



Department of Public Works
Engineering Division

Frequently Asked Questions Watershed Studies

What is a watershed?

A watershed is a land area that drains rainfall runoff (or stormwater) to a single outlet, or “discharge point.” The discharge point can be a lake, river, ditch, or storm sewer outfall. The City of Madison is divided into 23 major watersheds.

What is a watershed study?

A watershed study is an analysis of a watershed. Individual studies might focus on water pollution, aquatic life, flooding, or other issues impacting that watershed. The City watershed studies will focus on chronic flooding, which we’ll investigate by using computer models that are created to study flooding. The study will analyze where and why flooding occurs and then evaluate possible solutions.

How long will it take to study my watershed?

Each study takes 18-24 months to complete. The City is planning to systematically study all 23 watersheds in Madison over 5-10 years, starting in January 2020.

How many Public Information Meetings (PIMs) will occur and what do we talk about?

Each Watershed Study has at least three Public Information Meetings (PIMs).

1. The first PIM introduces the study – what is studied and what the schedule is.
2. The second PIM shows the existing conditions inundation mapping (inundation mapping shows how deep a water is) and asks if the maps show what they saw when it flooded.
3. The third PIM shows the proposed solutions to reduce flooding.

Some watersheds may have a fourth PIM; this happens if all the questions asked during the third PIM could not be answered.

How many rounds of focus groups will there be?

Most watershed studies will have two rounds of focus groups.

1. The first round will be to talk to the residents in the focus group area and find out what they observed for flooding.
2. The second round will be to show the maps that were created from the computer models and ask if the maps match what the residents observed.

Is street flooding normal?

Yes. In most cities, streets (including curb and gutter) are part of the stormwater drainage system. When it rains, water typically flows from adjacent lands to streets, then into storm pipes beneath the street, or into ditches. When the pipe or ditch is full, the street itself will hold water until the storm system drains enough to allow the street to drain. Allowing streets to temporarily flood keeps water from damaging buildings and other infrastructure.

Why is flooding a frequent problem in some neighborhoods?

There are many reasons why some areas flood. The following are just a few:

Some areas are low and water can easily pond on them.

Some areas have storm systems that cannot handle all the stormwater that flows into them.

Some houses were built below the elevation they were supposed to be.

When an area of a City is developed, it is built using the guidance from that time period. As we learn more, the City changes its guidance to help reduce flooding. Many of the older storm sewers do not meet current sizing targets. As the streets in these areas are reconstructed, the storm sewers will be replaced with a bigger storm sewer where needed.

Storm sewers are typically designed for “normal” rainfall events. When very heavy rains fall, even adequately designed sewers can be overwhelmed and flooding can occur.

Why does flash flooding occur?

Flash flooding occurs when more rain falls than the storm system can handle. Our storm sewers are designed for “normal” rain events, so in very heavy rains, the system can be overwhelmed.

Flash flooding can also occur when heavy rains rapidly melt large volumes of snow; the rain combines with snow melt to act like much larger rain events.

Why doesn't the City design storm sewers to prevent all flooding?

Designing storm sewers to prevent all flooding would be cost-prohibitive. The City's target is to fully convey stormwater in the storm sewer from rain events that have a 10% chance of occurring in any one year (10% Annual Exceedance Probability). This is the “10-year storm event” and in Madison is equivalent to about 4 inches of rain over a 24-hour period.

During the August 2018 storm event, some parts of Madison received 12 to 15 inches of rain in a 12-hour period. This amount of rain is three to four times more rain than the system is designed for. Storm sewers that can carry this much water can be too big to physically fit in many places. Therefore, the City's design approach is to construct overflow pathways to direct the larger events safely to public-owned land or water bodies.

What does a stormwater pond do?

Stormwater ponds typically have two jobs: they provide temporary storage for stormwater and they remove sediment and phosphorous from stormwater before it drains to our lakes and rivers.

Why can't you just dig the pond deeper or dredge it out?

Ponds with standing water in them are referred to as retention ponds. Generally speaking, the pond's ability to hold water is in the part of the pond above the permanent water level. Digging a pond deeper or dredging out the sediment generally only removes the sediment below the permanent water level. If the permanent water level does not change, the pond cannot store more water because the areas where the sediment will get replaced by water.

Pond storage can only be changed by either adding taller walls to the storage area or lowering the permanent water level.

Why can't we fix known issues now?

Drainage systems are interconnected and complex. Altering one area of the system can inadvertently change another area. A solution isn't a solution if it simply moves problems to another area. A holistic solution will be developed through the watershed studies and implemented in the years following the watershed study completion.

How is groundwater accounted for?

Groundwater is acknowledged in the watershed studies, but is not included in the evaluation. Groundwater evaluation is a different type of study. The City is working with area agencies to understand groundwater impacts and planning accordingly.

Why isn't groundwater being studied?

Groundwater issues are related, but not directly linked, to surface and stormwater. They do interact, but the degree to which they interact is different for different locations and situations. Groundwater covers a much larger area than a watershed study area. Groundwater modeling uses different modeling software and different information.

Watershed study and groundwater models can be integrated, however, this type of modeling is very expensive. It is also

outside the scope of the City's current watershed modeling.

How is a watershed study different than a FEMA Floodplain Map?

FEMA Flood Insurance Rate Maps (FIRMs) show areas subject to flooding from primary flooding sources, typically major rivers and their tributaries. Flooding within an urban watershed may be caused by local issues, which would not be included in a FEMA floodplain analysis. Local issues are things such as: undersized storm sewer pipes, not enough inlets, ponding at intersections, etc. A FEMA floodplain map will show what areas are at risk when the Yahara River floods, but not what areas are at risk when a large rainfall floods Mineral Point Road.

The FEMA Floodplain Maps show my house is outside of the flood zone. Do I really need flood insurance?

Having flood insurance is a decision each property owner makes for their situation. FEMA Floodplain Maps show flooding from rivers and lakes. The flooding that occurs in parts of Madison is because of the local storm sewer system, not the rivers and lakes. Many homes flood because excess stormwater cannot drain into a storm drainage system fast enough to prevent localized flooding. Also, many homes are in high groundwater areas where seasonal basement flooding can occur without rain. Homeowners can purchase flood insurance through the National Flood Insurance Program even if they are not in a FEMA floodplain.

Private flood insurance may cover sump pump failures and sanitary backups. To learn more, visit the National Flood Insurance Website, or contact your insurance agent.

Who can answer questions about area lake levels?

The Dane County Land & Water Resources Department maintains lake levels in Lakes Mendota, Monona, Waubesa, and Kegonsa. Target lake levels were set by the Wisconsin Department of Natural Resources in 1979. Information on Madison lake levels can be found at: <https://lwr.dane.gov/flood-facts-and-initiatives>

How are solutions created?

The solutions are created using many steps.

1. The computer models that were created for existing conditions are looked at to see why flooding is occurring.
2. A potential solution that could reduce flooding is entered into the computer model.
3. The potential solution is modified until the computer modeling shows the targets are met.
4. The solutions are reviewed with other City Engineering staff, and other City agencies (such as Parks and Emergency Services) to understand how the solutions would affect them.
5. Available information is reviewed to understand if something could impact construction (such as wetlands, utility conflicts, historical markers, etc.)
6. A cost estimate is developed.

How are projects being prioritized?

Engineering has developed a tool to help prioritize the order projects will be constructed. The tool accounts for the following:

- Flood reduction abilities
- Racial Equity and Social Justice
- Ability to improve emergency service access
- Cost/available funding sources
- Water quality benefits
- Co-benefits to other City facilities (streets, etc.)

Projects that rank the highest will be looked at to construct first.

When am I going to see solutions constructed?

Engineering cannot provide a specific date. There are many reasons why including:

1. To construct a project, it must be programmed into the City's 5-year Capital Improvement Program (CIP). Programming a project is a complex process and involves many factors. Factors include:
 - What does the project cost?
 - Are other projects happening in the same area? For example, is the street being reconstructed?
 - Is there grant funding?
2. The 5-year CIP is updated every year. For example, in 2020, the CIP for 2021-2026 is developed. In 2021, the CIP for 2022-2027 is updated. Because new information comes up every year, the order the projects are programmed can change.
3. The City has 23 watersheds. Currently, Engineering has the solutions for the first three watersheds. As more watershed studies are completed, more projects will be identified. It is expected that this will cause the order to move around.

Will I be assessed for these improvements?

No. The City has funding set aside through the Stormwater Utility for non-assessable flood mitigation projects that serve a public good. Some stormwater projects may be incorporated into previously planned street reconstruction projects, which would include assessments to property owners, however storm sewer improvements are not assessable. The only exception is ~~pipe~~ lateral connections to connect to serve specific properties.

How are the watershed studies and flood reduction projects funded?

Funding for the watershed studies comes from the Operating Budget and is part of the overall City Budget that gets adopted every year.

Funding for the public work construction projects comes from the City's yearly Capital Improvement Program Budget.

Funding is also provided by stormwater utility fees, which property owners see on their monthly municipal services bills. The funding from the stormwater utility fees is incorporated into the budget process.

Will this effort fix my flooded basement?

It depends. The watershed studies are designed to quantify flooding risks throughout the City due to stormwater runoff from large storms. They will not include a detailed look at groundwater conditions, groundwater-surface water interactions, or flooding that could occur due to a series of continuous, low-level storm events. Basement flooding at any given property may or may not be due to surface water runoff, and therefore may or may not be solved by the solutions laid out in this study.

Is the City thinking about climate change?

Yes. Recent studies indicate the Midwest is experiencing more rainfall in general and more 3"+ storm events in the last 20 years. The City has acknowledged this vulnerability and is looking at updating its design standards to address the more extreme storm events.

What resources are there to stay connected?

There are so many resources! Resources include City Engineering's Flooding Website, Report Flooding form, Facebook page, and podcast. Many of these locations include a link to sign up for City flooding updates. If you have any other questions, please contact Hannah Mohelnitzky, City Engineering Public Information Officer, hmohelnitzky@cityofmadison.com or 608-242-6003.