Patuxent Water Reclamation Facility

Anne Arundel County, Maryland

The existing Patuxent Water Reclamation Facility (WRF) plant uses modified oxidation ditches designed and built on the original WRF site. The current plant rating is for 10.5 MGD but was designed for an ultimate capacity of 11.6 MGD.

The main treatment steps consist of the following:

- Screening through three (3), 6 mm continuous self-cleaning bar screens
- Grit Removal through two (2) 12-ft diameter tray type units.
- Influent Pumping through four (4) 135 hp pumps (with 1 standby)
- Three (3), four-pass Oxidation Ditches each equipped with six (6) large diameter mixers and fine bubble diffused aeration. Each oxidation ditch has a volume of 3.4 MG with six aerated zones.
- Process aeration is provide through five Neuros high speed blowers, 2 @ 150 hp, 1 @ 200 hp, 2 @ 300 hp
- Four (4) 120-ft Secondary Clarifiers
- Nine (9) deep bed, mono-media Denitrifying Filters with 6 ft of media
- Ultraviolet Disinfection capable of a peak flow capacity of 48 MGD
- Cascade Aeration and discharge to the Little Patuxent River with Effluent Pumping at high flows

The solids handling processes included gravity sludge thickening, belt filter press dewatering to approximately 16% total solids, and stabilization through lime addition. Biosolids are taken off site for land application as Class B biosolids. The Patuxent WRF site also houses the County's grease and grit receiving facility.

The plant uses caustic and magnesium hydroxide to aid in pH and alkalinity adjustments, aluminum sulfate for phosphorus removal, and methanol as a carbon source for the denitrification filters.

In 2021 the Patuxent WRF treated 2.04 billion gallons of wastewater with better than 99.4% removal of BOD, TSS, NH3, TKN, and TP. The annual average total nitrogen for 2021 was 1.74 mg/L and the annual average total phosphorus was 0.18 mg/L.

Advanced Water Treatment Pilot System

The pilot treatment system will be located at the Patuxent WRF in the newly created Water Research Room. The goals for the pilot testing program are to treat water to meet Safe Drinking Water Act (SDWA) requirements and guidance, maintain low TOC and turbidity, assess and characterize the presence and removal of Contaminants of Emerging Concern (CECs), and meet finished water goals for aquifer geochemical compatibility. The pathogen removal goal will be to meet the “12/10/10” standard, where viruses should be reduced by 12 logs through treatment, and Cryptosporidium and Giardia by 10 logs each.

The 9 gpm treatment train consists of the following

Coagulation, Flocculation, and Sedimentation (Floc/Sed)
Ozone/Ozone Advanced Oxidation Processes (AOP)
Biological Filtration (BAF)
Granular Activated Carbon (GAC)
Ultraviolet (UV) Disinfection

Treated water from the pilot system will be returned to the main treatment plant flow.

Sampling will verify the compliance with the treatment goals, identify critical control parameters, identify operating parameters and optimization strategies, and inform cost estimates.