

MS4 Annual Report

Board of Public Works

Phil Gaebler - City of Madison Engineering Department

3/6/2024

Report Overview

- ▶ Minimal Control Measures
- ▶ Fiscal Analysis
- ▶ Progress

Minimal Control Measures - Each Required a Written Program

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Pollutant Control
5. Post-Construction Storm Water Management
6. Pollution Prevention - SWPPPS Required
7. Storm Sewer System Map
8. TMDL Progress and Plan

1. Public Education and Outreach

- ▶ Waterways Newsletter
 - ▶ Stormwater Management
 - ▶ Relocation of Herptiles
 - ▶ Watershed Studies
 - ▶ Sidewalk Salt and Water Softner Salt
- ▶ Ripple-Effects
 - ▶ <https://www.ripple-effects.com/>
 - ▶ Storm Drain Murals - 3 completed
 - ▶ Westmoreland, Owen, BB Clarke
 - ▶ Summer at the storm drain
 - ▶ Plant Dane
 - ▶ Native Plant Workshops
- ▶ Everyday Engineering Podcast
 - ▶ 23 Episodes in 2023
- ▶ Conference Presentations
 - ▶ Lakes and Watershed Conference - GI Pilot
 - ▶ NASECA Unintended Detention and Ordinance Change



Westmorland Park (Madison)

This storm drain mural was designed by a local artist using input from the Westmorland Neighborhood...



Owen Conservation Park (Madison)

This storm drain mural was designed by a local artist using input from students at Muir Elementary and...



BB Clarke Beach (Madison)

This storm drain mural was designed by a local artist using input from Girls Inc. in Madison. Visit Ripple...



cityofmadison.com/engineering/stormwater

FALL, 2023

Engineering Approaches Development in Environmentally Sensitive Way

City-wide, responsible development is a priority, and, to help achieve those goals, the City of Madison Engineering Division is approaching development in a more environmentally sensitive and more adaptive way than in years past.

"In the last 40 years, stormwater management has changed from sizing pipes to take the water 'away,' to a network of ponds and greenways designed to slow water down and soak water into the ground. The end result is runoff that more closely matches the runoff from before the development occurred," City of Madison Engineering Division Stormwater Engineer Phil Gaebler said.

The City updated its stormwater ordinance in 2020. This update included limitations on peak flow discharges and total volume discharge for redevelopment, this is only the second requirement of its kind in the state (Milwaukee being the first). The update also required a number of changes for new development that will significantly reduce the chance of structures flooding in the future.

The stormwater ordinance requires that 80 percent of sediment that would run off of a site after development be captured, and that the peak discharge rates of stormwater (the maximum rate water runs off of a site – think volume per time or gallons per minute) from rain storms be the same before and after a site is developed. To accomplish this, detention basins (think of very large bathtubs to fill up quick and let water out slow) are utilized. Oil and grease from parking lots must also be captured before running off into the drainage system.

The City has a number of goals and targets that we would like to and are required to meet. Specifically, the first goal includes reducing phosphorus (one of the main contributors to algae blooms) in Madison lakes. The Yahara chain of lakes eventually drain to the Rock River, which has requirements for the reduction of pollutants, such phosphorus, included as part of a long term initiative for achieving water quality goals stipulated in the Rock River Total Maximum Daily Load (TMDL) plan.

"The plan is ahead of schedule and the measurements are showing that the efforts are having an impact on the amount of phosphorus in the Yahara River," Gaebler said.

With changing climate challenges, it is imperative for the City to approach development and redevelopment in a way that supports builders, the community and environmental needs, something the City of Madison Engineering Division is committed to as the City continues to grow.



Pervious pavement at Portillos at West Towne.



An underground stormwater detention system at West High in Madison.

A Message from Your City Engineer, Jim Wolfe

Greetings, City of Madison!

Now is an incredible moment of growth for our City, which is exciting and brings a lot of opportunity for our community. All agencies throughout the City are working to help support responsible growth, and, more specifically, the stormwater section of the Engineering Division is focused on ensuring that the stormwater infrastructure provides for both resilience and water quality. This year's issue of *Waterways* covers a variety of topics that we often receive questions about from residents, but also ones that are timely, with construction season coming to a close and winter just around the corner. On this cover page, we focus on our approach to stormwater management and development in the City of Madison. Read more in "Engineering Approaches Development in Environmentally Sensitive Way."

Next, we're hoping to expand our community's knowledge of our infrastructure with some storm sewer education, check out "5 Things to Know about Madison's Sewer System (page 2)." We continue to make progress on our Watershed Studies, which will cover the entire City once complete, and we share an update on those 22 studies. We hope you'll take a moment to learn how the final reports will then be used for future projects on page 2. We're also partnering with other community organizations, like Clean Lakes Alliance, to make a call out to our community in the efforts toward healthy waterways (page 3) and helping you learn about Madison Metropolitan Sewerage District's Water Softener Screening Tool Kit on page 4. The City owns and maintains dozens of ponds throughout the City, which are important not only for stormwater management and treatment, but also provide habitat. These ponds do need work and maintenance over time, so we would also like to share with you how we managed to dredge Wexford Pond with first relocating our herptile friends. As winter approaches, brush up on the City's update to the salt ordinance on page 3. *Waterways* has continued to be an important tool for our community to stay educated about stormwater topics, and we're thankful our community continues its interest in a better stormwater system.

Jim Wolfe

2. Public Involvement

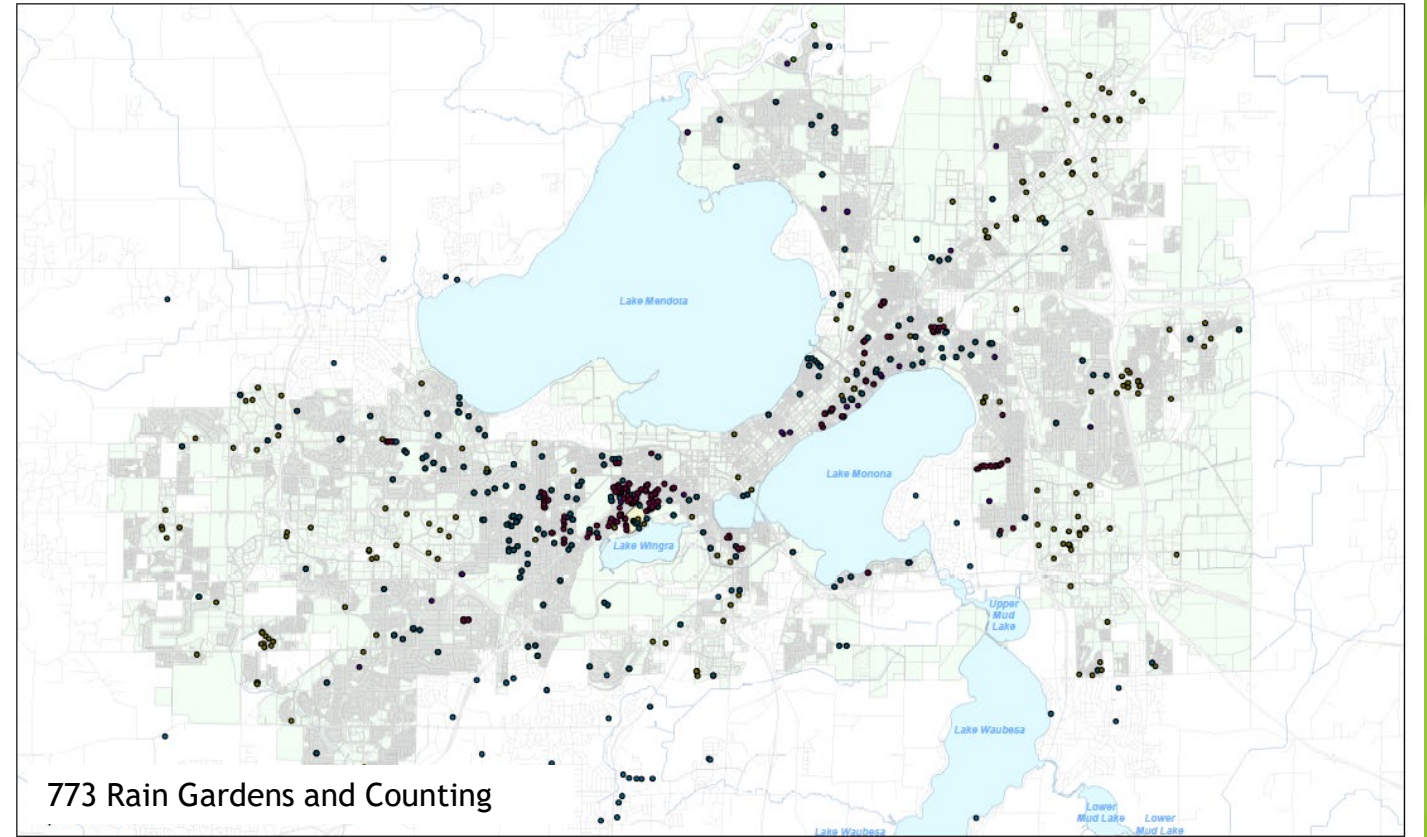
- ▶ SWU fee Adjustment policy
 - ▶ \$5 for terrace rain garden residents
 - ▶ Increased adjustments for residents with Rain gardens and Commercial properties with non-required stormwater treatment.
- ▶ Public Information meetings
 - ▶ Watershed studies
 - ▶ Implementation
 - ▶ Reconstruction Projects
- ▶ Friends Groups Grants
 - ▶ Wingra Chloride Monitoring
- ▶ Leaf Press Conference
 - ▶ Mulch in place
- ▶ Green Infrastructure Walking Tour
- ▶ Volunteer Native Plant Growers



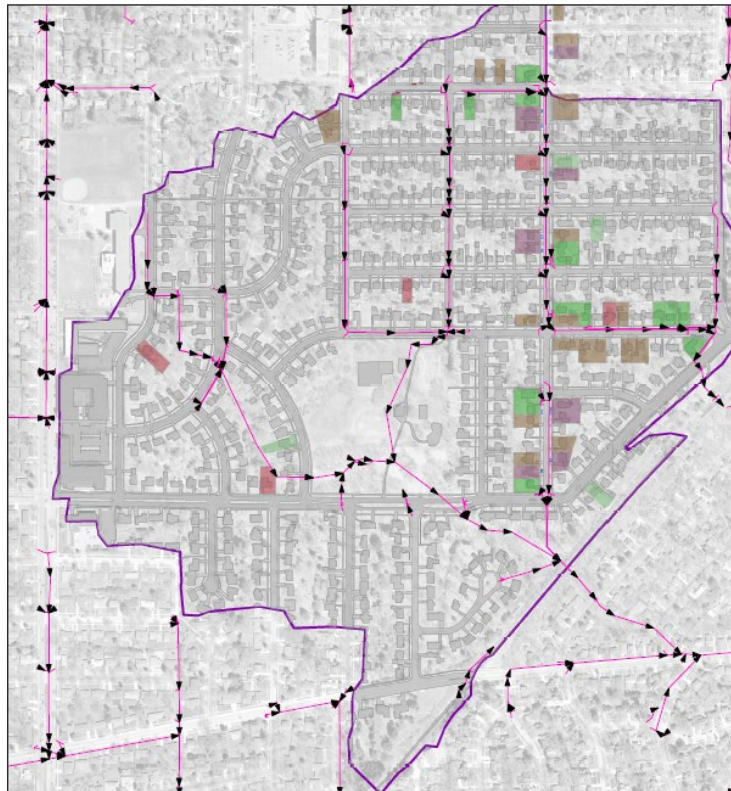
2. Public Engagement Rain Gardens

Continue to promote public and private installation

- Lake Mendota Drive Phase 2
- 1 on 1 RG workshop
- Time Lapse video



2. Public Engagement GI Pilot Study Installation Map



Green Infrastructure Study Area

Parcels
GI_Options
Private Rain Garden
Rain Barrel
Rain Basin
Rain Garden
Rock Crib



Public Installation Quantities

- Stormwater Terraces
Rain Gardens :17
Rain Basins: 22
- Permeable Streets
Parking lane of Euclid and St. Clair
6,344 sf + 2000 sf on Caromar
- Rock Cribs : 14
- Sidewalk Drains :129

Private Installation Quantities

- 11 Rain Gardens: 1 in the works
- 5 Rain Barrels
- Total Impervious Draining to GI: ~4%
- 100k WDNR Grant for 2023/2024



3. IDDE

- ▶ Illicit Discharge Detection and Elimination
 - ▶ Tests all 590 outfalls on a four year rotation
 - ▶ 55 tested in 2023:
 - ▶ No issues found
 - ▶ Completed inspection cycle
 - ▶ Water that should go to Madison Metro Sewerage District that goes to Storm Sewer
 - ▶ Cross Connections
 - ▶ Dumping
 - ▶ Concrete
 - ▶ Carpet Cleaners
 - ▶ Painters
 - ▶ Gave in person trainings in 2023 to field staff



Outfall in dry weather

3. IDDE

- ▶ Illicit Discharge Detection and Elimination
 - ▶ 125 complaints in 2023
 - ▶ Addressed by Public Health
 - ▶ Storm dumping can be reported here:

<https://www.cityofmadison.com/reportaproblem/dischargedumping.cfm>



Concrete washout in curb

4. Construction Site Pollution Control Erosion Control

- ▶ Issued **63** Permits over 1ac for 2023
 - ▶ **217** inspections
 - ▶ 18 Citation
 - ▶ 1132 self reports filed
- ▶ Green Tier Erosion Control Tour



Acacia Ridge Erosion
Control

5. Post Construction Stormwater Management

Review and maintenance of Private Stormwater Treatment

- ▶ 38 new facilities added
- ▶ 79 inspection reports filed
 - ▶ County wide effort to improve reporting happening in 2024



6. Pollution Prevention Ponds and Greenways

- ▶ 401 Ponds owned and managed by the City
 - ▶ Inspected for sediment depth, bank erosion and clogging
 - ▶ Completed inspection of all ponds over 8 yrs old in permit cycle.
 - ▶ **113** ponds in 2023
 - ▶ Benthic survey or transect survey
- ▶ 56 Ponds Managed by others in our system
- ▶ 1560 catchbasins
 - ▶ 1111 tons material removed
- ▶ Completed Green way inspections for permit cycle
 - ▶ **185** greenways in 2023



Mapped Greenway Rankings



Sycamore Pond

6. Pollution Prevention Winter Maintenance

- ▶ Certification program to get public and private applicators educated on ways to effectively reduce de-icing salt.
 - ▶ Co-hosted 2 trainings with Saltwise
 - ▶ Salt scales and gps fully functional for street department
- ▶ CARPC led Starkweather Creek Chloride Management Plan- Realtime monitoring of SWC
- ▶ Ordinance update to require residual salt be swept up from sidewalks: 10.28(1) of the Madison General Ordinances
 - ▶ Only municipality in state to have this ordinance.

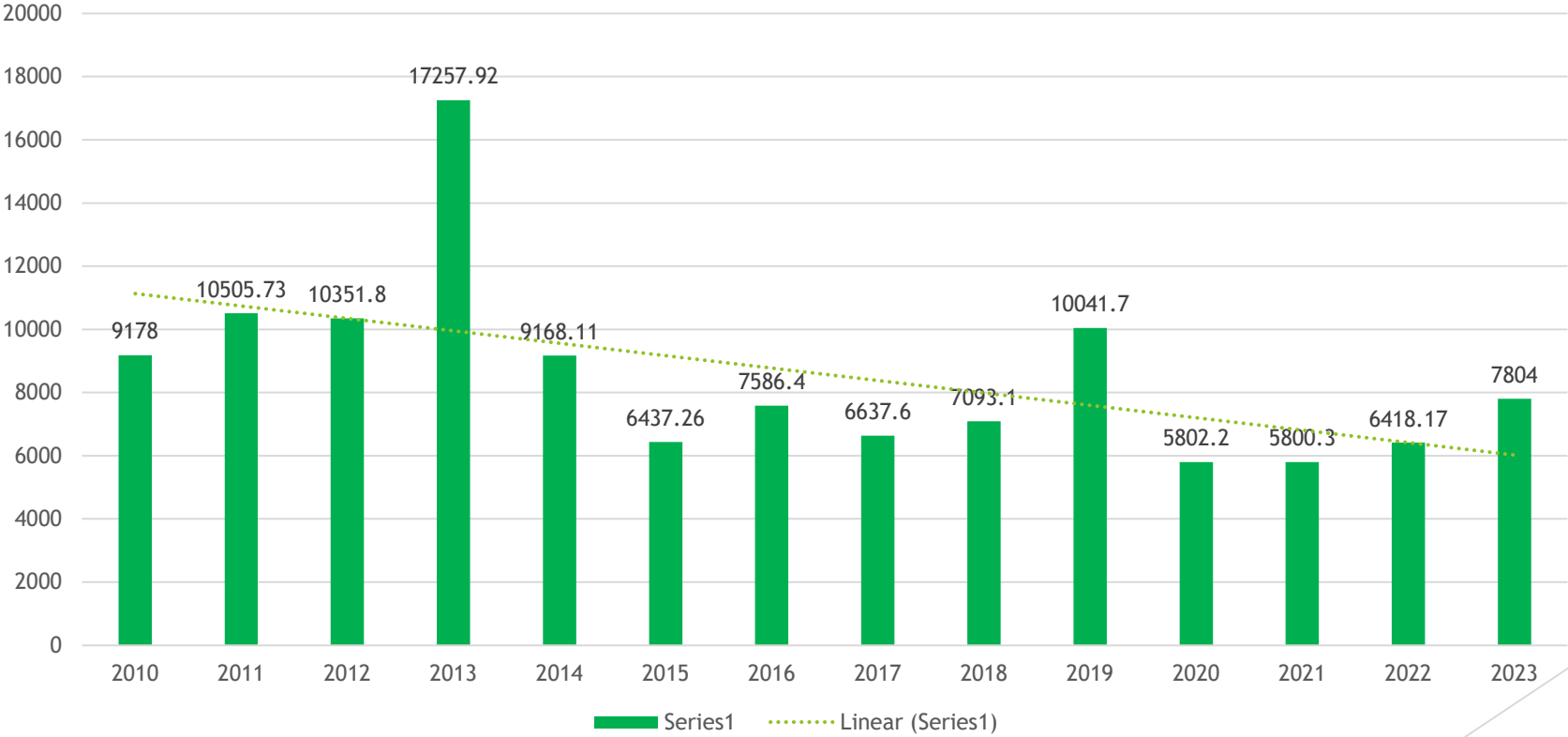


<https://www.cityofmadison.com/news/city-updates-salt-use-ordinance-for-public-sidewalks-lots>

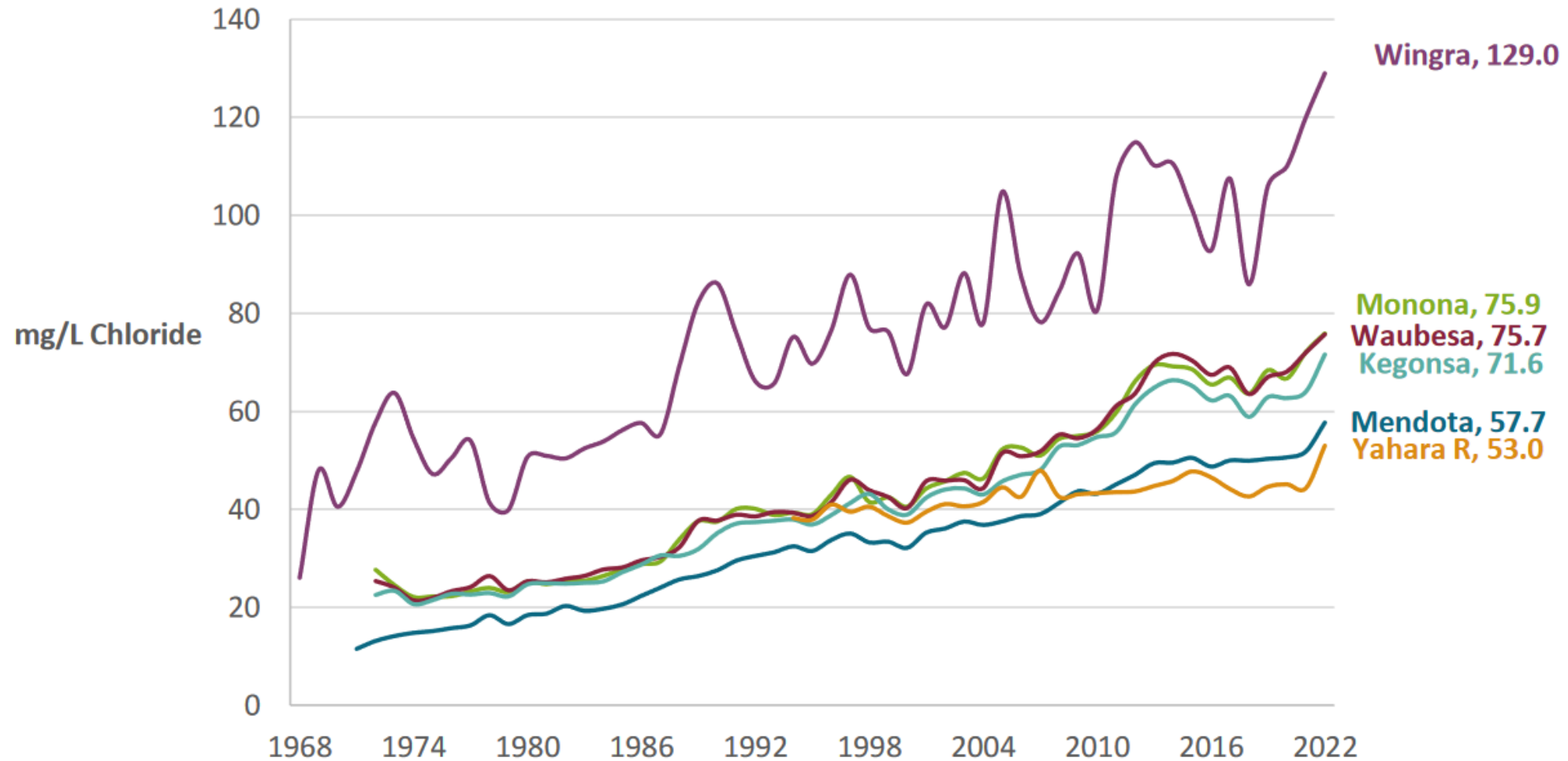
6. Pollution Prevention

Winter Maintenance

City Salt Use 2010-2022



Lake and river chloride concentrations have gradually increased for decades.



Source: Public Health Madison & Dane County monthly monitoring data

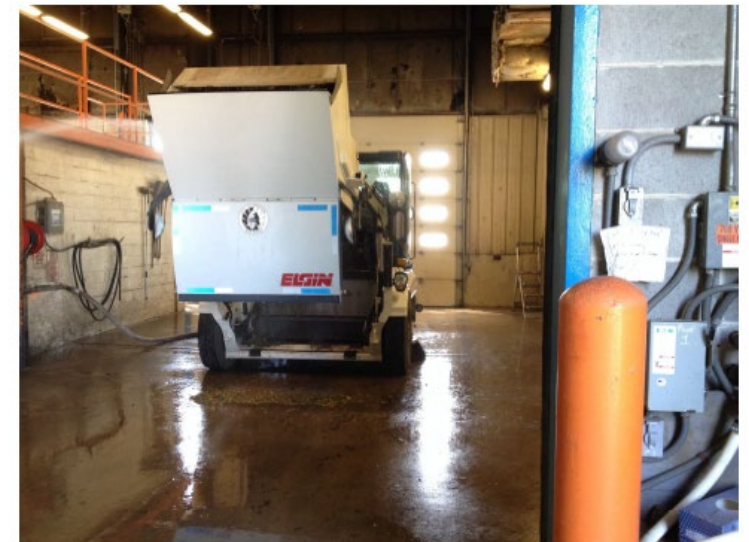
6. SWPPPS- Stormwater Pollution Prevention Plans



Sycamore Street Facility
Madison, WI

- 9 Sites with SWPPPs
- South point improvements complete
- Olin and Sycamore updates for 2024

1	2	3	4	5	A	B		C	D	E	F	G	H	I		J	K	L
					ACTIVITY/MATERIAL	LOCATION MAP ID								POTENTIAL POLLUTANTS		STORM WATER RISK		CURRENT PRACTICE
						Indoors	Outdoors		Sediment	Nutrients	Metals	Hydrocarbons	Toxins	other		Likelihood of Contact	Risk of release	
					Vehicle repair and maintenance	B-2			○	-	●	●	●	Leaks and spills - Fuel benzene, oil, hydraulic oil, transmission fluids, brake fluids, ethylene glycol, lead acid		○	○	<ul style="list-style-type: none"> ● Vehicles repaired and maintained indoors ● Floor drains in these facilities are connected to the sanitary sewer system
6					Vehicle storage and parking	B-1C B-4C	M-1		●	-	●	●	○	Leaks and spills - Fuel benzene, oil, hydraulic oil, transmission fluids, brake fluids, ethylene glycol, lead acid		●	○	<ul style="list-style-type: none"> ● Outside vehicle storage drains to stormsewer
7					Vehicle washing	B-1D			●	●	○	○	●			○	○	<ul style="list-style-type: none"> ● Vehicle washing is performed indoors ● Washbays are connected to the sanitary sewer system
8					Metals recycling		M-11		-	-								<ul style="list-style-type: none"> ● Material stored in uncovered dumpsters
9					Refuse		M-13		●	●								
10					Waste oil and used anitfreeze		M-13 M-12		-	-								
11					Gasoline and diesel fuel dispensing		M-15 M-14		-	-								
12					Cold Patch	B-1B			-	-								
13					Tack for Asphalt	B-1A			-	-								
14					Pea gravel	B-1A			○	-								
15					Spray patch equipment	B-1A			-	-								
16					Snow plow storage		M-7 M-4		-	-								
17					Sweeper dumps/transfer location		M-5		●	●								
18					Salt / Sand storage	B-3			●	-								
19					90% and 10% Salt				-	-								
20					Brine Solution tanks		M-10		-	-								



B-1D Vehicle Washing

6. Street Sweeping

- ▶ Clean Streets Clean Lakes Initiative
 - ▶ Weekly Sweeping with Parking Restrictions
 - ▶ 6,633 Tons Collected
 - ▶ Expanded Parking Restrictions Year Round
 - ▶ Vacuum Sweeper Received late 2023
 - ▶ 2023 Costs: \$2.93 million



6. Leaf and Yard Waste Collection 2021

- ▶ Madison Collected:
 - ▶ 13,867 tons of leaves
 - ▶ 1,276 tons of yard waste in 2023
- ▶ Cost :
 - ▶ \$2.63 million for Leaves
 - ▶ \$932,000 for Yard Waste
- ▶ Ordinance prohibiting leaves in Street
 - ▶ 10.18 - COLLECTION OF REFUSE AND RECYCLING OF WASTE.
- ▶ Promotion of leaf removal from street
 - ▶ Text alerts
 - ▶ Leaf reuse press conference
 - ▶ Mow leaves into lawn if possible



Stormwater Utility

Stormwater Utility

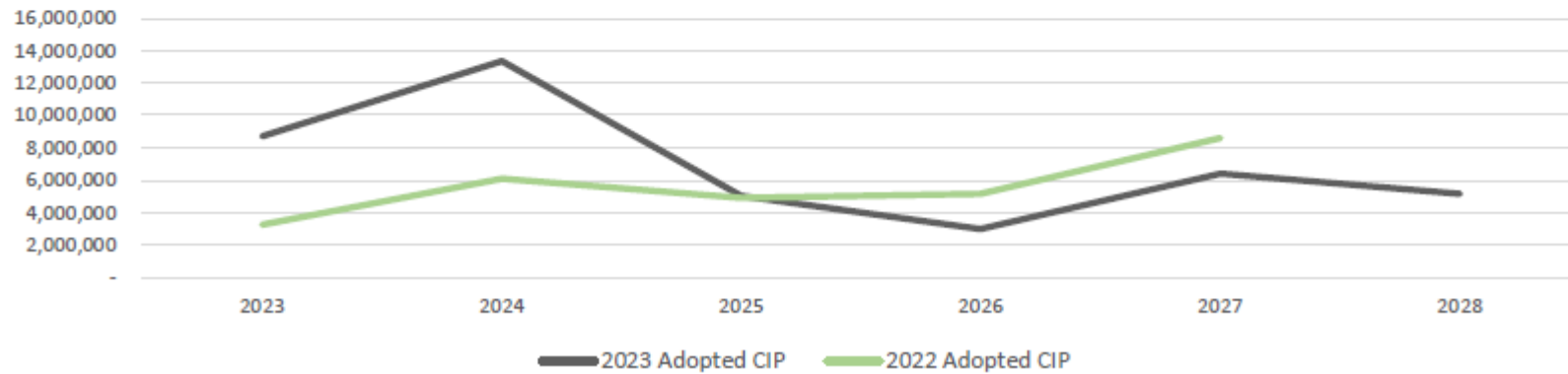
Capital Improvement Plan

Project Summary: Adopted

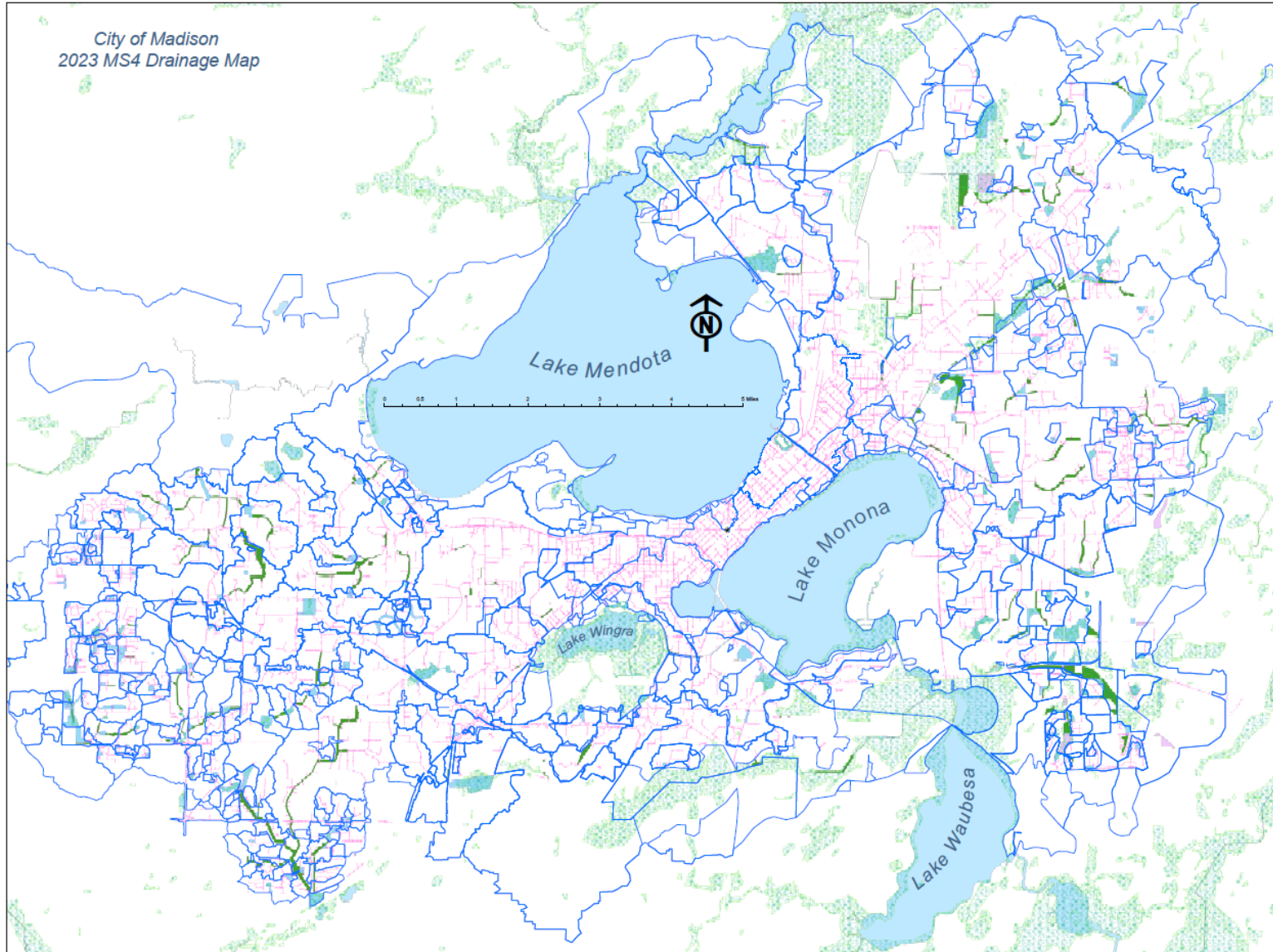
	2023	2024	2025	2026	2027	2028
Citywide Flood Mitigation	4,460,000	10,260,000	2,660,000	710,000	710,000	2,450,000
Storm Sewer System Improvements	210,000	270,000	210,000	210,000	210,000	210,000
Stormwater Quality System Improvements	3,660,000	2,325,000	1,565,000	1,450,000	4,650,000	2,000,000
Street Cleaning Equipment - Streets	393,000	503,000	576,000	616,000	816,000	520,000
	\$ 8,723,000	\$ 13,358,000	\$ 5,011,000	\$ 2,986,000	\$ 6,386,000	\$ 5,180,000

Changes from 2022 CIP

2023 Capital Improvement Plan
2023 Adopted vs. 2022 Adopted

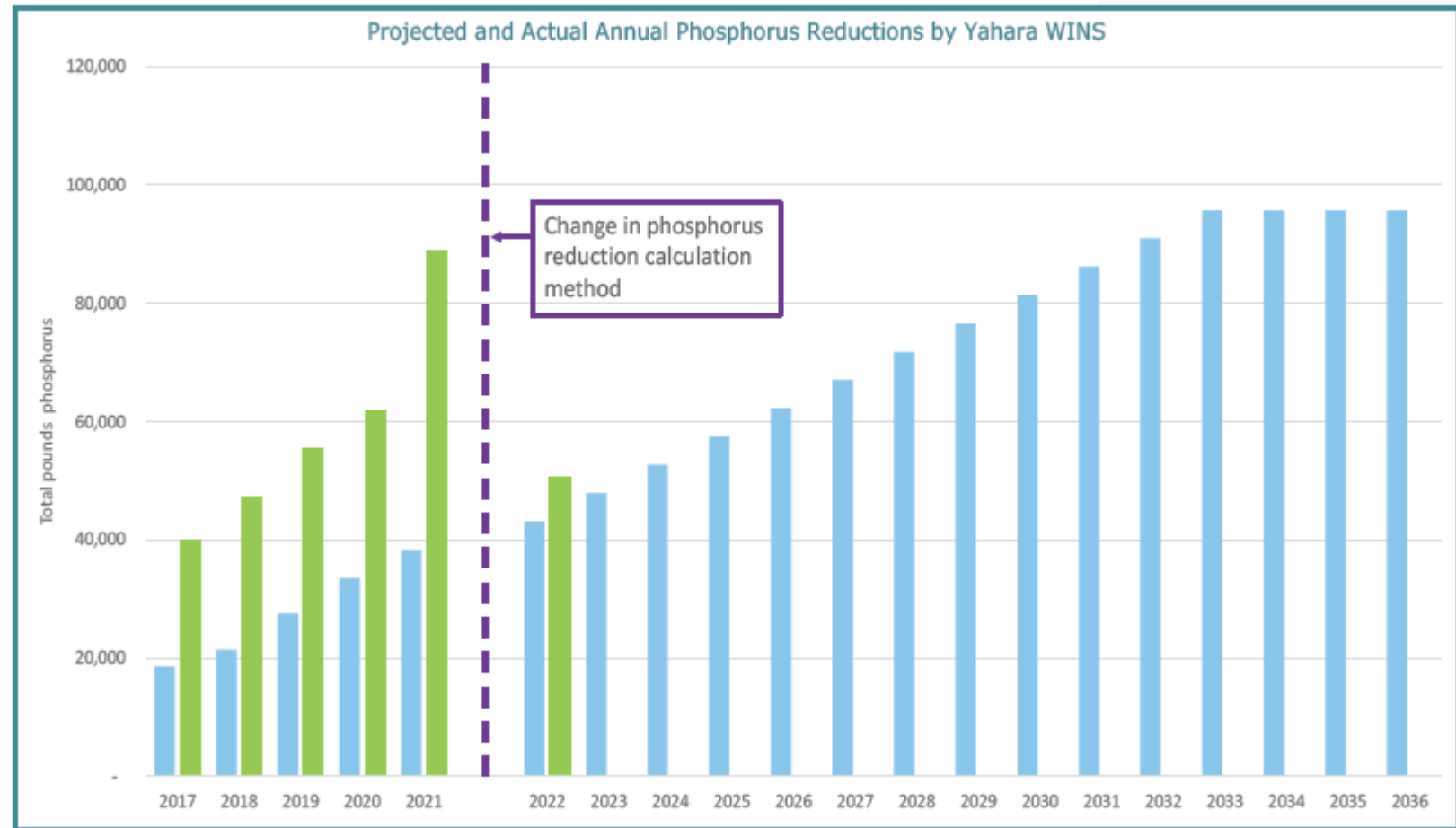


7.Drainage Map



8. Adaptive Management TMDL Compliance

- ▶ Madison Contributed
 - ▶ \$504,394 in 2023
 - ▶ Addresses 10,254 lb of TP
- ▶ Program is ahead of schedule but phosphorus accounting change impacted capture.
- ▶ ~~88,854~~ 50,563 lb TP Captured vs ~~38,290~~ 43,076 lb TP Goal for 2022
- ▶ TP \$/lb is lower than initially thought
- ▶ Ultimate Goal 104,000 lb
- ▶ Madison's MS4 produces 29,839 lb TP a year in the TMDL
- ▶ Currently Captures 7,877 lb annually
 - ▶ Adaptive management covers the 10,254 lb gap.



Going Forward

- ▶ Continue Outreach and Education Efforts
- ▶ Green Infrastructure Pilot
 - ▶ Additional permeable pavement 2024
- ▶ Increase Private Stormwater Management Inspection and Reporting
- ▶ Work to Reduce Phosphorus and TSS
 - ▶ Dry Pond SOC / sand filters (2024 target)
 - ▶ Enhanced phosphorus removal with additives
 - ▶ (Aluminum, Iron, Proprietary)
 - ▶ Watershed Study Proposed Solutions
 - ▶ Account for increased TSS and TP capture (400,000 lb TSS goal)
 - ▶ Private development , system improvements, leaf management
- ▶ Improve and Expand Salt Certification - Increase Brine Usage
- ▶ Continue with Erosion Control Inspections and IDDE Education
- ▶ SWPPP Inspections into Cityworks