

CHALLENGE

Insite / OB&G was retained by the Town of Beekman, New York to design a Sewage Treatment Plant (STP) to replace the existing plant at the Dover Ridge residential community. The Town was required to take over the facility following default of the former owner.

The existing STP, which discharged to a tributary to the water supply of a correctional facility was not meeting the requirements of its NYSDEC State Pollution Discharge Elimination System (SPDES) permit. The existing STP consisted of intermittent sand filter beds and sodium hypochlorite disinfection. These systems are typically unable to handle the increasingly more stringent effluent requirements that are being imposed by regulatory agencies for STPs that discharge to watersheds.

The community demanded a low cost facility to keep sewer fees at affordable levels. In addition, the project site was "in the backyards" of homes and a "zero" profile facility was important to residents.



Pre-Upgrade Intermittent Sand Bed



Pre-Upgrade Chlorine Contact Tank

STP DESIGN PARAMETERS

Average Design Flow

- 28,000 gallons per day (gpd)

Septic tank sizing

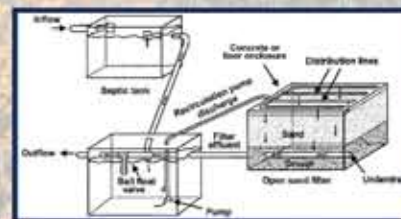
- 2.2 x average daily flow volume

RSF Design Criteria

- Hydraulic loading rate (forward flow) = 3 gpd/SF
- Recirculation ratio = 5-6:1
- Three - 50' x 64' sand beds, each sized for 1/3 of the design flow and each with a dedicated recirculation tank

UV Disinfection

- Open Channel with one duty and one standby lamp bank
- UV Dose = 40 mJ/cm²



RSF Schematic

UPGRADED STP



RSF During Construction



Completed RSF



UV Disinfection



Cascade Post-Aeration

SOLUTION

Insite / OB&G proposed a Recirculating Sand Filter (RSF) based STP. RSFs have the following advantages over conventional STPs (e.g., activated sludge, fixed film):

- Simpler operation and lower O&M costs
- Less visual impacts
- Improved solids removal and enhanced nutrient removal (ENR)

RSFs offer superior performance and have smaller footprint requirements than traditional intermittent sand beds. Their improved suspended solids removal allows for the use of UV disinfection, which does not form disinfection byproducts, as does chlorination.

Other improvements proposed at Dover Ridge included additional septic tankage, UV disinfection, and cascade aeration.

CONCLUSION

All SPDES effluent parameters are well within limits and expectations. Data consistently shows:

- CBOD₅ < 5.0 mg/l
- TSS < 10.0 mg/l
- Ammonia < 2.0 mg/l
- Fecal Coliform < 20/100 ml

The WWTP is a low profile plant with minimum visual impact and the low Operation and Maintenance (O&M) costs have kept sewer fees affordable for the community.



RSF, Aesthetic Backyard Neighbor