Rain, Rain, Here to Stay

Why rainwater harvesting should be a fundamental water management tool

By Eddie Van Giesen

Harvesting rainwater may not solve all of the world's water problems, but what it can do when combined with a complete water supply strategy is provide an alternative source of freshwater for daily consumption while also relieving some of the demand pressure on municipal water systems. Harvesting rainwater helps preserve valuable groundwater supplies and reduces the impacts of the storm water flows that continue to plague cities around the world.

Although rainwater harvesting can and should be an important piece of a water supply strategy, it represents only a part of an overall plan. A comprehensive water supply strategy should be a three-pronged approach that in addition to rainwater harvesting, includes harvesting and reuse of wastewater and site-generated storm water at grade surfaces, such as parking and driving areas and sidewalks.

In the current water supply paradigm, we pay to bring water in, often from far away or deep places, and pay to get rid of this water once it is used just once. In addition, we pay to get rid of the rain and storm water that comes to us from the skies through our storm water system.

This is the paradox of our complex but unsustainable urban environments. Too often, water supply strategies are built on two misguided principles: water is cheap and infinite, and water must be supplied to users through a one-way system. Both principles represent an outdated vision that must be changed to meet the realities of the modern world we live in.

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Like it or not, we have now arrived at a new paradigm, and it is a seismic departure from old, wasteful methodologies. To better manage the earth's most valuable natural resource – water – we must take deliberate strides away from supplying water through one-way centralized municipal sources. These should be replaced with systems that are supplemented

with site-collected and generated water.

Consider the number of times in recent years that public water systems have been interrupted in cities and built environments around the world. Or when, after natural disasters, the local population has no access to clean water. Consider in September 2017, Hurricane Maria, a Category 5 hurricane, brought torment and devastation to Dominica, the U. S. Virgin Islands and Puerto Rico. Sadly, those countries are still rebuilding and some places still do not have their water supply infrastructure rebuilt.

Water Supply Concerns

Even here in the U.S., we have big problems. For example, in Flint, Michigan, the public water system was delivering water contaminated with poisonous lead. The public trust was broken, and this was due to human negligence and apathy. It was an error of huge proportions.

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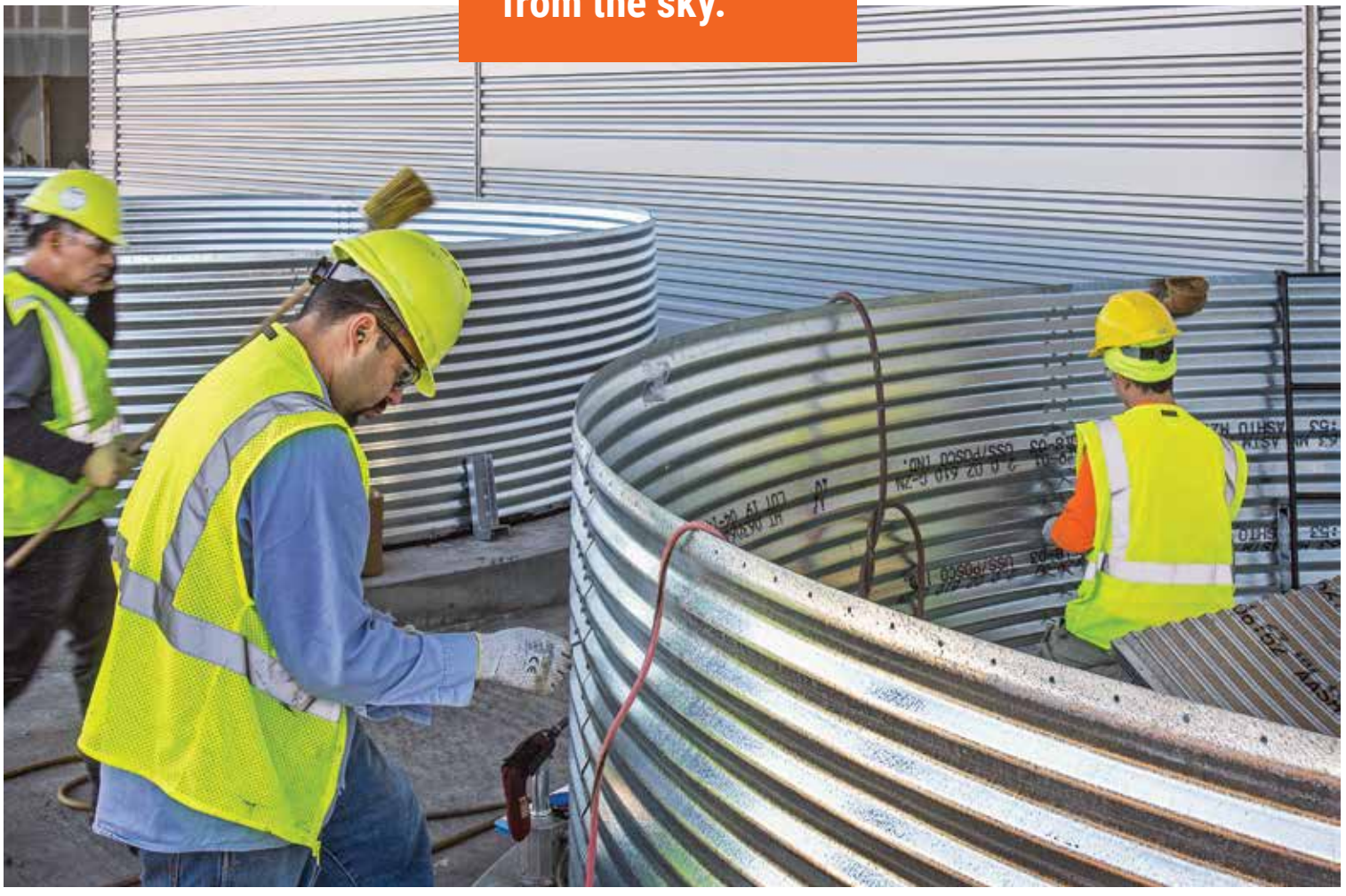
As one who has worked in the rainwater harvesting industry for more than a decade, I would like to challenge you to re-envision how cities worldwide could function from a hydrodynamic standpoint. Consider the possibility of a radically different relationship between humans, buildings and water supply. Rather than thinking of rainwater and recycling systems as components added to a building, we need to view buildings as tools to generate water from the sky.

Rainwater harvesting systems could be integrated into building function from the outset, not as add-on or retrofitted systems.



A new cruise ship terminal at Pier 27 in San Francisco, California, developed a rainwater harvesting system to recycle water in surrounding buildings.

This is the paradigm shift that affects everything from the economics of rainwater harvesting, sanitary and clean water management tied to population growth, and of course, building design.

In this new model, we would not allow rainwater systems to be subordinated to building design. Rather, building designers could celebrate, even flaunt, the vastly improved built environment. Buildings that have rainwater systems would be the new normal, not the occasional anomaly.

Adoption of this proposed new model also would challenge our old definitions of waste. All the water that we use for cleaning, washing and drinking would be reused. This is in addition to the use of captured rainwater. Even the solids generated through wastewater management systems would be put to use, rather than simply discarded.

The terminal is equipped with a series of tanks, pumps and filtration/disinfection equipment to deliver rainwater for toilet flushing.

In stretching our imagination beyond old ways of thinking, we turn away from requiring conventional returns on investment on rainwater and recycled water solutions. Rather than asking: "How much will the rainwater or recycling system cost?" the question should be, "What is the cost of not having water at all and how can we not do this?"

Many parts of the world, even in modern cities, do not have steady or safe supplies of drinking water despite the presence of abundant local rain. If we are not prudent and diligent in our water management here in the U.S., we will struggle with similar problems within the foreseeable future.

We are stewards of the earth and its resources. As the earth's population grows, the demand for water will only increase. We are now dangerously close to the tipping point of no return in terms of freshwater supply.

Addressing these issues head-on and with long range plans is the best way to safeguard us from losing our capacity to meet the growing, worldwide demand for fresh, clean water.

Rainwater Harvesting in Action

Illustrative of the types of rainwater harvesting systems referred to here is a system built in San Francisco, California, and installed a few years ago at Pier 27. There are few places as well recognized as San Francisco's celebrated waterfront. Beginning several years ago, a concerted effort was made to improve the pier.

With California at the leading edge of the sustainability movement, it should be no surprise that green technology was set as one of the key expectations for the new cruise ship terminal there.

One of the greenest facets of the project is a rainwater harvesting system. It is intended to recycle rainwater that would otherwise be lost rather than simply letting it run off to the bay. By utilizing rainwater harvesting, the facility can reduce its dependence on imported water.

Passengers departing and arriving in San Francisco now pass through the terminal which houses ticketing, baggage, customs

and security operations. However, unnoticed by the people entering the city is the network of drains, pipes, valves and storage tanks that form the basis of the rainwater harvesting system.

The cruise terminal is equipped with a series of tanks, pumps and filtration/disinfection equipment to deliver rainwater for toilet flushing. The rainwater harvesting system consists of three above-ground steel tanks, inlet pre-filters and the rainwater control station, which houses the filters, treatment, equipment controls.

Why waste clean EPA quality drinking water for flushing toilets when a readily available source is easily harvested from the building's roof?

Water from the terminal's roof is sent to a pre-filtration system where larger debris is removed before the collected rainwater enters the storage tanks. When there is a demand for water, the rainwater is pumped through the filtration, disinfection and treatment system before entering dedicated lines to the toilets.

Toilet flushing consumes vast amounts of potable water in commercial buildings. This is based on occupancy and usage patterns. Why waste clean EPA quality drinking water for flushing toilets when a readily available source is easily harvested from the building's roof? The science is here. The reasoning is sound.

Rainwater harvesting and water recycling has gone mainstream. It is time to make a real difference in the places we live by putting these water resources to use in a truly responsible and sustainable way. WQP

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