CSO permit. The City continues to work with MCES to understand when that request may be concurrently made from both permittees.