

Post-Construction Runoff Volume

Post construction standards are planned to be recommended for the City of Lincoln. Typical standards from other cities require that a specified volume of stormwater based on rainfall, runoff or pollutant be treated for new development and redevelopment projects prior to leaving the development site. Following are some typical runoff depth volumes that would need to be treated if a Lincoln approved ordinance was based on a specified percentile of rainfall events. The examples below use the 90% rainfall percentile which is a rainfall amount of 1.25 inches. Depth of runoff or Water Quality Control Volume (WQCV) is based on the rainfall amount and the amount of impervious area, which is dependent upon the type of development.

Type/Size Development	Impervious Area	Depth of Runoff	Volume of Runoff
10 acre Residential	30%	0.4 inches	0.3 acre feet
10 acre Mixed Use	55%	0.7 inches	0.6 acre feet
10 acre Commercial	80%	1.0 inch	0.8 acre feet

Volume Comparisons

An acre is equivalent to 43,560 square feet and an acre-foot (ac ft) is equivalent to 43,560 cubic feet. As a comparison a football field (i.e. 300 feet x 160 feet without the end zones) is about 1.1 acres and a city block of 330 feet x 660 feet is about 5 acres.

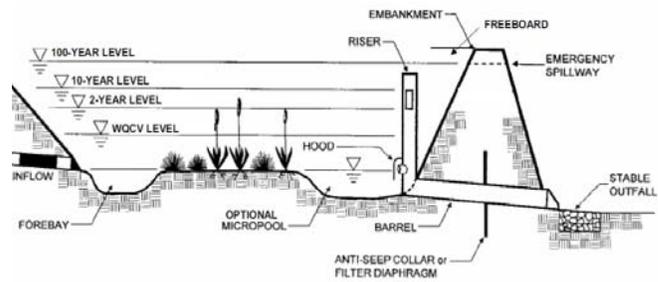
The Water Quality Control Volume from the 10 acre residential example above would cover a football field about 4 inches deep and a city block by about 1 inch deep. The Water Quality Control Volume from the 10 acre commercial example above would cover a football field about 9 inches deep and a city block by about 2 inches deep.

If a storage facility were to be used for the Water Quality Control Volume, it would need to be sized to store that volume of water with a release period of around 40 hours. (Note: The Water Quantity Volume is stored over a significantly less time, as the goal is to reduce peak flows not volume). Assuming a four foot deep storage pond with 4:1 side slopes, the 10 acre residential example would take up about 0.13 acres (about half the size of a single lot). The 10 acre commercial development example would take up about 0.28 acres (about a residential lot size).

Water Quality vs. Water Quantity

The figure at the top right shows the relationship between water quality and water quantity. A rough estimation of the amount of volume needed for Water Quality can be

estimated by adding the difference in the volumes between the 2 year pre- and post-development rain fall events and



the 100 year pre- and post-development rainfall events for a site. The table below provides an indication of estimated volumes needed for storage of both water quality and quantity for two example sites.

Site	Water Quality Volume	Water Quantity Volume
10 Acre Residential	0.3 acre feet	0.3 acre feet
10 Acre Commercial	0.8 acre feet	1.6 acre feet

Design Approach for the WQCV

Using a storage pond to control the Water Quality Control Volume provides a way to combine the water quantity detention requirements (2, 10 and 100 year events) and the water quality event (e.g. 90% event) into a single integrated facility. An alternative approach is to treat the Water Quality Control Volume separately through the use of Best Management Practices such as rain gardens, bio-swales, porous pavement, amended soils, etc. An example of such an approach is shown below for a commercial lot. If an Alternate Best Management Practice concept is incorporated into a development upfront, the overall costs of the development can be lower than a more conventional development due to reduced costs in storm drainage infrastructure and grading. Following past examples of lot sales in Lincoln and around the nation, many lots next to outlots and natural areas sell faster and for more than other lots.

