



Blackwater Reuse at Fishermen's Terminal

Closed loop treatment and reuse for a Living Building project



Maritime Innovation Center under construction at Fishermen's Terminal in Seattle

THE CLIENT

The Port of Seattle transformed the historic Ship Supply Building into the Maritime Innovation Center, a flagship project pursuing full certification under the International Living Building Challenge. The building must capture its water and treat its waste on site, closing the water loop within a compact urban waterfront setting.

THE CHALLENGE

The blackwater reuse system had to deliver reliable, health-protective performance despite an unusually constrained setting:

- All treatment equipment had to fit within a fixed mechanical footprint.
- A low design flow of 400 gallons per day required careful process sizing.

TREATMENT AND REUSE

Primary and biological treatment. Solids separation and anaerobic digestion are followed by an Orenco AdvanTex textile filter for biological treatment.

Pathogen removal and disinfection. Tubular ultrafiltration provides a physical pathogen barrier, followed by ultraviolet light and electro-chlorination for dual disinfection.

Reuse delivery. Disinfected effluent is stored and distributed to the Maritime Innovation Center for toilet flushing and to the surrounding landscape for irrigation.

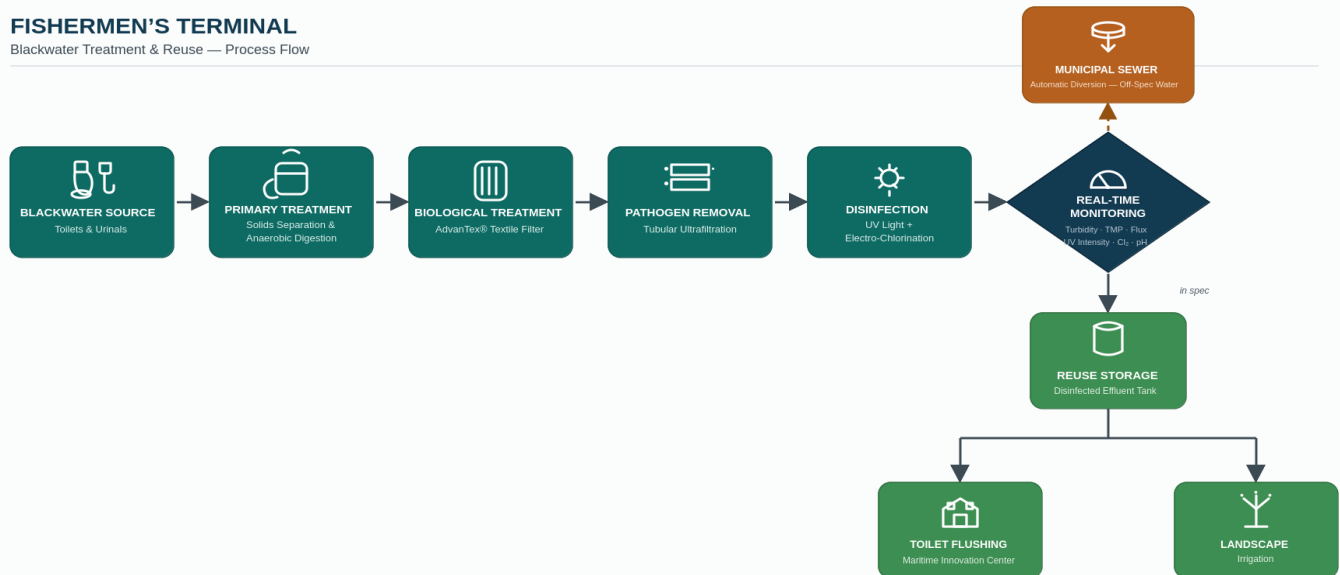
PARAMETER	PROJECT VALUE
FLOW RATE	400 GPD
TREATMENT SYSTEM	Solids removal, biological treatment, filtration, and dual disinfection
ONSITE REUSE	Toilet flushing and landscape irrigation
PUBLIC HEALTH PROTECTION	Real-time automated monitoring with off-spec diversion to sewer

THE SOLUTION

REGEN worked with the Port facilities team and Orenco Systems to design a compact modular treatment system within the building mechanical footprint. The design captures blackwater on site, treats it through multiple protective barriers, and returns reclaimed water for toilet flushing and landscape irrigation.

FISHERMEN'S TERMINAL

Blackwater Treatment & Reuse — Process Flow



REGEN AEC + Orenco Systems | Fishermen's Terminal, Port of Seattle

CONTROLS AND COMPLIANCE

Continuous monitoring. The control system tracks turbidity, transmembrane pressure, flux, ultraviolet intensity, free chlorine, and pH in real time.

Fail-safe diversion. During an upset or maintenance event, off-spec water is automatically diverted to the municipal sewer before it can enter the reuse network.

Regulatory readiness. The treatment train was developed against Washington draft Onsite Non-Potable Water System requirements and comparable health-based standards while the state rules advanced toward adoption.

THE OUTCOME

The installed system has completed clean-water functional testing. Once Washington finalizes its onsite reuse rules, REGEN's design can be placed into service as a working model for closed-loop water infrastructure in an industrial maritime setting.

RESULTS

- ✓ Reduces potable-water demand by supplying reclaimed water for toilet flushing and landscape irrigation.
- ✓ Meets strict multi-pathogen log-reduction targets through a fully automated and unattended treatment train.
- ✓ Provides a permitting precedent for similar projects under Washington onsite reuse requirements.
- ✓ Positions Fishermen's Terminal as a model for circular, decentralized, and climate-resilient water infrastructure.

PROJECT SIGNIFICANCE

The project demonstrates that high-performance blackwater reuse can be integrated into a constrained commercial building without sacrificing public-health safeguards or operational resilience. It turns a waste stream into a dependable local water supply and extends the Port of Seattle's sustainability ambitions into the infrastructure itself.