



# State of Alaska Water & Sewer Challenge

## The Problem



*"Honey bucket," a plastic bag lined bucket that collects urine and feces.*



*Plastic bags of feces from honey buckets are disposed of in a sewage lagoon.*

- Over 3,300 rural Alaska homes lack running water and a flush toilet. Many more depend on aging and deteriorating piped and haul systems.
- Lack of in-home water and sewer in Alaska contributes to severe skin infections and respiratory illnesses. Residents of Southwest Alaska suffer rates of invasive pneumococcal disease that are among the highest in the world.
- To address this public health problem, agencies have funded conventional, community-wide piped and truck haul systems. These systems work, but they are expensive to construct, and many communities cannot afford the high operating costs.
- Funding to build systems has declined severely while costs have risen sharply. The deficit between available funds and needs is over \$1 billion.
- Capital and operating costs of traditional approaches have become unsustainable. An innovative approach is needed.

## The Solution

The Alaska Department of Environmental Conservation, in coordination with tribal, state, and federal agencies, has initiated a project to spur widespread research to develop innovative and cost effective water and sewer systems for homes in remote Alaska villages. The project focuses on decentralized water and wastewater treatment, water re-use, and minimization. These approaches have a high potential for use in individual homes and housing clusters. **Our goal is to significantly reduce the capital and operating cost of in-home running water and sewer in rural Alaska, so every home can have service.**





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## *The* Project

- ❖ **Phase 1 (COMPLETED)** Engineers, social scientists, innovators, and people with rural Alaska experience formed joint venture teams.
- ❖ **Phase 2 (COMPLETED)** Funding awarded to select teams to research and develop new and sustainable in-home water and sewer systems.
- ❖ **Phase 3 (ONGOING)** Development of working prototypes and lab testing of pilot systems.
- ❖ **Phase 4 (2017-2019)** Field test systems in rural homes.
- ❖ **Phase 5 (2020+)** Select successful systems that will be affordable to build, operate, and maintain.



*Hauling household sewage around Atmaultluak.*

## *The* Teams of Phase 3

### DOWL Alaska

DOWL Alaska proposes a graywater re-use system located in a small vestibule attached to the house. The vestibule minimizes space requirements and avoids expensive heat trace to an outside holding tank. DOWL's prototype is at the Cold Climate Housing Research Center in Fairbanks. DOWL is also testing a Point-of-Use filter for drinking water.

### Summit Consulting

Summit proposes an entirely in-home system designed to minimize water and wastewater hauling. Raw water is treated by multi-stage cartridges, an ultrafiltration membrane and disinfection to produce drinking water. Graywater is treated by a biological process and then disinfected. Summit's system is at their main office complex outside Tok.

### University of Alaska Anchorage

UAA proposes to treat both graywater and some blackwater, as well as a modular approach that allows home-owners to select in-home components that fit their lifestyles and space available. Membrane treatment and high dose ultraviolet disinfection are used to produce non-potable wash water. UAA's system can be found on campus in Anchorage