



## What do we do?

- NitROE® Wastewater Treatment System (NitROE)
  - Installed downstream of conventional septic tank to produce a high quality water low in total nitrogen, organic compounds and suspended solids
    - **Retrofit of Existing Septic System:** Installation of just the NitROE tank
    - **New System:** Installation of septic tank, NitROE tank and leach field
  - Different models of NitROE can treat flow rates from 100 gallons per day to one million gallons per day or more
    - 2KS Models - single tank typically for 3-5 bedroom single residence
    - 2KM Models - multiple tanks up to 2,000 gallons per day
    - 10KM Models - multiple tanks 2,000 to 10,000 gallons per day
    - SSD Models - site specific design for over 10,000 gallons per day
  - Tanks are underground allowing integration into the site landscaping
  - Applicable to single residences, apartments, townhouses, clusters of residences and commercial establishments

KleanTu can install just the NitROE tank or the full retrofit or full new system depending on how the project is structured.

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## What does a NitROE look like?

550 gpd  
2KS Model



6,000 gpd  
10KM Model



As of 11/16/21, KleanTu has completed 30 NitROE installations on Cape Cod and Martha's Vineyard.



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## What is the performance of NitROE?

- Performance - NitROE produces a high quality treated wastewater
  - Single Family 2KS Model (Average of 19 Months Sampling)
    - Flow Rate.....352 gallons per day
    - Nitrogen In..... 73 mg/L [range for a number of installations, 40-170 mg/L]
    - Nitrogen Out..... 5 mg/L
    - BOD<sub>5</sub> Out..... 5 mg/L
    - TSS Out .....16 mg/L

Nitrogen Removal Rate = 73 pounds per year
  - MASSTC 2KM Model (Average of 38 Samples over 3 years)
    - Flow Rate.....500 - 1,200 gallons per day
    - Nitrogen Out..... 3 mg/L
    - BOD<sub>5</sub> Out..... .22 mg/L
    - TSS Out ..... 6 mg/L
    - Fecal Coliforms..125 count/100 ml (5 Samples)

The 2KS is for single-home residential applications intended to be affordable and to fit residential lots, while the multiple tank models (2KM, 10KM, SSD) can be tailored to provide treatment for larger homes, apartments, or multiple residential or non-residential applications.



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## What are features of NitROE?

- Performance - NitROE produces a high quality treated wastewater
- Simplicity with green aspects
  - Gravity flow through system
  - One small mechanical device - an air pump with around 120 watts power usage
  - 2KS and 2KM models fabricated inside standard concrete septic tanks
  - Made for current commercial installers to place with KleanTu field crew completing installation and starting up the units
  - Limited operation and maintenance needed
- Can retrofit existing systems thereby using existing infrastructure
- Provides minimum of Title 5 treatment in power outages
- Remote sensing for real time monitoring of system operation
- Out of sight below ground integration with landscaping
- Quiet operation without odors
- Can be fitted with phosphorus removal and disinfection technologies
- Affordable (next slide)

These features of NitROE make it worthy of consideration in any community where nitrogen reduction is needed or where new development requires nitrogen reduction.

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## What are costs of NitROE?

All in 2021 Dollars

- 2KS Total Installation Costs (average of 14 installations, excluding landscaping)
  - Retrofit of Existing System with NitROE Tank - Total retrofit: \$23,000
  - New System including septic tank and leach field - Total system installation: \$33,000
- 2KS O&M estimated costs
  - Air pump electricity and remote monitoring: \$280 per year
  - Provision for periodic parts replacements over 20 years equates to \$315 per year average
  - Total O&M \$595 per year (including provision for periodic parts replacement)
- 2KS Monitoring costs
  - Sampling and certified lab analysis: \$275 per event
- 2KM, 10KM, SSD - Installation and O&M costs are project specific as these systems are for larger flow applications and custom designed



Landscaped  
Air Pump  
and  
Controls