



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 within the next 5-8 years.

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 flood-prone. 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. Although standards have changed to account for flooding over the years, it is cost-prohibitive to replace all undersized storm sewers all at once.

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 general standard 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 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 was 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 fluctuation is complex and encompasses an area much larger than the City of Madison. The City is working with area agencies to understand groundwater impacts and planning accordingly.

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.

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, 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?

Flooding from sources not identified on FEMA Flood Insurance Rate Maps often occur in Madison and other cities. 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. Private 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 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>

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 with the exception of private lateral connections to connect to serve specific properties. Funding for the studies comes from the Operating Budgets and is part of the overall City Budget that gets adopted yearly. Funding for the public work construction projects comes from the City's yearly Capital Budget. Funding is also provided by stormwater utility fees, which are part of the monthly municipal services bills and is incorporated into the budget process.

When am I going to see solutions constructed?

It depends. Each watershed study will include a watershed-wide conceptual flood mitigation plan and modeling in Phase 2, which is beginning in March 2020. Results of the "solutions models" will be presented to residents at a public meeting in the fall of 2020. These solutions will be high-level conceptual designs, not construction-ready plan sets. Any infrastructure improvements will require prioritization for inclusion in the City's capital budget. Timing for specific solutions is not yet determined.

How will you choose the projects?

The City will use the existing conditions and proposed solutions watershed studies to identify critical infrastructure needs. The City will prioritize solutions based several factors, including, but not limited to cost-benefit ratios, inclusion in larger projects already programed (such as street reconstruction projects), equity, budgetary constraints and more.

Will this effort fix my flooded basement?

Depends. The watershed studies are designed to quantify flooding risks throughout the City due to stormwater runoff from large "one-off" 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.

Why are you not looking at groundwater?

Because 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. In addition to being generally modeled at different scales, ground and surface water modeling require different monitoring strategies, different modeling software and complex coupling of those models to get one integrated model. This type of modeling is very expensive, and is outside the scope of the City's current watershed modeling.

Will there be another round of focus groups?

No. The focus groups are complete for this watershed, no additional focus groups will be scheduled.

What resources are there to stay connected?

There are so many resources! The yellow postcard, known as the "Golden Ticket," as well as each meeting overview handout, includes URLs for City Engineering's Flooding Website, Report Flooding form, Facebook page, and podcast. It also includes 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.