

Retention/Detention Ponds

In a Nutshell

Retention or detention ponds are designed to help control stormwater runoff and improve water quality by collecting water and allowing the excess water to slowly drain. Retention ponds (also known as wet ponds) retain a certain amount of water in the pond at all times. Detention ponds (also known as dry ponds) drain all of their water usually within 72-hours. Both types of ponds can be effective tools in watershed planning and floodplain management.

The “How To”

Creation of a retention or detention pond should be undertaken only after careful consideration of the current status and future needs of the area. These ponds take up space and require regular maintenance.

For a good overview of the subject matter, please refer to the [Storm Water Technology Fact Sheet: Wet Detention Ponds](#). The document contains a lot of good information including an advantages/disadvantages section. The authors are quick to point out that the benefits far outweigh the disadvantages in most cases. The [Stormwater Best Management Practice Design Guide](#) provides a lot of information concerning retention and detention ponds. The article begins with an overview of the different types of ponds and where each is most appropriate. Next, the article goes into design criteria, which include the use of formulas to determine the size of a pond. Finally, the article includes a maintenance section.

An article on [best practices for water management](#) from the Missouri Office of Administration provides information on various kinds of retention/detention ponds. The article discusses detention ponds (p. 1), extended detention ponds (p. 9), infiltration basins (p. 17) and infiltration trenches (p. 25). For each type of pond, the article has a short description, minimum requirements, and a more detailed description of the layout of each type of pond.

Once the ponds are built, they require regular maintenance. This article on [Maintaining Detention Ponds](#) provides a good overview, as well as information on the importance of maintaining a pond, examples of needed maintenance, and an inspection checklist. The City of Wentzville published a [Citizen’s Guide](#) for retention/detention pond maintenance.

Planning & Zoning

It is important to note that retention ponds must be designed to keep people from trying to enter the pond area.

[The Recarga Model](#) is an excellent resource. The model is used to evaluate the performance of bioretention facilities, rain gardens, and infiltration basins. Communities can use this tool to evaluate their current stormwater management tools.

Dollars & Cents

The formula below was calculated by a study (Brown and Schueler, 1997) which is promoted by the EPA as the construction costs formula for retention ponds.

$$C = 24.5V^{0.705}$$

where:

C = Construction, design and permitting cost;

V = Volume in the pond to include the 10-year storm (ft³).

Using this equation, typical construction costs are:

\$45,700 for a 1 acre-foot facility

\$232,000 for a 10 acre-foot facility

\$1,170,000 for a 100 acre-foot facility

Measuring Success

[The Recarga Model](#) is an excellent resource. The model is used to evaluate the performance of bioretention facilities, rain gardens, and infiltration basins. Communities can use this tool to evaluate the performance of a new retention or detention pond. The [Metropolitan St. Louis Sewer District](#) (MSD) uses the Recarga Model and other performance measures to evaluate stormwater management practices. These include the EPA's SWMM tool and other measures developed by MSD.

OneSTL's [Water Quality](#) performance measure will also be an indicator of how successful a new retention or detention pond is. It is a measure of the impaired (polluted) rivers and streams in the region, and the desired trend is downward.

Discover More

The City of Wentzville's [Citizen's Guide for Detention & Retention Basin Maintenance](#)

The Missouri Botanical Garden's [Design and Plant Selection for Bio Retention Facilities](#)