

PLANT PROFILE

Village of Sussex Wastewater Treatment Facility

*CSWEA Operations award-winning facility
for Wisconsin at the 81st Annual Meeting*

By Tom Foltz

The Village of Sussex has an enviable tradition of providing the required wastewater treatment resources for its citizens and neighboring municipalities. Sussex built its first Wastewater Treatment Facility at the current site in 1959. At that time the facility was designed for an average daily flow of 0.3 mgd, and had a construction cost of \$163,000. New facilities were constructed in 1978 and 1994 to treat average daily design flows of 1.0 mgd, and 3.2 mgd, respectively. The respective construction costs for those two projects were \$2,600,000 and \$9,800,000. The 1994 regional treatment plant was recently upgraded to ultimately treat average and peak daily flows of 5.1 mgd and 17.0 mgd. The construction cost for the recently completed upgrades is \$6,691,000.

The 5.1 mgd regional facility serves the Village of Sussex, Village of Lannon, Lisbon Sanitary District No. 1, and a portion of the Village of Menomonee Falls. All influent wastewater is screened through a mechanically cleaned bar screen and pumped to further treatment. Under normal operating conditions, all influent flow will receive grit removal through vortex grit units and flow to the oxidation ditch activated sludge system. Anthracite media tertiary gravity filters follow the secondary clari-

fiers, and plant effluent is seasonally disinfected using ultraviolet light (UV) disinfection. All flow is metered and discharged through a step aerator to Sussex Creek; blowers and aeration diffusers are available for effluent aeration during high water events. Under extreme conditions, a small fraction of the flow may be diverted from the influent pumps directly to the oxidation ditch activated sludge system and around the tertiary filters to the UV disinfection system. Ferric chloride is added for phosphorus control. Liquid biosolids are gravity thickened and hauled from the plant and land-applied.

The treatment facility is designed to handle daily loads of 6170 lb BOD, 7230 lb TSS, 1360 lb TKN, and 150 lb of phosphorus. Monthly and weekly seasonal effluent BOD limits are 10 and 5 mg/l respectively for November to April and May to October. Monthly and weekly average TSS limits are 10 mg/l year round. Average effluent ammonia limits are variable year round and range from 1.9 to 5.0 mg/l (monthly) and 4.8 to 12.5 mg/l (weekly). Phosphorus must be controlled at 1.0 mg/l, and fecal coliform must be controlled to 400 col/100 ml. Effluent pH must be between 6.0 and 9.0, and effluent dissolved oxygen must be above 7.0 mg/l.



The recently completed modifications include renovation and upgrading the existing VTSH influent wastewater pumps with additional variable frequency drives, addition of a third vortex grit removal unit, two additional Orbal oxidation ditch shafts, a third secondary clarifier, new tertiary filter troughs, UV disinfection, a second biosolids storage tank, new septage receiving and debris dump stations, a second engine generator, and a new plant supervisory control and data acquisition system (SCADA) that also monitors 16 remote pumping stations. The influent wastewater pumps are run faster with smaller impellers to increase pumping capacity; submersible pumps may be used in the future. Full radius skimming was added to the new clarifier and to the two existing clarifiers. The new engine generator serves the new Orbal shafts and the UV disinfection system. The new SCADA system employs Wonderware operator interface software; radio communication with the remote pumping stations has solved a host of operating issues. The new and existing biosolids storage tanks are equipped with submersible pump decant systems that are very effective at increasing the gross solids concentration in the tanks.

Plant staff, Gerry Spengler, Dennis Wolf and Jon Bauman, are led by Superintendent Jim Thalke. Strand Associates designed the plant modifications, and C.D. Smith Construction was the general contractor. Staff Electric Company, A. Warp Mechanical, and Spies Painting completed electrical, mechanical, and painting improvements.

The renovated facility is planned to provide treatment capacity through the year 2025. The existing site has adequate land area for a duplicate treatment facility of approximate equal capacity. 



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