City of Kingston Wastewater Collection System
2024 ANNUAL REPORT

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

The City of Kingston Wastewater Collection System operates under Ministry of the Environment, Conservation and Parks (MECP), Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) number 018-W601.

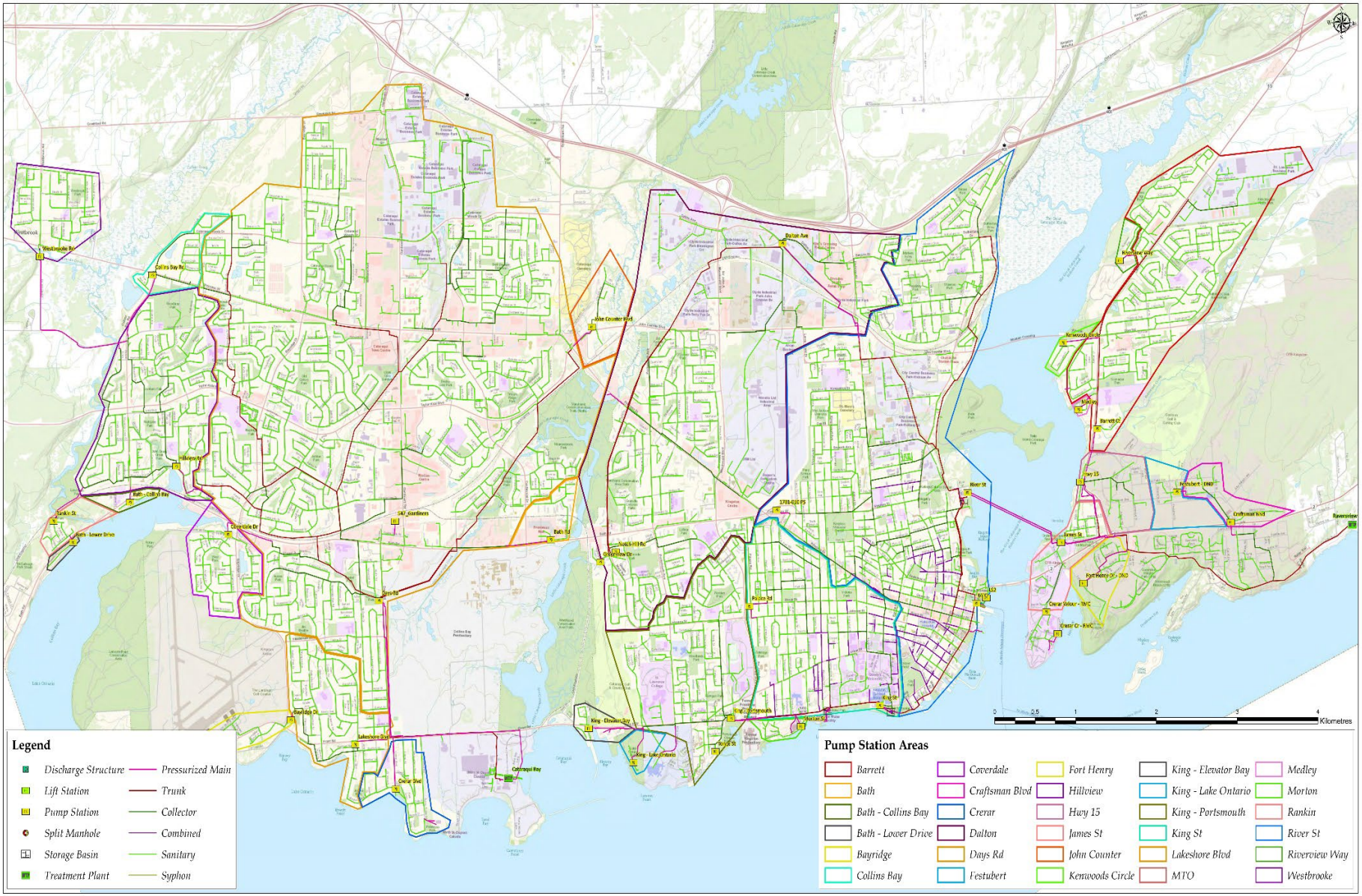
In 2024, the West Collection system received and moved 9,968,779.5 m^3 of wastewater to the Cataraqui Bay Water Pollution Control Plant (WPCP). The Central and East Collection system received and moved 19,128,065 m3 of wastewater to the Ravensview WPCP. The Cana Collection system received and moved 20,998 m^3 of wastewater to the Cana WPCP.

The collection system had several wet weather overflow events which totaled 913.33 m^3. The collection system had two spills to the environment from the collection system totaling 46 m^3. The overflow and spill locations are listed in Tables 1 and 2 respectively.

2 SYSTEM DESCRIPTION

The City of Kingston Wastewater Collection System collects and transmits sewage to one of three WPCPs, depending on the pump station area. The collection system consists of 474 km of gravity sewers (including 42.8 km of trunk sewers, 50.7 km of collector sewers and 381.0 km of local sewers) and includes 18 km of combined sewers but excludes the approximately 38,384 active service laterals to the property line. The collection system also has 29 sewage Pumping Stations (PS), three combined sewer overflow (CSO) tanks, six combined sewage retention tanks, and 29.0 km of forcemains, with final discharge into one of three Water Pollution Control Plants including Ravensview, Cataraqui Bay, and Cana.

Figure 1 – City of Kingston Collection System Major Infrastructure



3 OPERATION

Adequate staffing as well as preventative maintenance and regular equipment inspections allowed operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non-flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to help customers become more aware of what materials should not be flushed down the sewers. This program has included radio and media campaigns, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2024, staff educated owners of grease traps on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts the City's sanitary sewer collection system were delivered to many restaurants across the city.

Throughout the collection system, there are known sections that become clogged with non-flushable materials, and grease. There are 46 of these sections, they are monitored regularly and proactively cleaned when required. During 2024, crews inspected these sections a total of 523 times, 317 of those times flushing and cleaning were required.

Staff encountered operational problems at several pumping stations across the system that were a result of grease build up. These problems ranged from grease interfering with level instruments, to floats being caught up in the grease. Third party contractors were brought in several times throughout the year to clean wet wells and remove the grease and other non-flushable items as required.

Throughout the end of 2023 and early 2024, Collins Bay Road Sewage Pumping Station was inundated with extreme flows of water during rain events. These extreme flows had to be managed with the use of vacuum trucks to help avoid flooding and spills to the environment. Investigations into the source of the water took place, and a break in a pipe was located. This break allowed groundwater to flow freely into the collection system. A third-party contractor was brought in to grout the break in the pipe, and flows have dramatically decreased since.

During 2023, there were several spills of sewage from the Barrett Court PS. In response to this, a large project to replace the pumps and associated valving was started in 2024. Two of the three pumps and valving and piping were replaced with the third and final pump set for replacement in early 2025.

CSOs located in the collection system, both inline overflows and dedicated tanks, are inspected regularly throughout the year. There was a total of 70 inspections on the 13 active CSOs in 2024.

4 SYSTEM FLOWS

The City of Kingston wastewater collection system transported 29,096,844.5 m^3 of sewage to the Ravensview and Cataraqui Bay WPCPs. The Cana system collected and transported 20,998 m^3 of sewage to the Cana WPCP. The concentration of the raw influent into the three WPCP's increases as the volume of flow decreases. The flow into each plant also increases as the number of wet weather events increase. The increased flow during the wet season, as well as the differences in concentrations that correlate to changes in volumes, indicates there is ground water infiltration and/or illegal sump or roof leader connections in the systems.

5 BYPASS & OVERFLOW SUMMARY

The collection system had several wet weather overflow events which totaled 913.3 m^3 for 2024. The locations and total volumes of overflows can be found in Table 1. The surrogate loading rates from these overflow events are listed in Table 3. There were two spills to the environment from the collection system, totaling 46 m^3. The locations and details of the spills are located in Table 2. There

were no bypasses at any of the treatment facilities in 2024. The loading rates for the spills are in Table 4. None of the collection system overflows or spills were disinfected, and no adverse impacts were noted. Staff checked for, and cleaned up, any debris and garbage after each event. The number of overflows, and the volume of overflows, was dramatically reduced in 2024 compared to 2023. The rainfall events in 2024 were much less severe than in 2023, and that coupled with the efforts to separate storm and sanitary sewers has led to the reduced overflow volumes. The wet weather flow capture rate is calculated by Utilities Kingston each year, and data going back to 2010 is shown in Figure 2 – Wet-weather Flow Capture. In 2017, Utilities Kingston released a real-time overflow map that displays overflow locations and lets you know if an overflow has occurred within the past 48 hours.

6 OVERFLOW REDUCTION EFFORTS

The City of Kingston and Utilities Kingston have been working to reduce the number of combined sewers, both sanitary and storm water in the same pipe, within the collection system. These combined sewers are the primary source of overflows in the system during wet weather. Several large. combined sewer separation projects are expected in 2025. A much larger budget has been allocated to overflow reduction projects for 2025 compared to 2024.

The 2025 overflow reduction projects are:

- Sewer separation of Princess St (Albert to Division) and Garrett St Sewer Separation Project;
- Main St., Vine St., Ellice St. Sewer work and Separation Project;
- Sewer separation of Orchard St., and River St.; and
- Crerar Blvd SPS, Capacity increase including Forcemain replacement.

These 2025 projects have a total budget of $11.9 Million.

The proposed 2025 projects are all aimed at reducing and working towards separating and ultimately eliminating sewage overflows from the combined system. The work throughout 2024 included combined sewer separation of: two blocks of Victoria St., one block of Earl St., one block of Collingwood St., one block of Couper St., and two blocks of Union St. These projects will be completed in 2025. The budget for the 2024 overflow reduction construction projects was $1.93 million.

7 POLLUTION PREVENTION CONTROL PROGRAM

The Utilities Kingston Pollution Prevention and Control Plan (PPCP) was developed in 2017 and is set to be updated in 2025/2026. The PPCP focuses on combined sewer separation to reduce the number of overflows from the facilities in the future. The 2024 combined sewer separation projects reduced a large section of combined sewers that lead to a CSO tank that regularly overflows during rain events.

There were no specific timelines produced for the 2017 version of the PPCP. The City of Kingston and Utilities Kingston remain dedicated to completing sewer separations within the collection system in preparation for future population growth. More funds are being directed to PPCP work, following several years of other larger City of Kingston Infrastructure projects that are now complete.

Utilities Kingston completed inspections including collecting Closed-Circuit Television (CCTV) footage of large sections of trunk sanitary sewers throughout the summer. These inspections help to build our asset management inventory and identify any potential issues before they cause problems.

Utilities Kingston is working towards meeting the objectives set out in procedures F-5-1, and F-5-5, which describe the treatment requirements for municipal sanitary, and combined sewage systems. The City of Kingston Wastewater Collection System meets all of the minimum controls required by these procedures. Many projects have been completed, bringing the City's system closer to meeting

all of the objectives. These projects have reduced the frequency and quantity of system overflows over the past several years. The proposed future combined sewer separation projects and targeted sanitary sewer upgrades will continue to bring the system closer to meeting the objectives set out in these procedures. Utilities Kingston does not regularly meet the Beach Protection Criterion set out in the F-5-5 documents. Figure 3 – Number of CSO Events during June-September indicates that Utilities Kingston is getting closer to meeting the objective. All of the above-mentioned work will have a direct impact on the number and severity of overflows in the future. It appears the sewer separation and other overflow reduction projects are having the desired impact, although the weather has been less severe over the past several years as well. These results and the correlation to weather severity are shown in Figure 4 – Annual Overflow Volumes and Storm Severity Index.

8 CALIBRATIONS

Many of the pumping stations have flow meters installed which helps to investigate inflow and infiltration, as well as any operational problems that may occur. Third party contractors calibrated all facility flow meters. Calibration records are available upon request.

CSO overflow points have methods of recording volumes of sewage that overflow the sanitary system and discharge into the lake, or the storm water system. There are 15 flow monitoring devices used for these measurements. 11 of the 15 flow monitors were calibrated in 2024. Two locations were unavailable to staff due to security concerns, and two were unable to be calibrated due to conditions and faulty connection equipment. These four locations will be addressed and calibrated in 2025.

9 MAINTENANCE

Staff continued to use a preventative maintenance program in accordance with manufacturer's recommendations.

Additional Major Maintenance completed this year:

- Infrared scans of high voltage electrical was performed at Pumping Stations throughout the City.
- Equipment and motors had routine vibration monitoring conducted.
- King St. PS had one pump rebuilt.
- River St. PS main utility power breaker was replaced.
- King-Elevator Bay PS had major generator maintenance performed.
- Days Rd PS had the odour control media replaced.
- Bath Rd PS had one pump rebuilt.
- Hillview PS had a main breaker replaced, and a redundant level sensor installed.
- Rankin PS had a new control panel installed, as well as new discharge isolation, and check valves installed.
- Bath-Lower Drive PS had a new check valve installed, a generator hookup installed, and one pump rebuilt.
- Six air relief valves in the system were cleaned and had maintenance completed on them.

10 CAPITAL WORKS AND ALTERATIONS

The major highlights for capital works were:

- Construction of the Days Rd. PS was completed, and the station has been brought into service.
- King St. PS had a flow meter installed on the pumped header to the CSO tank.
- River St. PS generator controls were replaced.
- Barrett Ct. PS has had two of the three pumps and associated piping and valves replaced.
- Bayridge Dr. PS had a new flow meter installed.
- 14 Pumping Stations had alarm communication upgrades completed.

11 COMPLAINTS

In the 2024 reporting year, there were a number of complaints from residents regarding the system.

There were 14 odour complaints connected to the new Days Rd. PS. Utilities Kingston operations staff investigated the complaints and inspected the odour control unit at the facility regularly to ensure it was functioning and being properly maintained. The media in the odour control unit was replaced during the year, and modifications to the odour control system have been made to attempt to reduce the amount of odour escaping the station. Utilities Kingston had the contractor and engineering firm that were hired to construct the station design and implement possible solutions.

There were an additional 14 odour complaints, regarding the collection system. These complaints include sewage odours noted in residences and businesses. Staff responded and investigated all of these complaints. Responses to these complaints included inspecting infrastructure upstream and downstream of the complaint, installing dishes in manholes to reduce the chance of sewer gasses being released, jetting and cleaning pipes, inspecting lines with a camera, some visits to residences and businesses, and sewage sampling.

Staff responded to 127 complaints about lateral and main collection system backups. Operations staff worked with property owners and tenants at each site to locate and confirm the source of the backup. The majority of the sewer backups were caused by non-flushable materials, tree root growth, or deformed or degraded pipes. 71 of the 127 complaints were related to private infrastructure (i.e., the homeowner or business owner's sewer lateral on their property). Staff worked to relieve these backups using different methods. Crews rodded lines, performed camera work to identify and locate the issue, used jet trucks to clear blockages to return the collection system to good working order. Operators also proactively flush known problem sewers, in order to maintain the integrity of the collection system.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 ANNUAL OVERFLOW SUMMARY

Table 1 – Annual Overflow Summary

PCP #	Location	Number of Events	Volume (m3)
1	Orchard-Emma Martin CSO	0	0.00
2	535 Rideau Belle Park Trunk	0	0.00
5	Dalton Ave PS	0	0.00
14	Barrack St E of King St	0	0.00
22	William St W of Ontario St	0	0.00
23	Earl St W of Ontario St	6	20.87
24	Gore St W of Ontario St	0	0.00
25	Lower Union W of Ontario St	5	182.29
26	West St S of King St	0	0.00
28	King St (O'Kill) PS	0	0.00
34	Helen St at Mack St	0	0.00
35	Palace Rd PS	0	0.00
41	Morton St PS	0	0.00
43	King-Portsmouth PS	0	0.00
48	West end of Sherwood Dr	0	0.00
50	South end of Parkway	0	0.00
51	Clarence St W of King St	0	0.00
52	Raglan Rd at Rideau St	0	0.00
53	Union St at Division St	0	0.00
55	King-George CSO	0	0.00
56	King-Collingwood CSO	0	0.00
57	Crerar PS	0	0.00
65	535 Rideau Belle Park Local	3	710.16
68	Quebec St at Barrie St	0	0.00
69	Greenview Dr PS	0	0.00
70	Carlisle St at Chestnut St	0	0.00
74	Barrett Court	0	0.00
79	Riverview Way PS	0	0.00
N/A	Total	14	913.32

13 ANNUAL SPILL SUMMARY

Table 2 – Annual Spill Summary

PCP #	Location	Number of Events	Volume (m3)
1	Orchard-Emma Martin CSO	0	0.00
2	535 Rideau Belle Park Trunk	0	0.00
5	Dalton Ave PS	0	0.00
14	Barrack St E of King St	0	0.00
22	William St W of Ontario St	0	0.00
23	Earl St W of Ontario St	0	0.00
24	Gore St W of Ontario St	0	0.00
25	Lower Union W of Ontario St	0	0.00
26	West St S of King St	0	0.00
28	King St (O'Kill) PS	0	0.00
34	Helen St at Mack St	0	0.00
35	Palace Rd PS	0	0.00
41	Morton St PS	0	0.00
43	King-Portsmouth PS	0	0.00
48	West end of Sherwood Dr	0	0.00
50	South end of Parkway	0	0.00
51	Clarence St W of King St	0	0.00
52	Raglan Rd at Rideau St	0	0.00

PCP #	Location	Number of Events	Volume (m3)
53	Union St at Division St	0	0.00
55	King-George CSO	0	0.00
56	King-Collingwood CSO	0	0.00
57	Crerar PS	0	0.00
65	535 Rideau Belle Park Local	0	0.00
68	Quebec St at Barrie St	0	0.00
69	Greenview Dr PS	0	0.00
70	Carlisle St at Chestnut St	0	0.00
74	Barrett Court	1	45.00
76	Ravensview Water Pollution Control Plant	0	0.00
79	Riverview Way PS	0	0.00
N/A	Collection System Breaks	1	1.00
N/A	Total	2	46.00

14 OVERFLOW LOADING RATE

Table 3 – Overflow Loading Rate

Date	Location	Duration	Volume (m3)	BOD (kg)	TP (kg)	TSS (kg)	TKN (kg)	E.Coli
June 13th 2024	PCP 23 - Earl St	0:20	0.883	0.08	0.00	0.05	0.00	92,521
June 13th 2024	PCP 25 - Lower Union	0:15	16.832	1.62	0.01	0.99	0.09	92,521
June 23rd 2024	PCP 23 - Earl St	0:05	0.267	0.03	0.00	0.02	0.00	92,521
July 10th 2024	PCP 23 - Earl St	6:00	10.288	0.99	0.01	0.61	0.06	92,521
July 10th 2024	PCP 25 – Lower Union	9:00	88.711	8.52	0.08	5.23	0.50	92,521
July 10th 2024	PCP 65 - 535 Rideau Belle Park	0:10	34.803	3.34	0.03	2.05	0.19	92,521
Aug 9th 2024	PCP 23 - Earl St	0:30	3.577	0.34	0.00	0.21	0.02	92,521
Aug 9th 2024	PCP 25 – Lower Union	0:30	25.404	2.44	0.02	1.50	0.14	92,521
Aug 9th 2024	PCP 65 - 535 Rideau Belle Park	1:35	536.279	51.48	0.46	31.64	3.00	92,521
Aug 19th 2024	PCP 23 - Earl St	0:10	1.927	0.18	0.00	0.11	0.01	92,521
Aug 19th 2024	PCP 25 – Lower Union	0:10	15.777	1.51	0.01	0.93	0.09	92,521
September 7th 2024	PCP 23 - Earl St	0:15	3.927	0.38	0.00	0.23	0.02	92,521
September 7th 2024	PCP 25 – Lower Union	0:20	35.569	3.41	0.03	2.10	0.20	92,521
September 7th 2024	PCP 65 - 535 Rideau Belle Park	0:20	139.081	13.35	0.12	8.21	0.78	92,521

15 SPILL LOADING RATES

Table 4 – Spill Loading Rates

Date	Location	Duration	Volume (m3)	BOD (kg)	TP (kg)	TSS (kg)	TKN (kg)	E.coli
May 24th 2024	PCP 74 - Barrett Ct	0:50	45	1.26	0.24	2.52	2.44	9,200,000
December 27th 2024	Bath Rd & Centennial Dr	2:00	1	198.00	6.77	205.00	51.00	1,080,000

16 OVERFLOW AND BYPASS EVENT AND VOLUME GRAPHS

Figure 1 – Wet-weather Flow Capture

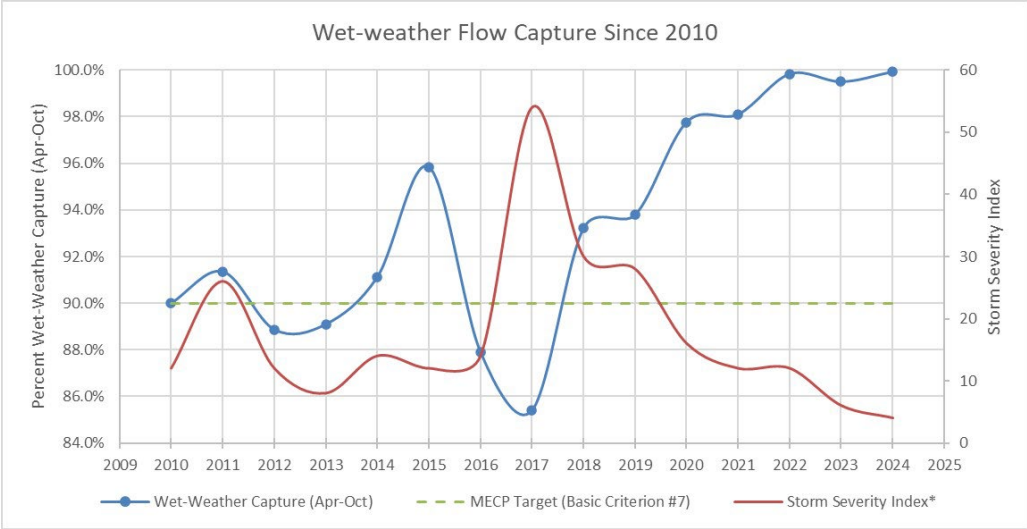


Figure 2 – Number of CSO Events during June-September

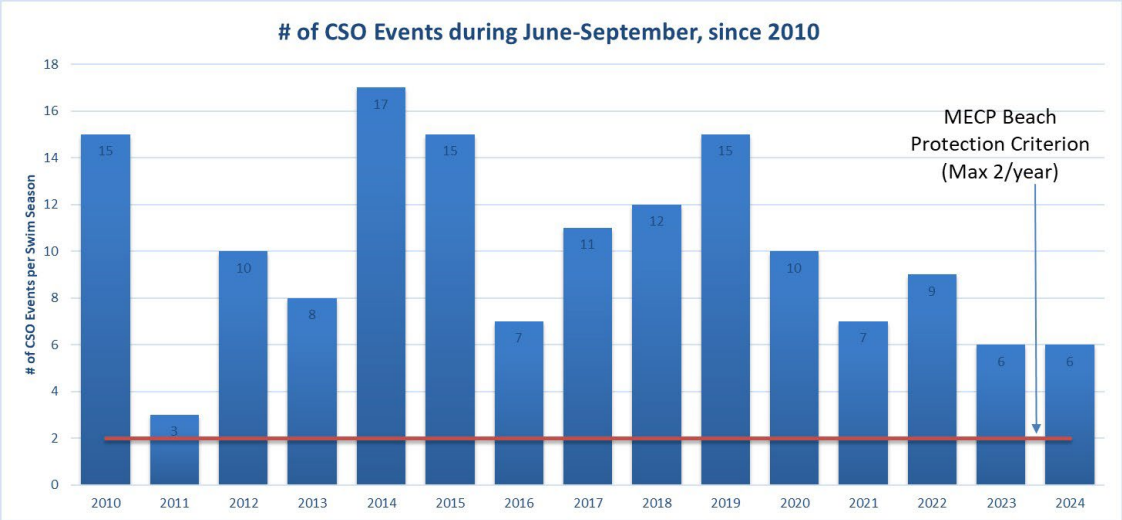


Figure 3 – Annual Overflow Volumes and Storm Severity Index