



In this image, we see a residential potable water system utilizing rainwater harvesting. The four Infiltrator IM-tanks are installed in series, connected at the bottom inlet to allow them to function as one tank system and also connected at the top to allow for venting. The system yields a total storage volume of over 7,000 gallons. It includes filtering and first flush diversion, pretreatment, and UV disinfection.

Photo courtesy of Rain Pipe & Light Pipe, Inc.

ONSITE, ON TIME

Embracing a more holistic, decentralized approach to water management

BY DENNIS F. HALLAHAN

HISTORICALLY, the evolution of drinking water and wastewater management has shifted towards a centralized scheme because of urbanization and the concentration of pollutants. Centralization became the norm and the public perception that followed deemed centralized management as superior. The push for centralized infrastructure through the 1900s and the lack of maintenance thereafter has led to the current state of degrading and dated infrastructure. This has become too much of a financial burden for budget-strapped communities and detrimental to environmental and human health. If we are to adapt in a sustainable fashion, we need a change in perspective.

Some communities are turning to public-private partnerships (P3s) to finance necessary infrastructure improvements, but this approach is not widespread due to local constituent's resistance to private sector involvement in public water projects. In the recently released 2016 budget, the Canadian government earmarked \$5 billion for water, wastewater, and green infrastructure projects including \$2

billion over four years for a Clean Water and Wastewater Fund. The budget notes that there is an "urgent need" to modernize water and wastewater infrastructure and to build partnerships.

The need is also clearly identified, as the Environment and Climate Change Canada (ECCC) has estimated that approximately 150 billion litres of untreated or undertreated wastewater flows into Canadian surface waters from centralized sewers, making sewers the number one polluter of Canadian surface waters. Comparatively, an estimated 20,000 replacement septic systems are installed yearly nation-wide, the flow of which would amount to approximately 0.03 per cent of the untreated wastewater discharged by sewers to Canadian surface waters.

Progress in solutions

There are a growing number of design options within the decentralized industry to provide differing levels of treatment and a move towards clustered systems. Clustered systems keep treatment and groundwater recharge localized, while still providing opportunity for third-

party operation, maintenance, and management. Yet zoning and regulations tend to favour centralized infrastructure. Homeowners and developers need to educate and lobby for improved decentralized regulations. Communities should be able to make a choice to move past the stigma of onsite systems and focus on the environmental and fiscal sustainability of decentralized wastewater management.

One of the holistic approaches is to embrace water reuse, even with wastewater. For example the technologies are available to and treat wastewater to the necessary standards prior to reuse. Irrigation for landscaping may require lower levels of treatment whereas reuse for non-potable indoor uses such as toilet flushing or cooling would necessitate treatment. This is where the fundamental shift of thinking can occur; in lieu of disposing wastewater by dumping to a river or sea, the water is reused, thereby decreasing the demand upon potable water sources.

Both public stigma and regulations can be barriers to the acceptance of water reuse. The perception of using

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wastewater as a potable water source seems unnerving and dangerous without proper education; in reality—we are continuously reusing water/wastewater. In fact, all municipal water systems that draw water downstream from a wastewater treatment plant are implementing de-facto water reuse. Decentralized water reuse simply offers

a more direct and sustainable practice. A still largely untapped water source is rainwater. From small residential rainwater harvesting systems to those designed for large-scale commercial applications, the technology in components, filtration, and controls is propelling this water supply alternative to the forefront. With little treatment,

rainwater can be used for irrigation, toilet flushing, and cooling. With further treatment, rainwater becomes viable as a source of a potable water supply.

As populations continue to grow and shift, it is imperative for all aspects of the water cycle to be optimized for sustainability. Receptivity to new approaches to finance these infrastructure improvements is critical for communities to move ahead with safe and sound water and wastewater infrastructure programs. Implementing next generation decentralized wastewater treatment, water reuse, and rainwater harvesting approaches are three potential solutions to move toward a dependable, safe and sustainable water cycle. Water is required for life; let's treat it as such. *wc*



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