

# Mendham East Wastewater Treatment Facility Conversion



Mendham Township, New Jersey

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 Onsite Engineering, Inc.

# BACKGROUND

- Constructed in 1986 with ownership of the facility taken by Mendham in July 1996
- Treatment system utilizes breakpoint chlorination with subsurface effluent discharge
- Facility was designed to treat 40,000 gallons per day (approx. 362 bedrooms)
- Treats on average 20,000 to 25,000 gallons per day
- Treatment system is antiquated, labor intensive, and expensive



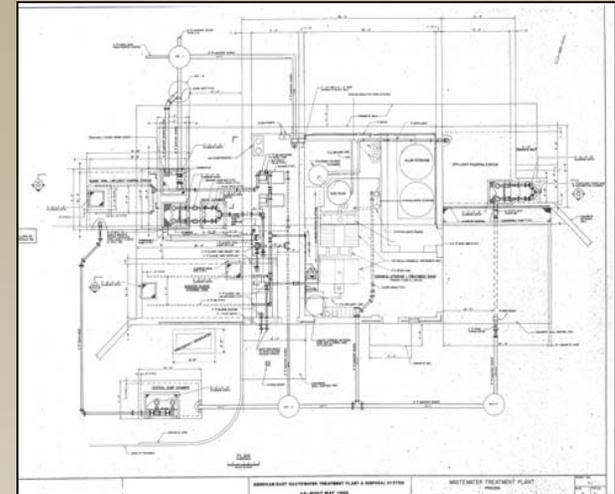
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# EVALUATION – PHASE I

- Reviewed biologically based technologies:
  - Aerobic rotating biological contactors, activated sludge systems, membrane bioreactor, sequencing batch reactor, proprietary biological treatment systems
- Systems evaluation based on suitability given existing infrastructure and constraints associated with retrofitting an existing wastewater treatment facility
- Solicited equipment manufacturers to propose biological system layout given configuration of the existing wastewater treatment facility



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# EVALUATION – PHASE II



- Benefit vs. Cost analysis of proposed technologies and configurations
- Key aspects of analysis:
  - Consistency of system to meet Permit requirements
  - Incorporation of system into existing facility
  - Feasibility to maintain flow conditions during upgrades
  - Ability to accommodate increase in flow
  - Capital and long-term operation and maintenance costs
  - Net environmental impacts from upgrades

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# EVALUATION – PHASE II

## Opinion of Probable Cost

<b>Category</b>	<b>Ovivo MBR</b>	<b>Aqua Aerobics SBR</b>	<b>Zenon MBR</b>	<b>Amphidrome System</b>
Construction Costs	\$1,555,650	\$1,555,706	\$1,595,125	\$1,592,720
Annual Reserves	\$28,300	\$25,500	\$27,000	\$29,500
Annual Operation & Maintenance Costs	\$100,900	\$103,800	\$102,800	\$107,800

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# FINANCIAL RATE STRUCTURE REVIEW

- Township receives \$257,790 in revenue from end users (\$712/bedroom)
- Cost of upgrade ~ \$1,600,000
- Financing for 30 years at 3%
- Include allowances for required reserves and operation and maintenance costs



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# FINANCIAL RATE STRUCTURE REVIEW

## Estimated Total Annual Expenses

<b>Category</b>	<b>Annual Expense</b>
Capital Loan Repayment	\$80,948
Reserve Account Funding	\$28,500
Operation & Maintenance Expenses	\$102,000
<b>Total Annual Expenses</b>	<b>\$211,448</b>

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# OPERATIONAL ASSESSMENT / NET ENVIRONMENTAL IMPACTS

- Breakpoint Chlorination system uses harsh chemicals to perform treatment;
  - Chemicals degrade wwtf infrastructure, including tanks and building
  - Use of chlorine at Mendham East generates over 45,000 lbs./year of greenhouse gas emissions.
- Inefficient treatment of solids continues to negatively impact performance and life expectancy of leaching fields
- Conversion to a biological system will improve treatment;
  - Improved water quality and leaching performance/longevity
  - Elimination of the cost and impacts of using chlorine in treatment
  - Estimated reduction in annual operations costs by 40%

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# CONCLUSIONS / RECCOMENDATIONS

- Conversion of the existing chemical treatment system to a more conventional biologically based system is technically and financially viable.
- Of the technologies evaluated, the MBR systems appears to be the most cost effective, have the most expansion potential and have the least impact to ongoing operations of the WWTF during construction.
- The MBRs have the smallest footprint, require the least amount of new tanks and would not impact the surrounding residents with new outside wastewater processing tanks such as the SBR and Amphidrome system would.

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# CONCLUSIONS / RECCOMENDATIONS CONTINUED

- Estimated cost to implement and operate a new WWTF system is approximately \$46,000/yr. less that current annual revenues
  - Stand alone project seems feasible
  - Would provide value to the end users
  - Would provide environmental benefits to the community
- The Township's expenditures related to past and future leaching system repairs must be addressed to balance the Mendham East WWTF annual operations budget upon commissioning of the treatment system upgrade.

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