



Lexmark Bioretention Basin and Rainwater Harvest Project

Lexington, KY

July - December 2016

Lexmark's international corporate headquarters features Lexington's most productive stormwater recycling project.

The combination of impervious roof areas and parking lots on the 264-acre campus produce significant stormwater volume and water quality considerations for Cane Run creek. Like many urban watersheds, Cane Run is a 303d-listed stream impacted by urban runoff and storm surges that overwhelm the stream's capacity. The Cane Run watershed is also designated as a resource protection area that feeds the drinking water supply for the city of Georgetown. Lexmark wanted a stormwater solution that would benefit the community as well as the business.

The project team created an innovative project to reduce stormwater issues as well as Lexmark's draw from the drinking water supply. This project was awarded funding in part by the Lexington-Fayette Urban County Government's Water Quality Management Fee and the Stormwater Quality Projects Incentive Grant Program. The project drainage area is 35 acres and mostly buildings and parking lots. A stormwater basin was created within a 2.4-acre footprint, although its capacity is dependent on flow through rates. The bottom of the basin has a filter media of predominantly sand above a gravel drainage course. The project team partnered with the University of Kentucky researchers to evaluate the percent of sand and soil that provides favorable infiltration rates, the removal effectiveness for potential stormwater runoff pollutants (e.g. sediment, oils, grease, etc.), and the effects of different gravel media in the underdrain system on water hardness and mineralization. Two 7.5 HP pumps in the basin sump can each transfer up to 250 gallons per minute (500 GPM combined maximum) to nearby storage tanks. One 3-million-gallon storage tank holds water primarily for evaporative cooling and boiler systems. Another 500,000-gallon tank sits next to and feeds the evaporative chillers.

Another benefit of using rainwater is a reduction of maintenance. The limestone dominated geology of Kentucky produces higher levels of calcium dissolved in the water supply. Although not a significant threat to human consumption, when water with dissolved minerals is used in an evaporative cooling system, the process produces a build-up of minerals that must be routinely removed. By using rainwater, the process water is essentially distilled water, lacking minerals and reducing the need for treatments. The evaporative system completes the hydrologic cycle and returns the water as vapor to the atmosphere. For these types of water use, it is not critical that water be treated to drinking water standards or come from a municipal supply.

Between mid-2018 to mid-2019, 4 million gallons of rainwater was harvested for use and the same 4 million gallons of stormwater runoff did not impact Cane Run. Between January and August 2019, this system provided 95% of water use in the cooling towers (5,700,000 gallons). Within 17 months of operation, this system reduced demands on drinking water supplies by over 9 million gallons. The return on investment was met within the first three years by reducing cost of purchased water supply. This demonstrates Lexmark's commitment to corporate environmental, health, safety and sustainability goals. This innovative project has been recognized with multiple awards.



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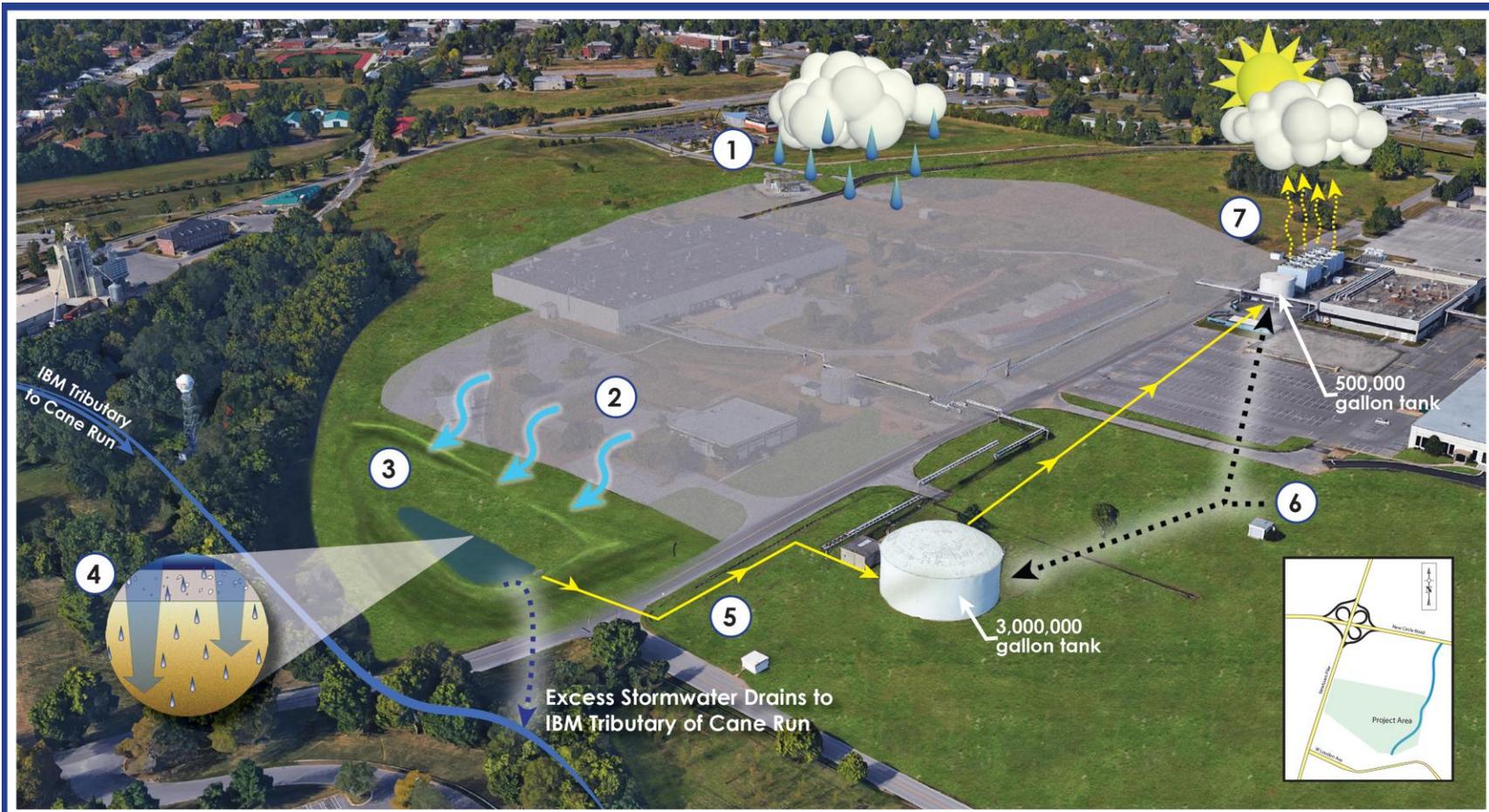
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1. Precipitate

Rain falls to the ground

2. Runoff

Stormwater runs off 33 acres of impervious area (mostly parking lot)

3. Collect

Stormwater runoff collects in a 2.4 acres bioretention basin

4. Infiltrate

Stormwater infiltrates through amended sand/soil filter to remove pollutants before draining to the pump wet well

5. Convey

Water is pumped from wet well to tanks

6. Store

Water remains stored in tanks until it is needed for non-potable use

7. Evaporate

Cooling towers evaporate water back to the atmosphere