



Waterways

City of Madison Engineering Division • Annual Stormwater and Sewer Utilities Newsletter

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 (page3) 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

5 Things to know about Madison's Stormwater Sewer System:

- 1. Madison does not have a combined sewer.** In a combined sewer system, both the stormwater and sanitary water go to a water treatment facility. In Madison's separate system, just the sanitary water goes to the water treatment facility. Stormwater/rainfall is discharged to surrounding lakes and streams.
- 2. Madison treats its stormwater.** Thirty-nine percent of the sediment going through our storm sewer network is captured by a treatment system, which includes catch basins, rain gardens, bioretention, detention basins, pervious pavement, and street sweepers. However, the best treatment is prevention, so keeping leaves, sediment and garbage out of the streets and gutters is best.
- 3. In the City of Madison, leaves are the largest source of phosphorus to the lake.** Phosphorus causes blue-green algae in our lakes. One simple way to reduce the amount of phosphorus that reaches the lake is to rake your leaves out of the street and to the terrace before a rainstorm.
- 4. Storm sewers are for stormwater only.** Never dump cleaning water, paint brush water, oil, chemicals, concrete washout, or car washing water into the storm sewer because it eventually leads to our lakes.
- 5. Storm sewers under the street come in different sizes and can last for over 100 years.** They are strong, heavy and expensive, so it's good to get them sized correctly the first go around.

'Final Reports' are 'Concepts' not 'Final Designs' for Future Flooding Projects

The City of Madison Engineering Division may almost be complete with its Watershed Studies, but it wants to help the community understand next steps and how the final reports from each study are used to guide future decisions for stormwater in the community.

"Watershed studies of this scale have never been done at the City of Madison before," City of Madison Engineering Division Principal Stormwater Engineer Janet Schmidt said. "We have some areas that have been studied for multiple things however the comprehensive approach is relatively new."

The City is studying 22 different watersheds in total. In January of 2019 the City of Madison began the watershed study program. A watershed is an area of land that drains to the same point, and the studies are an analysis of each defined watershed in the City.

Each study final report shows where and why flooding occurs, and then, through complex engineering design, possible solutions are created and modeled to see how they change the way the system functions.

Once the studies are complete, City engineers use the information to help inform decision making and future projects.

"The projects shown in the watershed study reports are concepts. To construct a project, it must move

from the concept stage to the design stage, which takes several years of more detailed planning, engagement with the public, then honing in on a constructible design while meeting all the permitting and regulatory requirements," Schmidt said.

Design does not begin until a project is included into the City's 5-year Capital Improvement Program (CIP).

"The City looks at many factors before a project moves from a concept to the design phase. This includes funding opportunities, other projects in the area (such as street projects) and the general cost of the project (larger projects will take a long time to program since there is limited funding available)," Schmidt said. "We look at issues around racial equity and social justice, emergency service access, water quality benefits, environmental issues including tree loss, and local, state and federal regulations and permitting."

While City Engineering performs the watershed studies to create flood mitigation projects throughout the City, executing the projects is a separate process.

The City anticipates completion of all studies in 2026. Each final report will be considered as living models, which will continue to be updated over time. Learn more on each study at www.cityofmadison.com/WatershedStudies.

Trying Something New, Herptiles Back Home in Dredging Project

Wexford Retention Pond is getting some much-needed dredging work, and in the process, the City has learned how to complete dredging while also relocating herptiles (reptiles or amphibians).

The Wexford Retention Pond filled up with sediment, and the City budgeted to dredge and construct forebays in the pond. Dredging is the process of removing sediment, typically eroded sand and dirt that comes from winter street sanding and erosion from surrounding lands, to improve the pond's ability to capture additional pollutants, sediment and nutrients.

Forebays are deeper areas within the pond that allow for easier maintenance dredging in the future. Before the City can begin dredging later this fall, it wanted to work with a local professional team to relocate the herptiles safely.

"Many herptiles depend on the existing pond conditions for winter survival. For example, painted turtles bury themselves at the bottom of a body or remain motionless in a semi-active state at the bottom of the pond," City of Madison Landscape Architect Sarah Lerner said. "Removing herptiles is important for the Wexford Pond project because this winter construction project will significantly impact their environment during hibernation."

To allow dredging of the accumulated material, the City needs to dewater the pond this winter, which is when many herptiles are hibernating in shallow water depths.

"It was important to partner with outside expertise in wildlife biology experienced with safely catching and relocating herptiles. Their valuable knowledge led to the successful relocation of over 100 turtles and over 200 frogs," Lerner said.

City Engineering, in partnership with an ecological firm that include wildlife biologists specialists will be on-call during construction to assist with additional potential relocations. The pond has historically had an abundant population of herptiles including painted turtles, snapping turtles, springpeepers, and bullfrogs.



‘Education First’ Approach for Excess Salt Use on Public Sidewalks

Ahead of this winter, all City of Madison property owners should review the City’s Salt Use Ordinance, and the potential for citation if using excess salt on **public** sidewalks.

The ordinance was put in place in 2022. Last year, the updates to the salt ordinance included an approach to educate property owners using excess salt. This year, City staff will continue to educate first, then issue citations if properties haven’t complied after inspection. Citations can be issued for failure to clean up excess salt on a public sidewalk after over-salting and continuing/repeat instances of excess salt use on public sidewalks.

“Our enforcement philosophy is to educate first, and enforce when necessary,” Building Inspection Division Director Matt Tucker said. “We will continue to educate our community, property owners and snow removal contractors on responsible and code-complaint application and clean-up of salt and similar melting and traction agents, and can issue municipal citations for ongoing or reoccurring violations.”

Salt Ordinance citations do not include excess salt use on streets, driveways or private parking lots. Excess salt is defined as the presence of salt after the snow and ice are gone.

“Our sidewalks are oversalted by 10-15 times the necessary rate, which is seen by the steady climb in our lake’s chloride levels in the past 65 years,” City of Madison Engineering Division Stormwater Engineer Phil Gaebler said. “This climb in chloride levels is impacting fish, amphibians, aquatic bugs’ ability to grow, and damaging our infrastructure.”

Excess salt can have a large impact on groundwater including some of Madison’s drinking water. Additionally once the salt enters the waterways, it is very expensive and difficult to remove. If you see a public sidewalk with excess salt, community members can report it by using the report a problem portal on the City of Madison Engineering Division website.

“It is important to report and bring awareness to this ordinance, as using the least amount of salt to maintain safe surfaces to reduce chloride in both our lakes, streams, and Madison’s drinking water,” Gaebler said. “While this ordinance is only focused on public sidewalks, the hope is that the efforts to get the correct level of salt will carry over to private parking lots as well.”

Report excess salt use at: www.cityofmadison.com/reportaproblem/sidewalk.cfm

Does Salt Make Our Lakes Green?

By Allison Madison Program Manager at WI Salt Wise

Most of the conversation around “cleaning up” our lakes focuses on phosphorus reduction. However, elevated levels of salt also contribute to greener, murkier waters.

Salt kills off zooplankton

Tiny zooplankton that eat algae are the first to be impacted as salt concentrations increase in our lakes. More salt means fewer zooplankton. Fewer zooplankton means more algae.

Imagine zooplankton as tiny cucumbers in a brine solution. As the lakes become salty, their bodies lose water and they experience more and more stress. This pickling effect is driven by the chloride that is found in almost all deicing products.

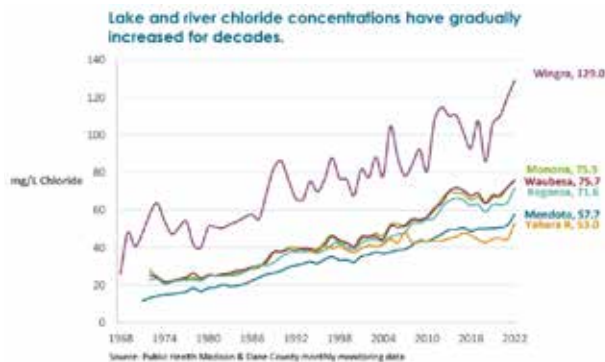
Salt makes inactive phosphorus bioavailable

Phosphorus fertilizes freshwater. When phosphorus levels rise due to inputs from leaves, manure, and soils, populations of algae and weedy vegetation can explode. Unfortunately, phosphorus that is currently bound up in lake sediment and unavailable to algae can be released as salt concentrations rise.

Since salt water is more dense than freshwater, salt inputs cause the formation of a cool, salty layer of water at the bottom of lakes. This dense layer inhibits natural lake mixing. Less mixing means less oxygen at lower depths and anaerobic conditions that release bound phosphorus into the water.

What can we do?

1. Follow the City’s lead and commit to Salt Wise practices.
2. Ask contractors to take a free Smart Salting training.
3. Learn more: www.wisaltwise.com.



One Water: Healthy Lakes, Lands and Waters is Possible

By Paul Dearlove, Deputy Director of Clean Lakes Alliance

Clean Lakes Alliance envisions a future when our community is renowned for its healthy lakes, lands and waters. Madison is surrounded by water and one of only two cities in the nation built on an isthmus. Our water wealth, and the human history it has nurtured, date back thousands of years. Once buried under glacial ice, this place called Teejop (pronounced Day-Jope and meaning “Four Lakes”) by the native Ho-Chunk was viewed as sacred. Thousands of ancient burial and effigy mounds constructed near the water’s edge – one of the largest concentrations known to exist in North America – symbolize Teejop’s value to its original inhabitants and how much the lakes were revered as spiritual life forces.

Our water story has since evolved and continues to be written.

While Madison is rich in lakes, streams, marshes, and groundwater, we cannot afford to forget that these are merely waystations for water on loan to us as it cycles across the planet. Today, stewardship can be defined as conserving and protecting water as if our lives and those of future generations depended on it.

With each new rain garden, native planting and green-infrastructure installation added to our yards, farm fields and public spaces, Teejop grows that much healthier and more resilient.

Learn more by visiting cleanlakesalliance.org/renew-the-blue.

Efficiency Goes a Long Way, Use the Water Softener Screening Tool Kit

Water softeners are often forgotten home appliances, but their impact doesn't go unnoticed. Water softeners remove calcium, magnesium and other minerals from drinking water which helps improve the taste and feel of water. However, they also come with challenges for the environment. Water softeners use salt to remove minerals, and eventually this chloride makes its way into local waterways, damaging the diversity and productivity of fish and insects, and harming vital aquatic vegetation. Whether your water softener is working efficiently is a big factor in reducing chloride pollution. To help protect our waterways, Madison Metropolitan Sewerage District provides a free water softener self-screening tool. This tool analyzes the efficiency and salt usage of a water softener, and provides steps on how to reduce salt use. This tool is free and available on mobile devices. As chloride levels in the Madison lakes have steadily risen over the past 50 years, this tool helps reduce our salt use, and the chloride in our lakes.



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Rain Barrel Sale

<https://ripple-effects.com/rainBarrels>

\$30 off if you live in
MAMSWAP Community

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Stormwater
Utility Billing:
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Sidewalk Concerns:
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