By Steve Roy, LEED AP (An excerpt from a feature in Roofing Magazine, May 2014)

Can stormwater management using rooftops in urban areas be the financial solution to our growing urban stormwater problem? Will public-private partnerships with building owners help to provide a government service—stormwater drainage—in a more cost-effective manner? As cities struggle with the high administrative and procurement costs and time delays to manage stormwater, should we be looking up to roofs as part of the solution? Can we avoid more regulations and instead look to market-based solutions? These questions are beginning to be discussed and tested as new, innovative approaches to solving difficult and expensive urban stormwater management issues.

STORMWATER MANDATES

Many cities and counties are dealing with more stringent stormwater permits issued from the Washington, D.C.-based U.S. Environmental Protection Agency (EPA) and state environmental agencies that implement the federal Clean Water Act. Many communities are operating under federal court orders and administrative consent orders from EPA to reduce stormwater runoff into rivers, lakes, and streams. In addition, there are 177 communities in the U.S. where stormwater and wastewater collection systems are combined, known as combined sewer overflows (CSOs). These CSOs result in billions of gallons per year of combined untreated stormwater and wastewater discharged into waterways during large rainfall events. Funding crises have developed in many municipalities as they create programs, hire new staff, and design and construct new infrastructure to meet these regulatory requirements.

Many cities have spent billions of dollars separating stormwater drainage from wastewater-collection systems by installing new, costly drainage systems. In addition, large underground storage tunnels and vaults have been installed by many cities at the costs of billions of dollars per installation. These tunnels and vaults are designed to collect, hold and slowly release the stormwater into the treatment network. Increasing
stormwater pipe sizes and creating tunnels and vaults is extremely costly. For example, Washington, D.C., just broke ground on the construction of two stormwater tunnels that are currently projected to cost $2.6 billion dollars to construct. Just one of the tunnels will be 13-miles long and hold 157 million gallons of combined stormwater and wastewater in 23-foot-diameter tunnels, 100-feet below the surface.

Green-infrastructure approaches to stormwater issues are included in most municipal stormwater permits and orders. For example, New York City is spending $187 million on green infrastructure for stormwater control in CSO areas to control the equivalent of 1 1/2 inches of runoff from impervious surfaces by December 2015. Public and private areas are under consideration for green-infrastructure solutions, and the city expects to spend $2.4 billion in green infrastructure during the next 20 years.

As cities address urban stormwater management, stormwater fees are being assessed on private-property owners to help fund the programs to solve urban stormwater issues. Close to 1,500 stormwater utilities are now in operation in the U.S., and the number is rapidly growing. These stormwater utilities typically are assessing stormwater fees based on the amount of impervious surfaces by property owner. The fees can range from a few hundred dollars per year to tens of thousands.

Roofs are considered an impervious surface because they are designed to shed stormwater through drainage networks into the collection system beneath city streets. For example, in New York City alone roofs make up 11.5 percent of the total area, or roughly 944.3 billion square feet, according to the city’s Department of Design and Construction’s Cool & Green Roofing Manual.

“Rather than looking at roofs as part of the stormwater problem in cities, they should be viewed as a possible solution.”

PRIVATE SECTOR MARKET-BASED APPROACH

Currently, green infrastructure related to stormwater management is being constructed and installed by local governments and private-development entities. However, the funding available for incorporation of green infrastructure into capital projects is not available in high enough quantities to adequately address the problems. A market-based solution could include a re-examination of roofs as a place to manage stormwater at a much lower cost than public right-of-way projects.

How could this operate? Property owners with roofs could construct stormwater-detention technology, such as blue roofs. Owners would be paid by the stormwater utility for every gallon of stormwater detained during a rain event. The private sector would design, install, operate, and own the green infrastructure, and the government would only pay for the performance. This concept is similar to how power-purchase agreements are used by solar companies to generate electricity, which is purchased by the host customer, through rooftop photovoltaic arrays.
Imagine a large, flat-roof owner in a city that is struggling with CSO problems. The building owner could contribute to his or her municipality’s stormwater management by creating a blue roof that detains millions of gallons of stormwater each year. The municipality or utility would enter into an agreement to pay the owner for every gallon of stormwater that is detained during a storm event. The cost to the government would be significantly less than current expenditures to manage the same volume of stormwater, and ownership, operation and maintenance of the green infrastructure are held by the private sector. The government only pays for the stormwater volume managed. The owner obtains a revenue source that is guaranteed for a period of time (usually 20 years at a minimum). The revenue would cover the installation, operation and maintenance, as well as eventually provide a profit, for the building owner.

In fact, market-based solutions for green infrastructure already are occurring. The EPA, Maryland Department of Environment and Prince George’s County announced a $100 million initiative to demonstrate how community-based, public-private partnerships can spur green-infrastructure-driven stormwater controls while creating thousands of local jobs and boosting economic growth. The organizations currently are providing technical and regulatory support for developing and implementing the Prince George’s County Urban Stormwater Retrofit Public-Private Partnership Demonstration Pilot.

The roofing industry should begin the dialogue with municipalities—acting as the agent for large roof owners—to bring this concept of sustainable and multipurpose roofs into the public discussion. The cost of a market-based solution to address urban stormwater management that uses rooftops will be significantly less than the current government approach. In addition, a guaranteed revenue stream at fair-market prices to rooftop owners will ensure the private sector will actively cooperate and install green infrastructure. To manage stormwater in urban areas, we should be looking up to the roofs as part of the solution.

Questions?

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About ESS

ESS Group, Inc. is a multi-disciplinary environmental consulting and engineering firm comprised of scientists, engineers, and environmental specialists who provide full life cycle engineering and consulting services. ESS has worked with public and private sector clients to prepare stormwater management plans and Stormwater Pollution Prevention Plans (SWPPP), develop stormwater designs, and submit stormwater permit allocations. Our civil engineers, water resource engineers and environmental scientists have collaborated to address our client’s stormwater issues during both construction and operations of their developments and facilities.