Evolution of Wastewater Management

Presentation Overview

- What do I do with this Wastewater?
  - Evolution of the goals
- What is an Onsite Wastewater Treatment System?
- Wastewater Infrastructure
- Environmental health ultimately determines public health
- Pilot study of systems

Evolution of wastewater treatment goals

- From outdoor plumbing to water reuse
Outdoor plumbing: the pit privy

- Goal: designated place
- No carrier needed to convey waste
- Waste applied directly to the soil
- Public health concerns addressed
- Management: relocate

Indoor plumbing

- Convenience
- Water carrier to convey waste out of facility
- ‘Collection system’
- Public health and pathogens
- Management: keep pipe flowing

Disposal

- Goal: limit human contact
- Keep wastewater below ground
- Disposal options
- Public health
  - “Disposing” of pathogens
  - Treatment?
- Management: install, flush and forget
Septic tank and soil treatment area

- Evolving goal:
  - Disposal: effluent goes away versus
  - Dispersal: TREATMENT
- Public health AND environmental issues addressed
- Management:
  - Disposal: often none at all
  - Dispersal: System management is critical

Goal: TREATMENT AND DISPERSAL

- Starting to address both environmental concerns in addition to public health concerns
- Technological advancements now allow removal of:
  - Pathogens
  - Solids
  - Nutrients
- System management is vital to treatment
- Goal is now DISPERSAL
  - Hydrologic cycle

Hydrologic Cycle
Reuse

- Goal: careful use of a valuable resource
- Wastewater vs. water
- Potable vs. Non-potable uses
  - Landscape reuse
  - Toilet flushing
  - Some areas are looking at it as potable
- Management: O&M is even more critical

Varying rates of evolution

- Vary across the country
- Driving forces for change
  - Limited water resources
  - Environmental concerns
    - TMDL program
    - CZMP program
    - Source water protection
  - Watershed Protection Plans

Changes in Goals means:

- Approach must also change
  - Siting requirements
  - Choice of components and systems
  - System O&M
  - Management program
  - Industry needs
Decentralized wastewater treatment system:

- Collection, treatment, and dispersal/reuse of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities, at or near the point of waste generation.

Decentralized Approach

Distributed management:

- Method used to manage wastewater infrastructure where a responsible management entity (RME) combines onsite, cluster and centralized treatment in a cost effective and sustainable structure.
What is an Onsite Wastewater Treatment System?

1. Wastewater Source
2. Collection and Storage
3. Pretreatment components
4. Final Treatment and Dispersal components

Wastewater source

User
- Domestic
- Commercial
- Industrial

Collection
- Piping from facility with cleanout
  - Blackwater
  - Graywater
Collection
- Holding tanks
- Composting toilets
- Incinerating toilets

Pretreatment
- Septic tanks
- Aerobic treatment units
- Media filters
- Constructed wetlands
- Membrane bioreactors
- Disinfection

Final treatment and dispersal
- Trench and bed distribution
Final treatment and dispersal

- Low pressure distribution
- Subsurface drip distribution

Choice should be determined by effluent quality and site conditions.

Key Terms for Management

- Clear communication
- Identify key issues

Oak Trail Shores

- Septic system evaluation
- August 21-24, 2007
- Dye study
- Water surface
Dye Study

- Five homes
- Bright Dyes
  - Red
  - Yellow/Green
- 10 tablets in one gallon of water
- Poured into sink
- Added water to system

Check for Dye

- Walk over evaluation of the site
- Visual check of water in the canal
- Portable testing system
- No dye found over three days

Soil

- Wastewater treatment
- Soil acceptance
  - Water enters soil
- Soil treatment
  - Aerobic soil
  - Separation to groundwater
- Percolation test
Soil Water Acceptance

- Percolation test
- Excavated a 4 inch diameter hole
- 30 inch depth
- Measured drop over 19 hour period
- 84 minutes per inch

Saturated Water Surface

- Water level controlled by lake surface and canal
- Assume water level greater below the land between water bodies

Soil Profile Evaluation

- Three homes
  - Uphill of canal
  - Across the island of canal
- Soil profile
  - Red color
  - Some mixed material near lake
  - Tree roots to a depth of six feet
  - Texture?
**Saturated Zone**

- Excavated a hole to saturated zone
- Measured water surface
- Approximately 8 feet up side of canal
- Approximately 5.5 feet on island between canal

---

**Residence**

- Septic tank and trench soil treatment system
- Broken septic tank lid
- Homeowner concerns regarding stormwater
- Replaced lid

---

**General Concerns**

- Age of systems:
  - Acceptance of water from home
  - Stormwater infiltration
  - Tank structural integrity
- Plan for wastewater infrastructure
- Point of sale inspection
- Economics
Summary

- Decentralized management will play a vital role in our future infrastructure needs.
- Technologies are available for meeting our needs.
- Environmental regulations will continue to be more stringent.
- Environmental health is ultimate form of public health protection.

Questions?