



# Lake Tishomingo Wastewater Treatment and Collection System

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*Slides Courtesy of Orenco Systems, Inc. & Flow Systems, Inc.*

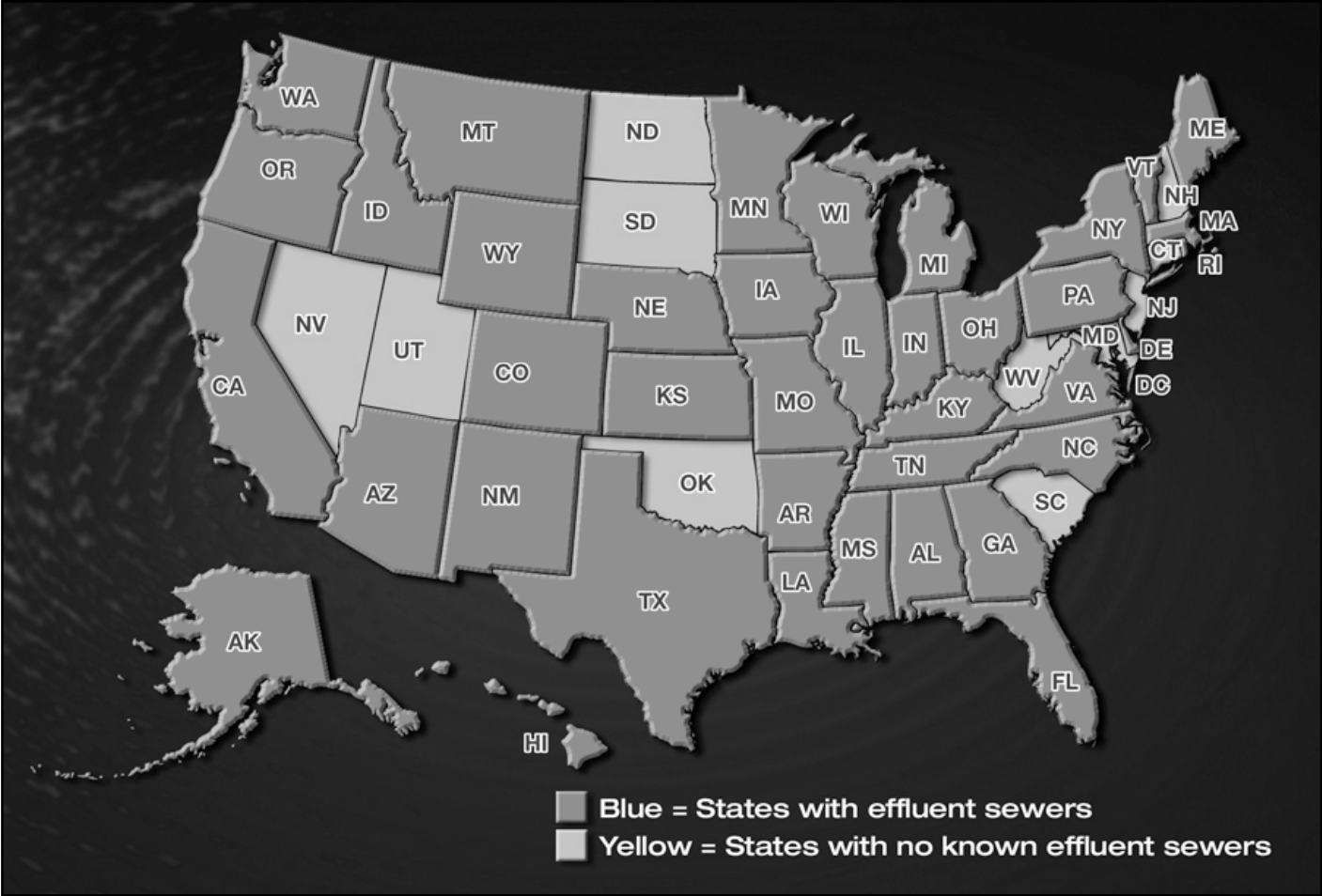
*Dan Hufker, Sales Representative*



# Discussion Topics

- **Introduction to effluent sewer systems**
- What is an effluent sewer?
- What are the advantages of an effluent sewer system?
- What are the O&M requirements of an effluent sewer?
- What are the costs associated with effluent sewers?
- What is a Recirculating Sand Filter?

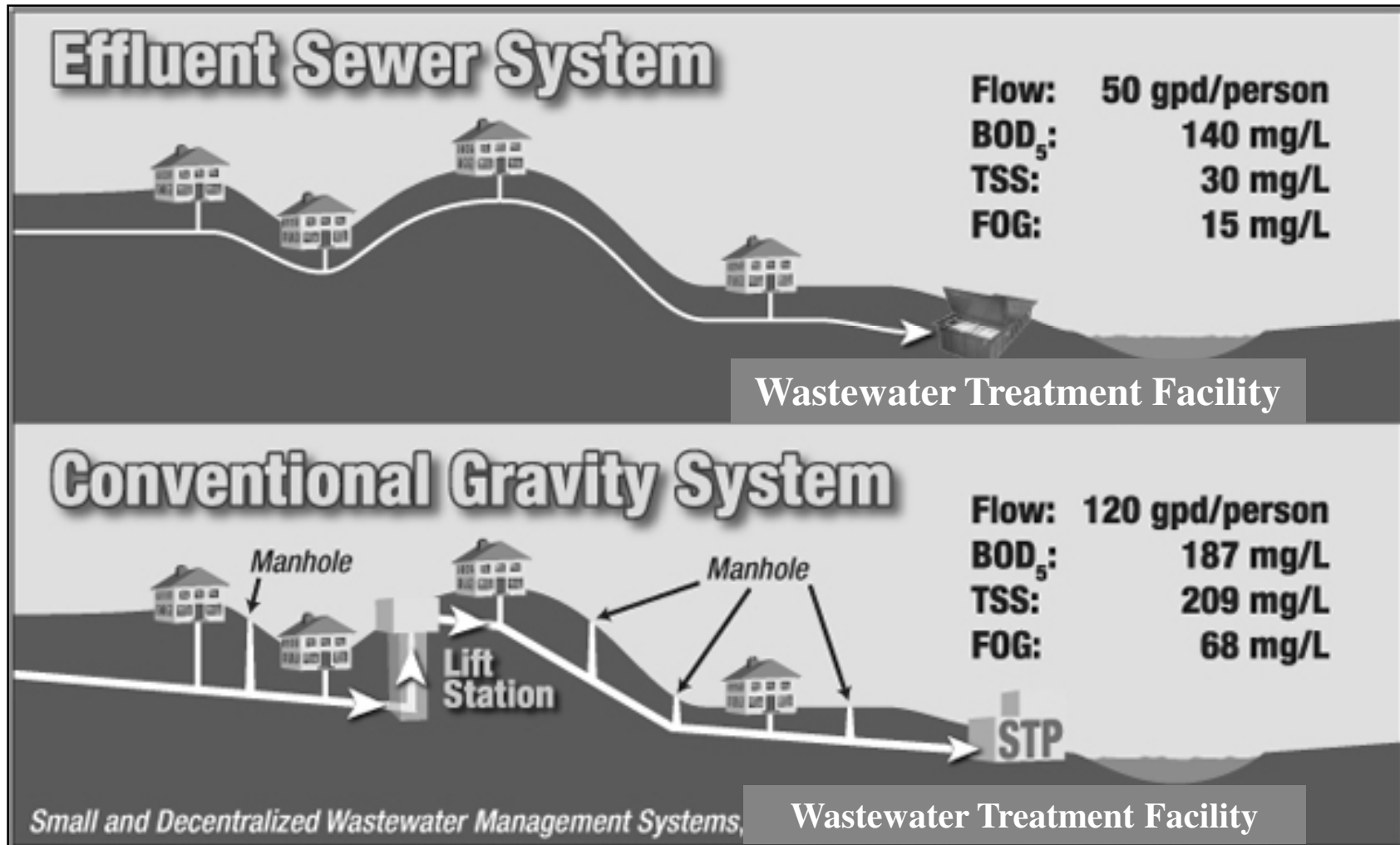
# Effluent Sewers in the United States



2004: Effluent sewers can be found in nearly every state of the U.S.



# System Comparison





# Benefits

- Allows the construction of homes in areas where standard sewers or septic systems can't be used
- The system is professionally maintained by trained utility operators
- Has affordable installation costs and low maintenance costs
- Has little visual impact





# Effluent Sewers are Easy to Maintain

- 25 years of documented system performance
- Minimal service calls
- Negligible power costs (\$1/month)
- Tank pumpout intervals of 5 to 10 years, depending upon waste loading





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# STEP System Effluent Sewers

- Septic Tank Effluent Pumping



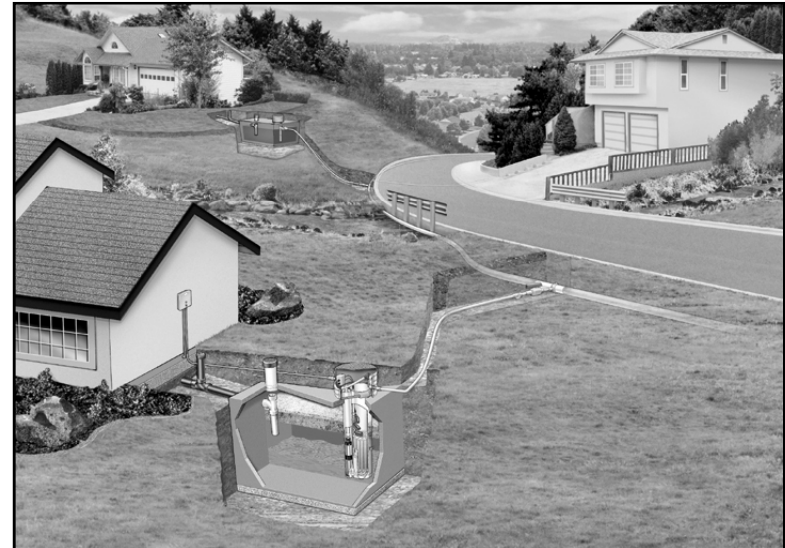




# STEP Wastewater Systems

## Effluent Sewers ... On-lot Components

- 1,000 to 1,500 gal septic tank
- 1/2 Hp, 10 gal/min, 115VAC effluent pump  
~ 20+ yr life
- Control panel
- Pump vault

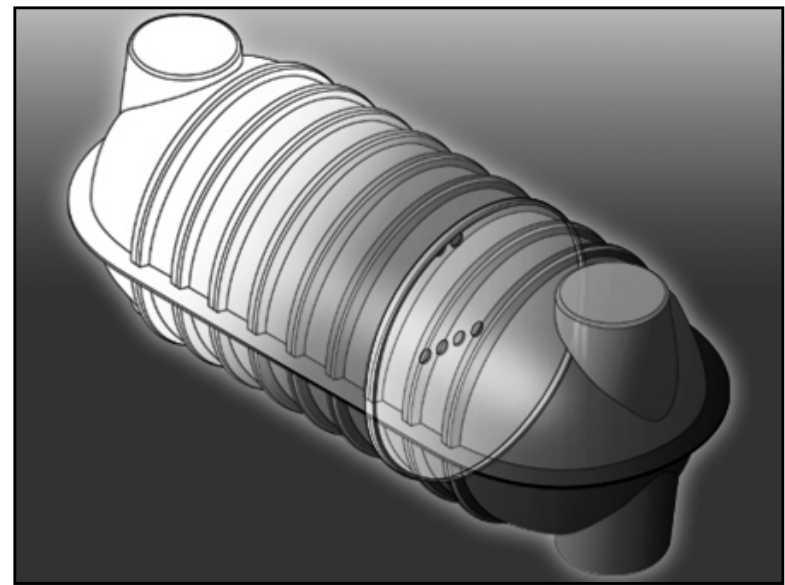




# Materials of Tank Construction

Tanks must ...

- Be concrete or fiberglass
- Meet Engineer's General Specifications Guidelines





# Poor Top Seam and Wall Seam





# Orenco Effluent Sewer Components

## ProSTEP™ Pumping Package

- Component compatibility with an engineered package containing
  - ~ Pump vault
  - ~ High-head effluent pump
  - ~ Biotube® filter cartridge
  - ~ Float assembly
  - ~ Discharge assembly





# Orengo Effluent Sewer Components

## High-Head Effluent Pump

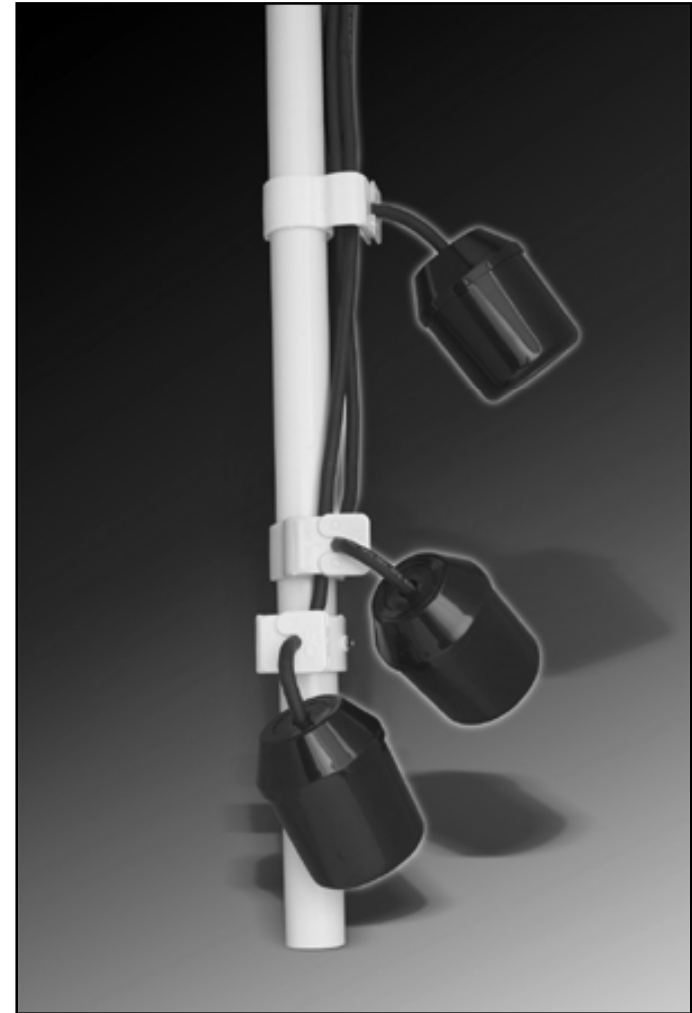
- Non-corroding stainless steel
- Typically 115V
- Lightweight; under 30 pounds
- Long life; 20 to 30 years





# Float Assemblies

- UL508, motor rated, signal rated, open/closed, drawdown signal
- Factory set
- Color tagged
- Adjustable float collar





# Control Panels

- High-quality components
- Touch-safe components
- Neat wiring; accessible components





# PVC Access Risers

- Lightweight
- Corrosion-resistant grommets installed

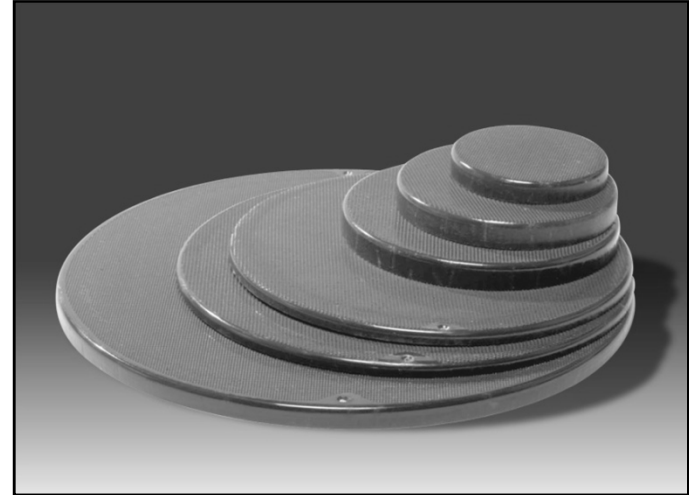






# Fiberglass Lids

- 4-bolt attachment method
- Sturdy fiberglass construction
- Insulation and carbon filter adders
- Tamper-resistant bolts
- Lightweight

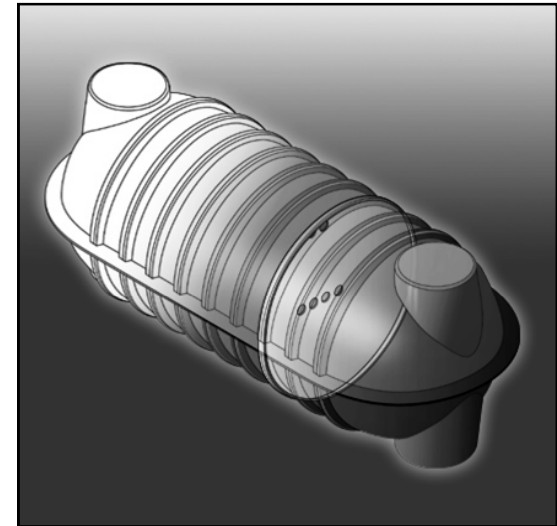




# STEP Wastewater Systems

## Effluent Sewer ... On-lot Components, cont.

- Primary treatment in septic tanks
- 80% removal of fats, oils, and greases
- 24-hour emergency storage
- Abuses stay in septic tank





# STEP Wastewater Systems Collection System: Main Lines

- Small diameter pipe (2-4 inch diameter)
- No manholes
  - ~ Cleanouts at terminal ends of mainlines, etc.
- Small Trenches





# STEP Wastewater Systems

## Collection System: Main Lines, cont.

- Follows contour of the land ... no deep excavations
- Shall burial depth ... typically 30” burial depth (below frost depth)
- Minimal construction trauma
- Low operation and maintenance costs



# STEP Wastewater Systems

## Collection System: Main Lines, cont.

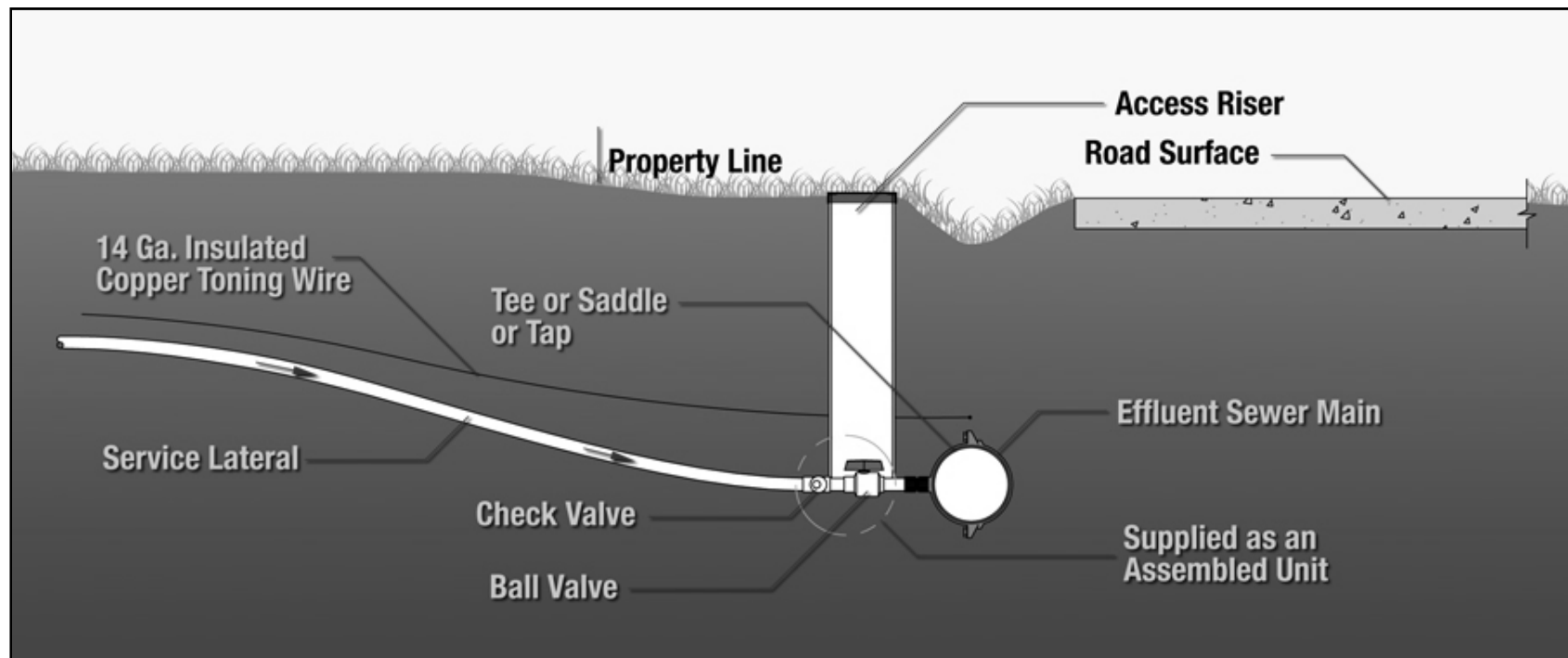
- Largely immune to I&I and leakage
  - Lost capacity in treatment facility
  - I&I must be treated
  - Causes of I&I must be repaired
  - I&I events cause SSO's (Sanitary Sewer Overflows)





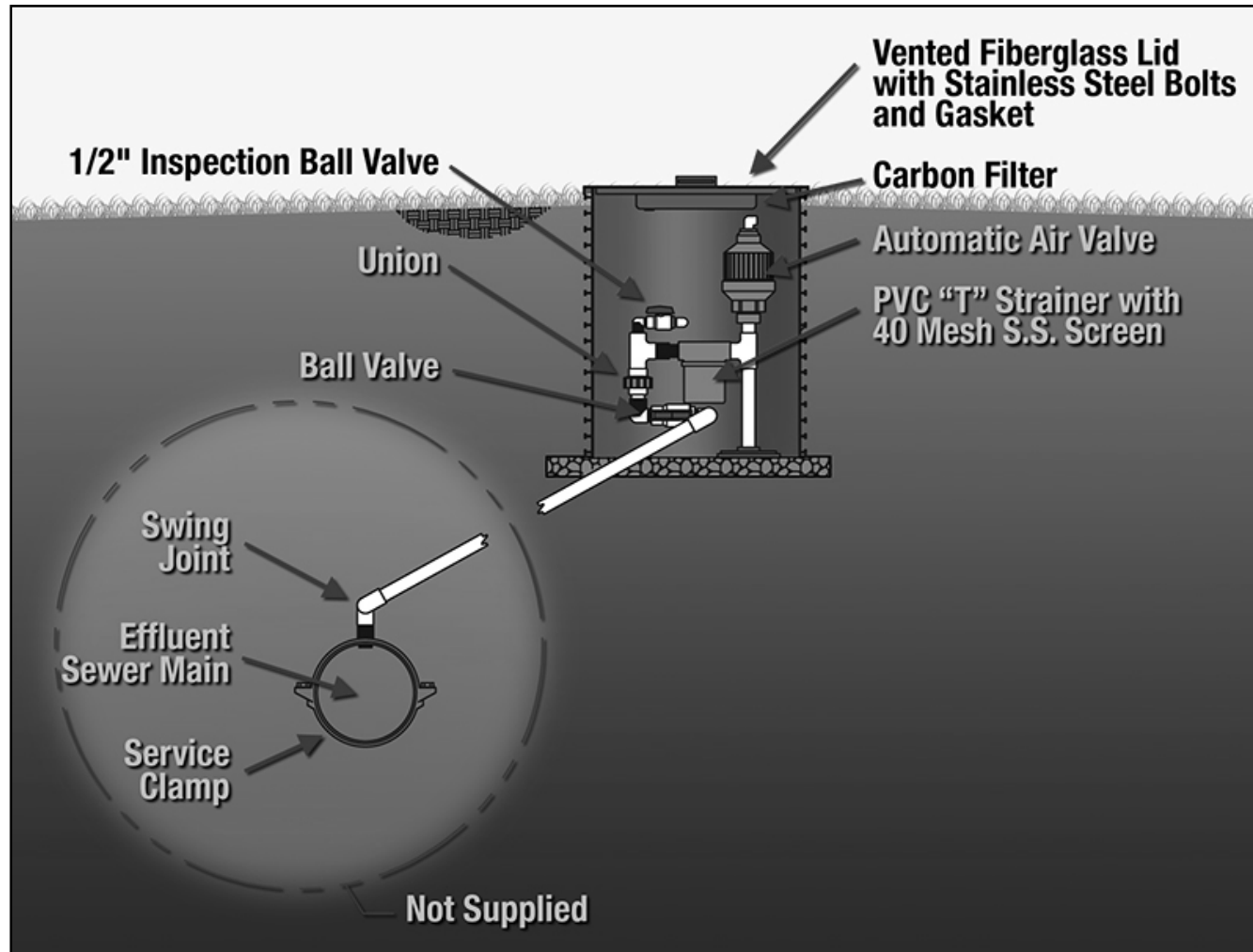
# Service Connections

- Comprised of check valves and ball valves
- Access to the surface required
- Allows for isolation of on-lot components





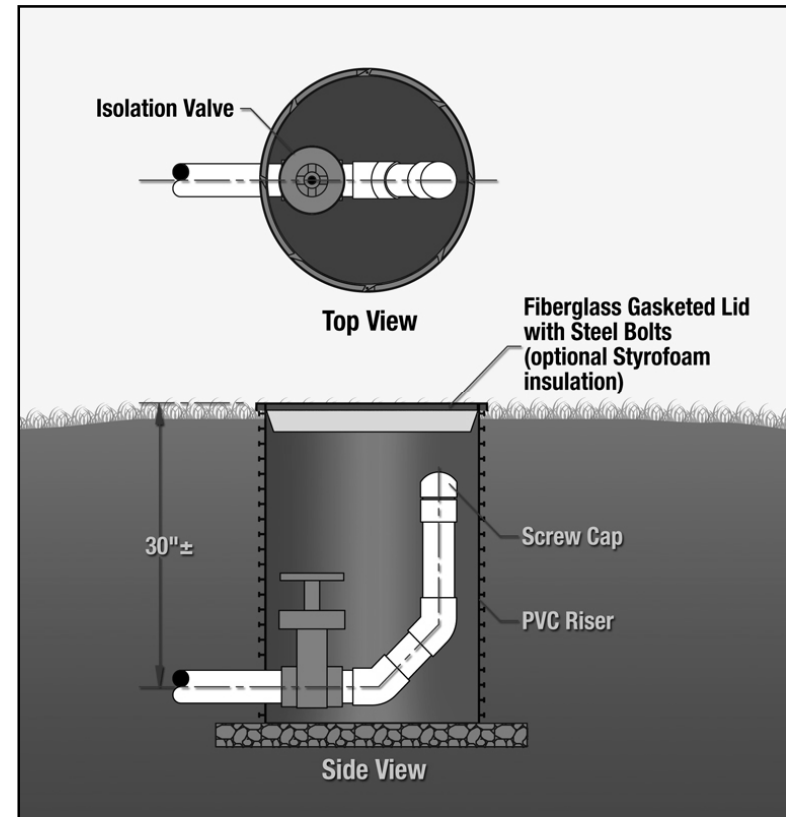
# Automatic Air Valves





# Cleanouts

- Located at terminal ends
- Provides an entry point for cleaning “pigs”







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# Advantages of an Effluent Sewer

- Flexible in design
  - ~ Adaptable to varying site conditions
  - ~ Allows for phased buildout
  - ~ Can be integrated into existing sewer infrastructure
- Design includes storage/reserve in the event of power outages or need to repair mainline break
- Low-impact construction
  - ~ Minimal disruption to community



# Advantages of an Effluent Sewer

- Protects public health and the environment
- No infiltration
- No overflows
- Emergency storage





# Quality of Treatment

- The **ONLY** collection technology that provides treatment
  - ~ 70 to 90% reduction in waste strength
- Collection and treatment technology integration
  - ~ Reduced hydraulic and biological loading to treatment facility



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# Operation and Maintenance On-Lot

- Occasional inspection and cleaning by trained O&M Provider
- Documented tank pumpout intervals of 5 to 10 years
- About \$1 per month for electricity for each homeowner



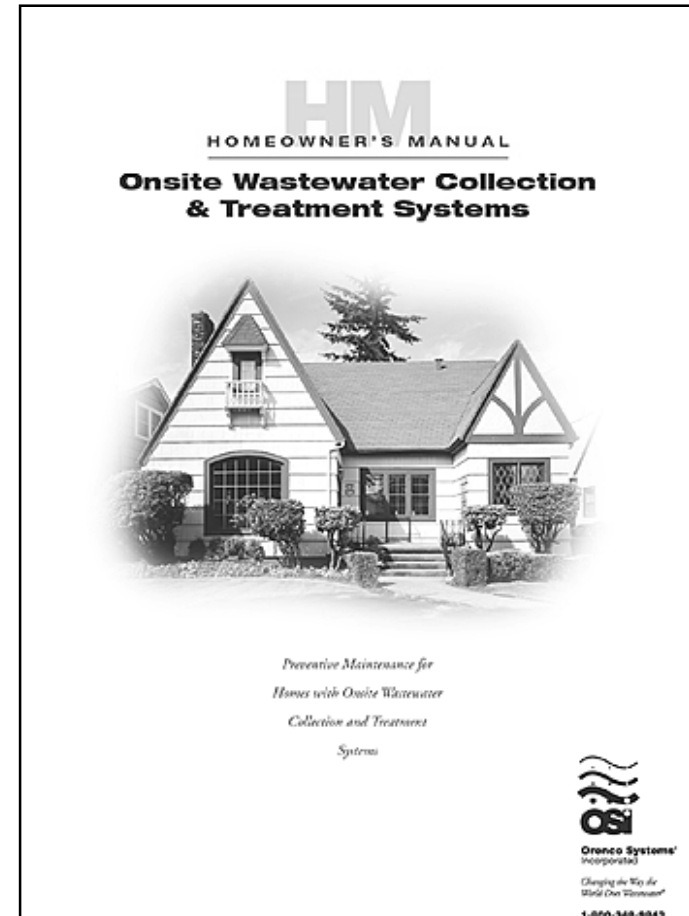
# Operation and Maintenance Collection Lines

- Inspect and clean components
  - ~ Automatic air valves
  - ~ Cleanouts
- Exercise mainline valves
- Pigging of mainlines may be necessary



# Homeowners Play an Important Role

- Read the Homeowner's Manual
- Educate family members to practice wise system use
- Keep household plumbing in good repair
- Notify utility operator of anything unusual







# Discussion Topics

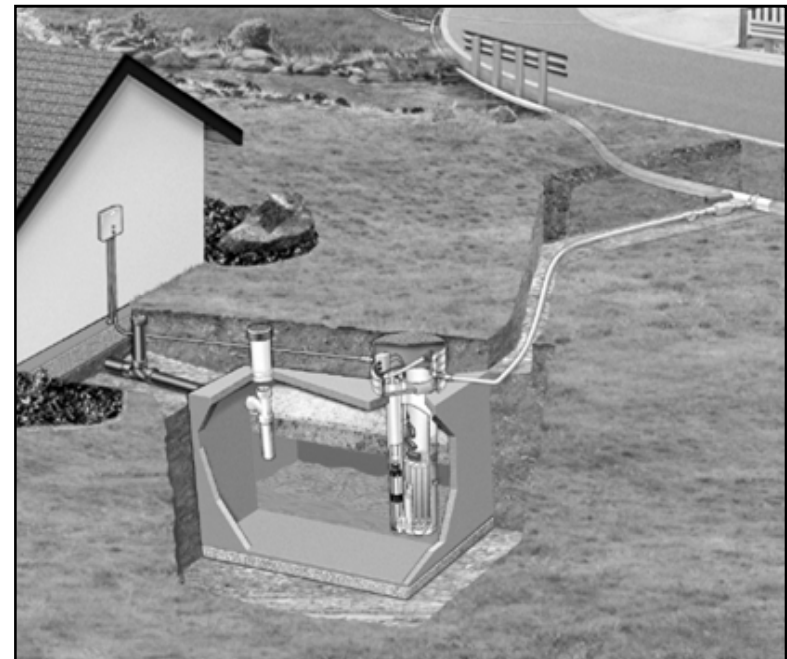
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# Orenco STEP System

**Typical Installed Cost: \$4500 to \$5500**

- Building sewer lateral
- Septic tank, risers, and lids
- ProSTEP™ pump package
- Control panel
- Electrical conduit and wire
- Electrical power to controls
- Service line



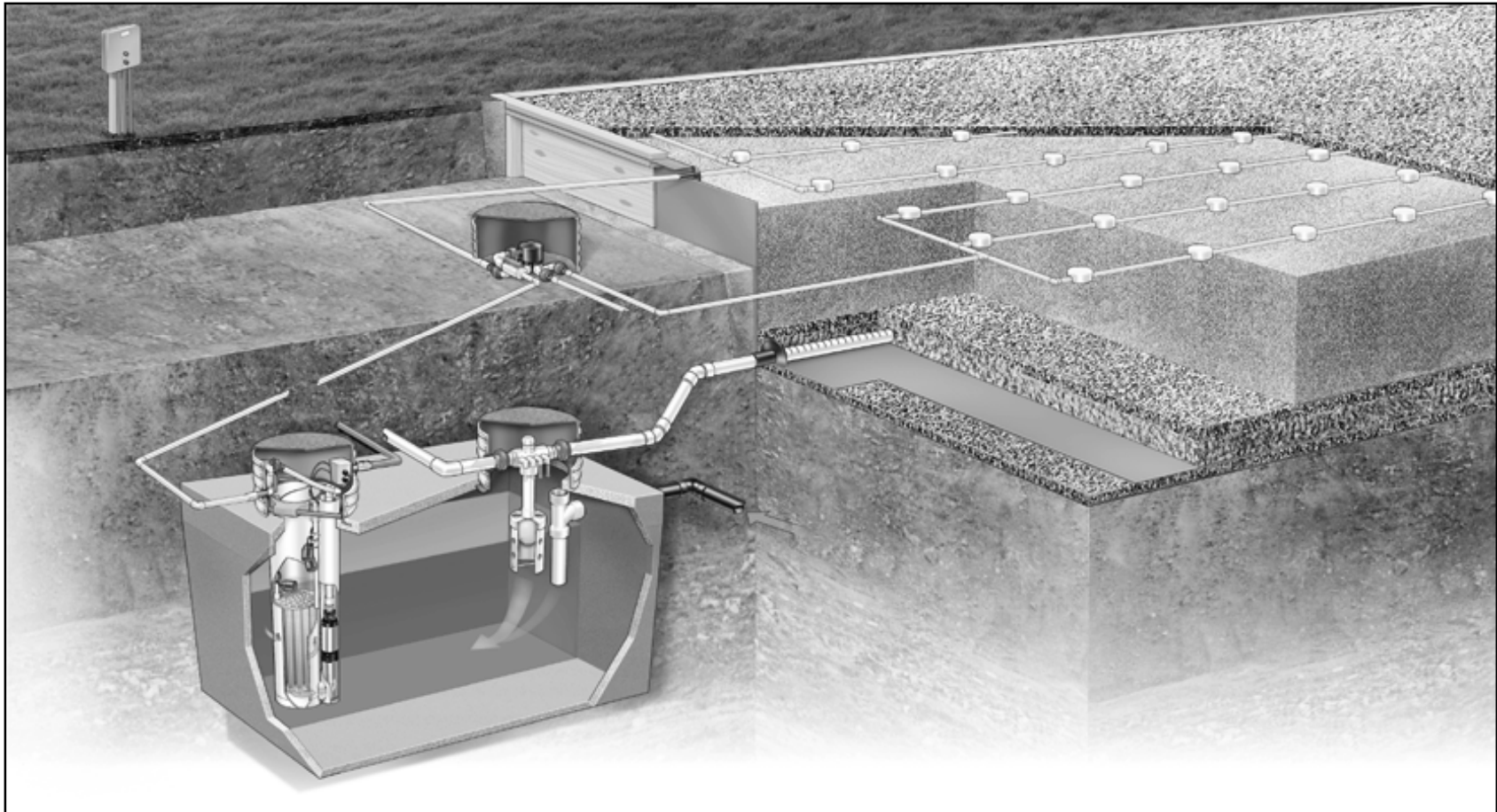


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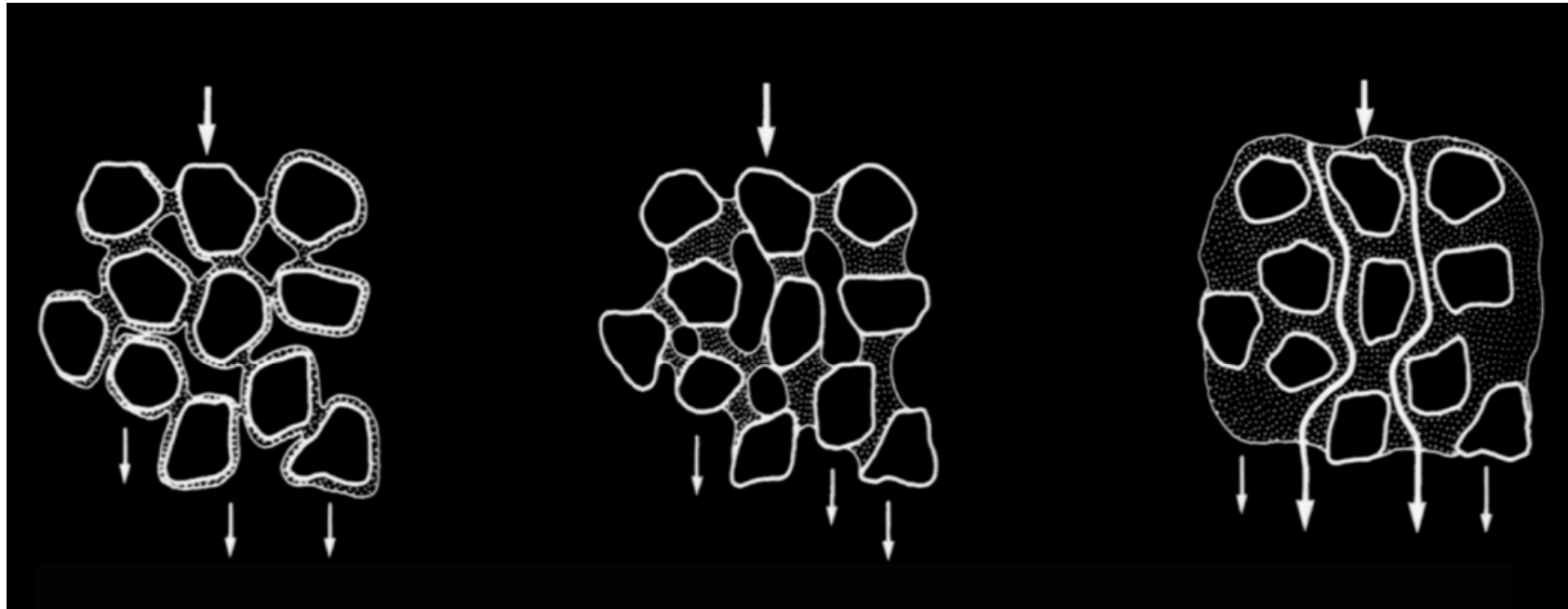


# Recirculating Sand Filters





# Hydraulic Loading Conditions



*24 doses/day  
wets the media.*

*4 doses/day*

*1 dose/day  
floods the media.*



# Manifold Design

- 1/8" diameter orifice
- 2' x 2' grid
- 5' residual head





# 29,000 gpd





# RSF Example





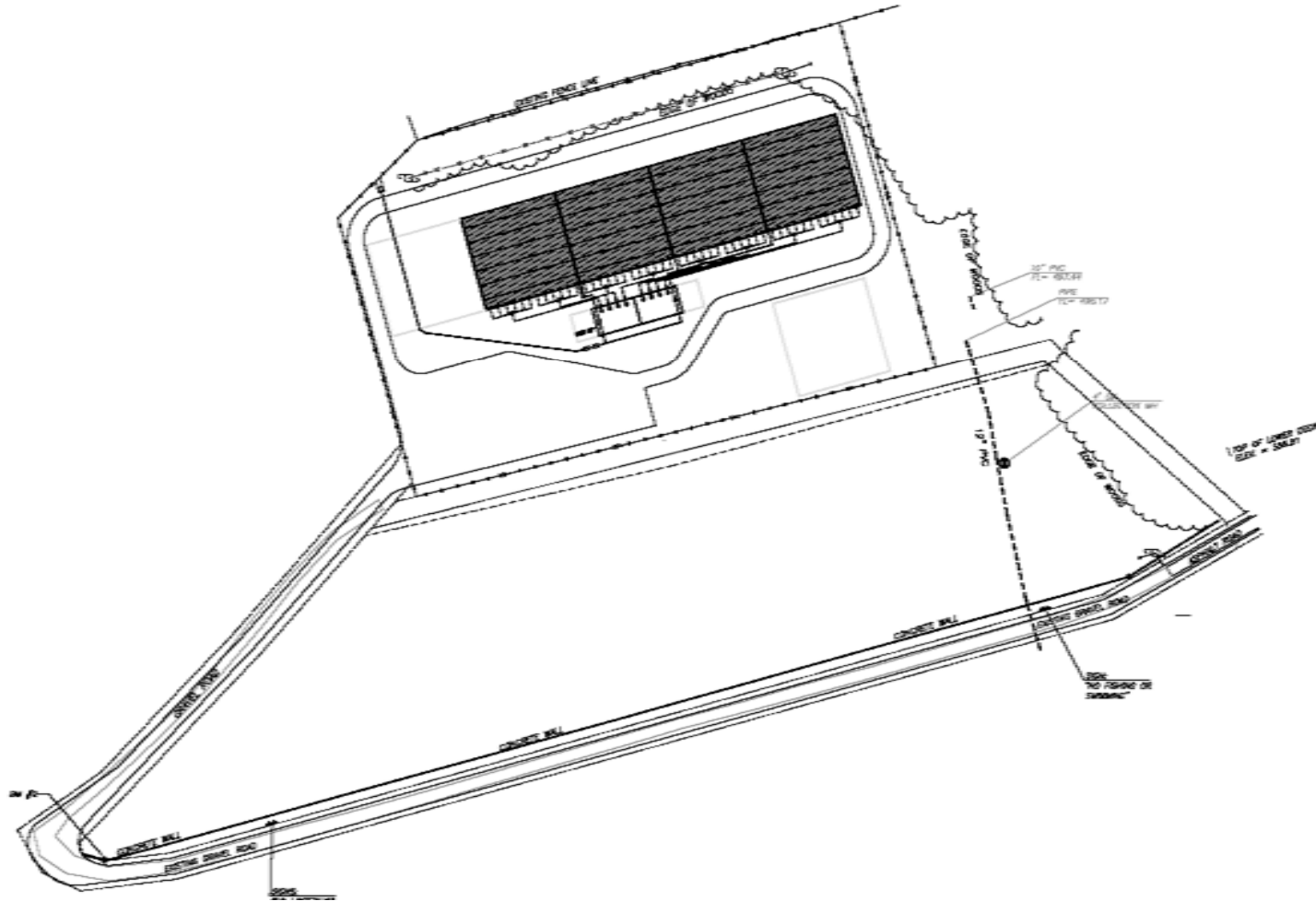


# RSF Example



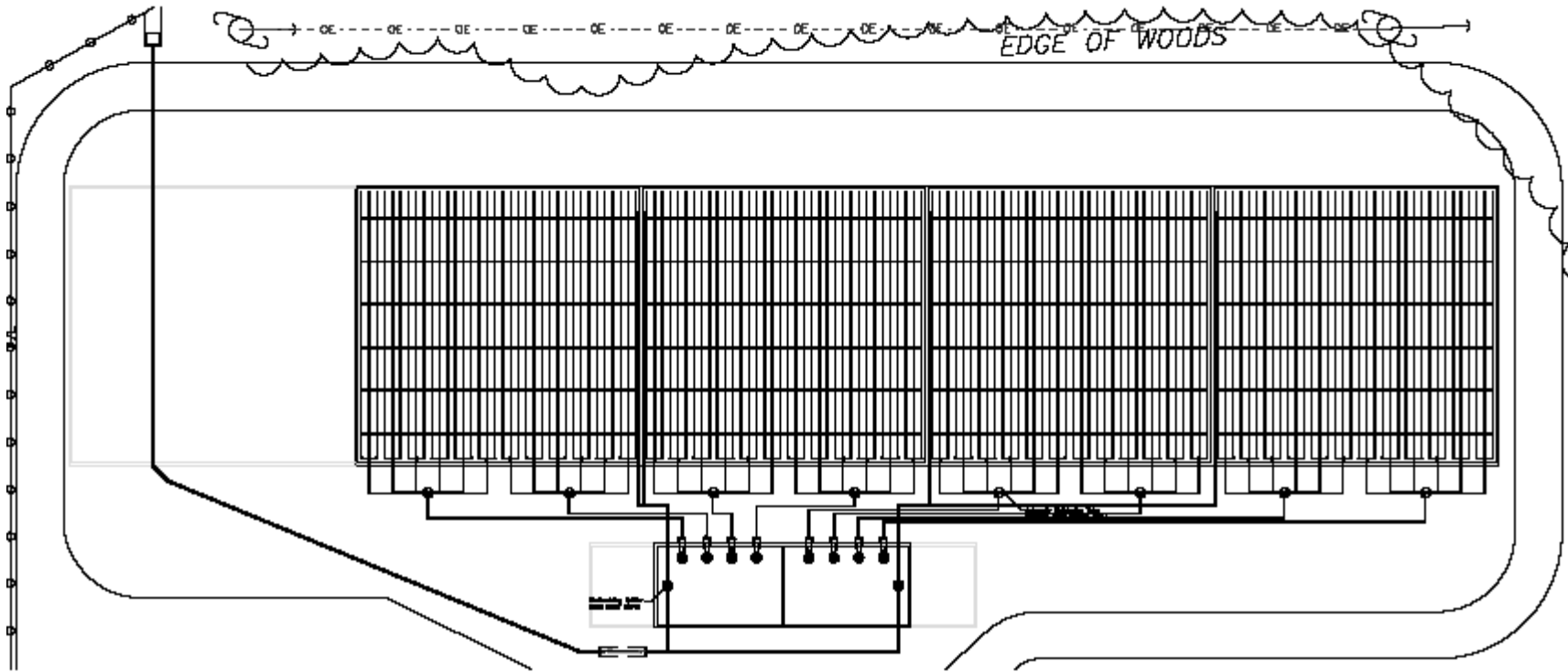


# Lake Tishomingo RSF Layout





# Lake Tishomingo RSF Layout





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# ELECTRIC CONNECTION

- **What are the options for the electrical connection?**



# ELECTRIC CONNECTION

- **Primary Option:**

Connect Directly to Customers Meter Base



# Primary Option – Electrical Connection





# ELECTRIC CONNECTION

- **Primary Option:**

Connect Directly to Customers Meter Base

- **Second Option (Voluntary-Requires Signed Easement):**

Homeowner provides electrical connection, complete with disconnect, on outside of house closest to the septic tank and pumping system.





# Secondary Option – Electrical Connection





# Secondary Option – Electrical Connection





# ELECTRIC CONNECTION

- **Primary Option:**

Connect Directly to Customers Meter Base

- **Second Option (Voluntary-Requires Signed Easement):**

Homeowner provides an approved electrical connection, complete with disconnect, on outside of house closest to the septic tank and pumping system.

- **Third Option (Evaluated on Case by Case Situation):**

District connects pumping system to an electrical circuit already available for a septic tank aerator or pumping system used for an existing LPP drain field.



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