



# JOHNSON STREET GREEN INFRASTRUCTURE RETROFIT PROJECT

PICP Eliminates Flooding In City Intersection While Improving Water Quality Of Local River

## LOCATION:

Chattanooga, Tennessee

## PRODUCTS:

Aqua-Bricloc® & Aqua-Bric®

## INSTALLED AREA:

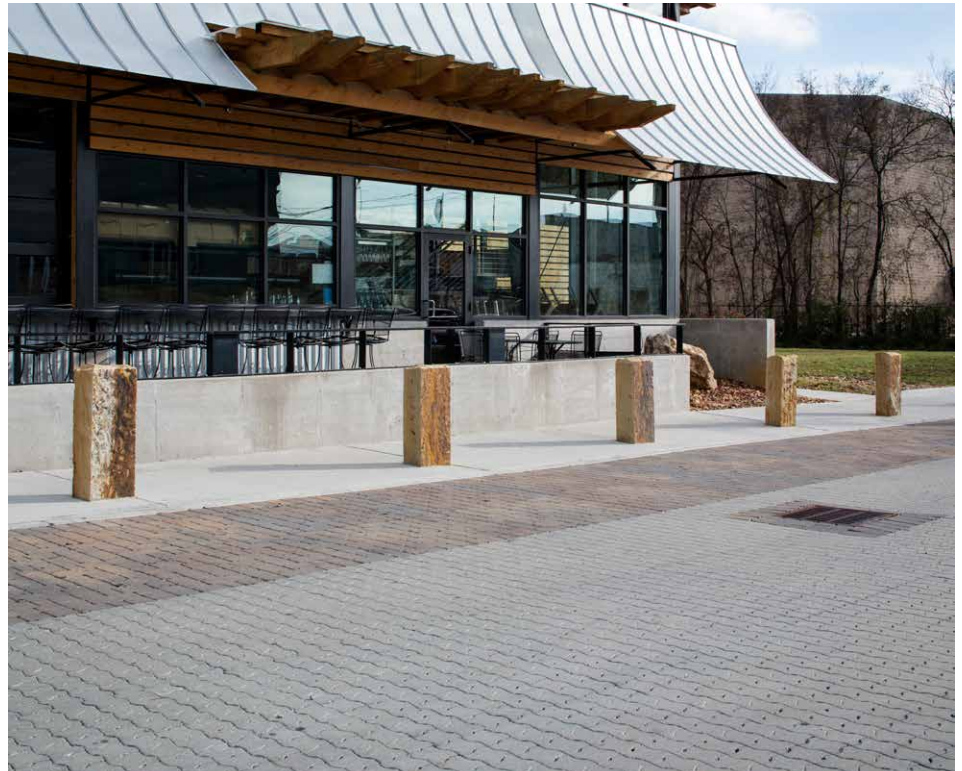
28,000 sq. ft.

## ENGINEER & DESIGN:

City of Chattanooga

## CONTRACTOR:

Thomas Brothers



## Background

The crash pad is a Chattanooga hostel frequented by adventure travelers who enjoy the multiple outdoor activities that the area has to offer, including the wide variety of water sports afforded by the Tennessee River. However, wading or driving in ankle-deep water at the intersection outside their hotel is not exactly what travelers have in mind. Due to the absence of a stormwater drainage system at the intersection adjacent to The Crash Pad, the intersecting streets of Johnson and Passenger flooded nearly every time it rained, causing more than just inconveniences. "The whole intersection would get covered, and the pavement suffered a lot because of that as well," Mark Heinzer, engineering manager for drainage and flood control for the City of Chattanooga, said to Forester Magazine. When property owners Dan Rose and Max Poppel decided

to develop a piece of neighboring property to build the Flying Squirrel restaurant and bar, they approached the city with a partnership idea that would eliminate the flooding, address the intersection's structural issues, and meet the city's stringent stormwater management requirements for new construction.

## The Challenge

Decades ago, Chattanooga's founding fathers created a system that combines the city's sewer system with its storm drains. Common in many older municipalities, the simple system does its job until a torrential downpour, which over strains the capacity of the city's treatment plant and causes overflow of raw sewage into the Tennessee River, a haven for outdoor enthusiasts and a source of drinking water for communities

across the Southeast. Due to mandates by the Environmental Protection Agency to reduce overflow, the City of Chattanooga has instituted multiple stormwater management programs. One program requires any new development or redevelopment to capture the first inch of rain on their property and prevent it from running off into the sewer system.

## The Solution

Instead of spending hundreds of thousands of dollars on pipes, storage tanks and other types of stormwater abatement, property owners Rose and Poppel proposed a public-private partnership with the city. They offered to front the cost for permeable interlocking concrete pavers (PICP) to completely resurface Johnson Street if the city would agree to install the PICP

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pavement system. "The original proposal was to do just the intersection. We got them to consider doing the whole block," Poppel said to the Times Free Press. "The amount we spent on (the pavers) roughly corresponded to the amount of street improvements we were going to have to do anyway."

This proposal presented a unique opportunity for the city. "We were going to need to replace those roads anyway. So, the opportunity presented itself to do more than just pave them; we were able to include some stormwater improvements as well," Heinzer said.

The Johnson Street Green Infrastructure Retrofit Project included construction of 28,000 square feet of roadway using PICP. Belgard® Aqua-Bricloc® was used for the primary paver field, providing an attractive serpentine cobbled pattern with the ability to support extremely heavy vehicular loads. Parking shoulders were constructed with Aqua-Bric® in a herringbone pattern, which provided a striking contrasting border for the new roadway. The result was a charming ADA compliant street capable of handling both heavy traffic and heavy rainfall.

The project was not without its challenges, however. When excavating the roadway, it was discovered that some of the existing fill bore traces of industrial contamination and had to be removed. The remaining soils weren't highly permeable and had to be scarified, as opposed to the typical compaction that is done for a

roadway installation. An underdrain system was installed between the soil and aggregate fill that was directed to the combined sewer system. The graduated aggregate layers provide up to 6 inches of storage before infiltrating into the underdrain. "It slows down that peak rate for the combined sewer system," reducing the potential for overflow, Heinzer said.

**There have been zero problems with rainwater. It doesn't stand in the roadway at all. The water goes right through the surface of the pavement and gets underground and is held there. We've had absolutely no problems since the project with any kind of flooding.**

*Mark Heinzer  
Engineering Manager for City of Chattanooga*

## The Result

The finished permeable paver street, with 3 feet of gravel reservoir underneath, now captures all of the intersection's excess rainwater, keeping 11,000 cubic feet of rainwater out of the combined sewer system. A few years after installation of the pavers, Heinzer says, "There have been zero problems with rainwater. It doesn't stand in the roadway at all. The water goes right through the surface of the pavement and gets underground and is held there. We've

had absolutely no problems since the project with any kind of flooding."

Heinzer notes that although the system is still functioning properly, the city has plans to do some preventative maintenance to keep it functioning at optimal levels. "It's got such a redundancy in its capacity that it's still working fine," he said. As a preventative measure, the city plans to use a sweeper and a vacuum truck to remove any fines that could potentially clog joints, then refill the joints with aggregate chips—a process they plan to repeat every two or three years, as needed.

Property owners Rose and Poppel won the Tennessee Governor's Environmental Stewardship Award in 2014 for excellence in green building for their work on the Flying Squirrel, the Johnston Street Project, and the adjacent hostel, The Crash Pad, which was certified LEED Platinum in 2012 and was built on a brownfield.

Due to the success of this and similar projects that collectively total well over 100,000 square feet of PICP within the city, the City of Chattanooga has endorsed PICP as an LID solution to capture stormwater before it enters the sewer system. As an incentive for other property owners, like the developers of The Crash Pad and Flying Squirrel, Chattanooga will become one of the first cities in the U.S. to setup a stormwater market for property owners who replace asphalt parking lots with PICP, allowing them to trade stormwater credits to those who can't make similar improvements.



### About Belgard Commercial®

Belgard Commercial, part of Oldcastle® APG, offers a complete collection of paver and wall products for plazas, terraces, parking areas, roadways, rooftops and retaining walls. Available in a range of styles, premium Belgard Commercial products have been found in the nation's finest developments and award-winning commercial and retail properties since 1995.

Oldcastle APG is part of CRH's Building Products division. As the largest building materials company in North America, CRH provides a single-source solution for commercial construction projects with a full portfolio that also includes structural masonry, masonry veneers, dry mix products, hardscape jointing sands and sealants, stormwater management systems, concrete infrastructure, architectural glass, lawn & garden products, and composite decking.