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ACT Solutions

Terrain Demands Leading-Edge Water Plan Yellowknife, NWT

Issue

In Yellowknife, the cost of servicing lots can be exorbitant due to the need to either bury pipes in permafrost and rock or to use a 'truck and haul' system to deliver fresh water and remove sewage. A system that doesn't need to accommodate underground services would be more flexible and allow innovation in subdivision design standards, lot sizes and site requirements. Reduced servicing costs could be passed on to homeowners and successful projects could be transferred to many Northern communities.

Plan

The City of Yellowknife was awarded an ACT grant to determine whether land development and housing costs, along with overall capital and operational costs for an infrastructure system, could be reduced using on-site wastewater reclamation technology. An additional objective was to develop servicing technology suited to the terrain and climate of the North.

Project team

Vista Engineering
UMA Engineering

City of Yellowknife – Planning and
Lands Department; Building
Inspection Division
Northwest Territories Construction
Association

Results

The project team conducted extensive research and data collection, finding that recent innovations in on-site wastewater treatment had extended the technology into only a few full-scale applications in urban settings.

One system, identified as having the greatest potential for Yellowknife, was the one used in Canada Mortgage and Housing Corporation's Healthy House in Toronto. There, the technology allowed an infill house to be built without requiring municipal services. This system led to the one installed in Nidlo, NWT, on Latham Island, which demonstrates the application of wastewater recycling in the North.

Recent developments in wastewater recycling have focused on treatment process advancements that use technology such as bioreactors, filters and ultraviolet disinfections.



Northern communities can benefit from wastewater recycling systems like this one installed in Nidlo, NWT.

Source: Bill Fandrick, City of Yellowknife

In addition, a number of studies have been conducted on how to naturally manage the dispersion of effluent.

The project team learned from their investigations that a significant amount of money could be saved using on-site wastewater recycling systems in Yellowknife. While municipal infrastructure savings (capital and operating costs) for a typical residential development in Yellowknife may be about 25 per cent, those savings could rise as high as 40 per cent through production-scale implementation.

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The magnitude of system-wide benefits — such as reduced water supply and fire suppression requirements, along with the value of delaying future capacity expansions to the system — will depend on the magnitude of the application of the technology.

“We feel a cluster development offers the greatest chance of success,” says City of Yellowknife Planning and Lands Division Manager Monte Christensen, noting that type of development would offer an economy of scale for the treatment unit and a savings in the household plumbing.

The cost benefits of on-site wastewater recycling extend beyond day-to-day reductions in water supply requirements and sewage collection and treatment requirements, the study found. Future capacity expansions to the system will also be affected.

“Right now, our main thrust is to find a better way to develop subdivisions,” Christensen says. A system that requires reduced water treatment capacity allows more flexibility in locating housing, as development would not need to be near water and sewer lines. Housing affordability would be enhanced because the City would be able to make more efficient use of what, at times, can be a restricted land base.

“We’re looking to use this technology in places that are a little more removed, a little harder to access,” Christensen says. “It would let us develop residential areas that we consider to be in the best location, not just the ones that are close to water and sewer lines.”

Because on-site wastewater recycling is essentially non-existent in residential settings, the

study states, public health authorities have neither the experience nor the regulatory framework to approve these systems. Regulations governing on-site wastewater recycling should be included in the Public Health Act.

“Once the public health department develops standards, then people will be more excited about it,” Christensen predicts.

The City of Yellowknife has yet to identify an opportunity to launch a full-scale on-site wastewater recycling system. Of the systems studied by the project team, none had been approved for residential use by the public health department.

Christensen believes the cost savings and impact on housing affordability will generate more discussion and draw people to new wastewater recycling technologies.

“The ideas discussed in the report are familiar to City administration,” Christensen says. “We still firmly believe they are ideas that are worthwhile pursuing.”

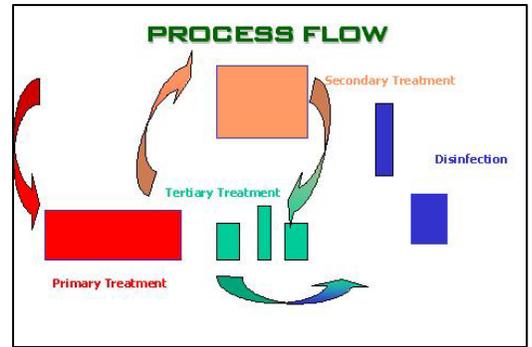
Related reports

On-Site Wastewater Recycling in Cold Regions (City of Yellowknife, Vista Engineering, UMA Engineering 2000)

This report is available from the ACT website. See “ACT projects & solutions”.

Contact

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The process flow in a wastewater recycling system

Source: Bill Fandrick, City of Yellowknife

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