

# Zero-Discharge Greenhouse-Enclosed Wastewater Management System

A wastewater system incorporated into a public garden protects local resources

*Single-Family Home – Montague, Massachusetts*

## Project Background

High groundwater conditions and proximity to a municipal water supply resulted in a mandate from local regulators to demolish a home and wastewater treatment system in the town of Montague, Massachusetts, and to subsequently condemn the property. The mandate was issued during sale of the home and the associated wastewater system inspection.

The property owner retained the services of the Ecological Engineering Group (EEG) to design and permit a system to manage wastewater from the home and minimize impacts on the environment.

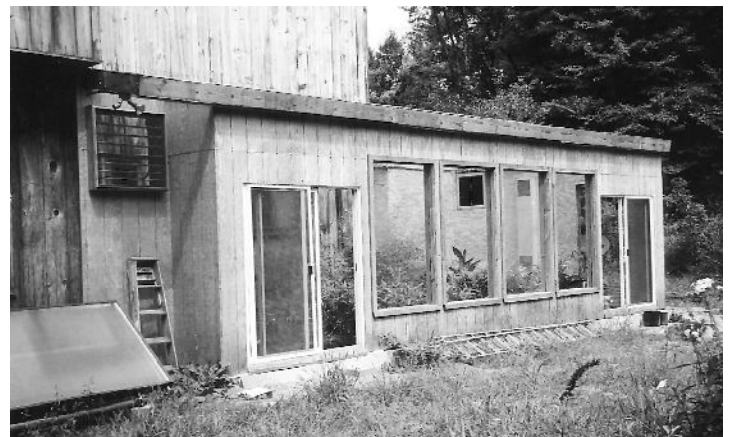
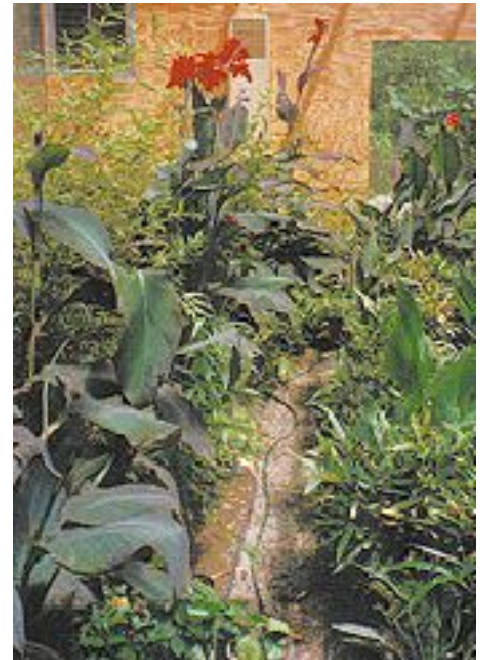
## Project Description

After discussing the feasibility of a zero-discharge system with the local Board of Health, EEG solicited a piloting permit from the Massachusetts Department of Environmental Protection (DEP). The system includes a Massachusetts plumbing board-approved EcoTech Carousel composting toilet system with a dry toilet stool. The composting toilet system reactor is located in the basement of the house and reduces blackwater to a dry stabilized end-product which can be legally buried under six inches of soil on the homeowner's property.

Wastewater effluent, or *graywater*, drains to a Washwater Garden™. This system is enclosed in a solar-heated atrium to promote plant growth without natural precipitation, which reduces land area requirements. Graywater is utilized by a series of selected plants including bamboo, bougainvillea, hibiscus, and canna lily, which are known for utilizing large volumes of water. Maintenance of the system requires simple plant pruning and gardening tasks, as well as examination and upkeep of a kitchen grease trap and an in-house lint filter. An initial start-up period was required as the plants acclimated and matured in the system. During the first year, occasional tank pump-outs were required.

## Unique Features

- Zero-discharge system provides excellent protection of public health and environment.
- Greenhouse-enclosed garden provides aesthetic value as a tropical patio



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