

TELLICO AREA SERVICES SYSTEM

Niles Ferry Wastewater Treatment Plant



ADDITIONAL FEATURES CONSTRUCTED

- Motor Control Center (MCC) Room
- Administration Building
- Air Compressor Additions
- Pump Stations:
 - RAS
 - WAS
 - Plant Drainage
 - Recycle Water
 - Digested Sludge
- Standby Generator Set
- Influent and Effluent Flow Meters & Flumes
- Instrumentation and Controls

ACKNOWLEDGEMENTS:

Tellico Area Services System
Water & Sewer Services Staff

BROCHURE PREPARED BY:



Mechanical Drum Screen at Headworks



Ultraviolet Light Disinfection System



Dewatering Equipment inside the Solids Handling Building



Sludge Holding Tank



TELLICO AREA SERVICES SYSTEM

Niles Ferry Wastewater Treatment Plant



TELLICO AREA SERVICES SYSTEM

Niles Ferry Wastewater Treatment Plant



PLANT HISTORY

Tellico Area Services System (TASS) is a utility company created on December 3, 1970 by a joint agreement between Loudon and Monroe Counties. The purpose was to provide a modern water and wastewater treatment system to its citizens and also to realize the area's potential for industrial and residential growth. TASS is governed by the Water and Wastewater Finance Board in Nashville, Tenn.

TASS employs 20 full time employees, some of whom are in the newly built 5,200 square foot office complex. The 20 employees presently on the job represent more than 155 cumulative years of water and wastewater experience. There are four state certified water treatment plant operators, eight certified water distribution operators; four state certified wastewater plant operators; seven state certified wastewater collection system operators; four state certified backflow prevention operators and one Kentucky/Tennessee Water Environment Association pretreatment operator.

The current system consists of a 7-million gallon a day water plant; 241.2 miles of water lines; a 1.5 million gallon a day wastewater treatment plant, 51.41 miles of sewer lines; seven water pumping stations; 17 sewer pumping stations; five water tanks with a combined storage capacity of 6-million gallons. There are currently 3,778 water customers; five wholesale water customers and two wholesale wastewater customers. With the recent completion of the Niles Ferry WWTP Expansion Project, the wastewater sector has created additional treatment capacity to serve the increased industrial and residential demands of the area.

THE TREATMENT PROCESS

The Niles Ferry WWTP is a 1.5 MGD secondary treatment facility designed to handle 350 mg/L of influent BOD and TSS, and 60 mg/L of influent TKN. Treated effluent is discharged into the Tellico Lake meeting secondary effluent treatment standards. It utilizes the extended aeration (oxidation ditch) biological process and is capable of providing aerobic/anoxic treatment for the removal of organic and some nutrient pollutants.

1. Headworks Pump Station - The headworks (raw wastewater) pump station receives flow from the collection system, supernatant flow from the sludge holding basins, and return flows from other plant unit operations. The submersible pump



Administration & Control Building



Oxidation Ditch Basins



Secondary Clarifier

station includes three variable speed, chopper type pumps that transfer raw wastewater to the mechanical drum screen.

- 2. Mechanical Fine Screen** - Raw wastewater is pumped from the headworks pump station to the internally fed rotary drum screen (6 mm opening). Screenings are removed by the drum screen and discharged into a screening conveyor/compactor unit where excess water is removed from the solids. The compacted solids are disposed into a trash container equipped with a bagging device for ultimate disposal to the landfill. Screened wastewater gravity flows into the oxidation ditch via a flow distribution box.
- 3. Oxidation Ditch** - Two oxidation ditch trains are utilized to provide the biological and nutrient removal requirements of this facility. Each train consists of an anoxic and aerobic zone. The anoxic zone has been incorporated into the same basin to take advantage of the normal recirculation effect offered by the oxidation ditch geometry. The anoxic zone is equipped with a submersible, slow speed mixer while the aerobic zone is equipped with 3 brush rotors. A PLC system, along with dissolved oxygen analyzers and VFDs is utilized to control the air requirements of the biological step. The design incorporates additional features such as use of recirculating pumps for operating the oxidation ditches in parallel or series mode. These optional features are tools that will enable the plant to meet more stringent nutrient removal requirements in the future. Return activated sludge from the clarifier is pumped at the head of the oxidation ditch train to balance the bacteria concentration in the ditch.
- 4. Secondary Clarifiers** - Two circular center feed clarifiers are utilized to remove suspended particles from the oxidation ditch mixed liquor. Each unit is equipped with fiberglass effluent v-notch weirs, peripheral concrete launders, telescoping valves in each sludge collection box, and a scum collection wet-well equipped with a mechanical mixer. Sludge removed from each clarifier is either returned back to the oxidation ditch train or wasted into the sludge holding tanks.
- 5. Ultraviolet Disinfection** - A dual concrete channel is used to disinfect treated water using ultraviolet light. Two banks of U.V. modules are installed and flow-paced to provide the optimal U.V. dose to the treated effluent. Only one channel is currently in service. Each U.V. module consists of multiple U.V. light bulbs equipped with a self-cleaning mechanism to prolong the life of the light bulb and optimize light penetration and power consumption. The other channel serves as emergency bypass and a place to add future U.V. equipment. A galvanized metal frame cover and a removable hoist system are provided to support the needs of this unit operation.
- 6. Sludge Holding Tanks** - Wasted sludge removed from the biological train is collected in the old wastewater treatment plant which is now renovated to act as an aerobic digester. The unit consists of three sludge holding chambers and a sludge thickener basin. Each basin includes coarse bubble diffusers and new telescoping and other process valves to help promote solids thickening and stabilization.
- 7. Sludge Dewatering** - Thickened sludge from the aerobic digester is pumped into the dewatering equipment where excess water is separated from the cake sludge. The dewatering press utilizes a rotating screw assembly along with a series of fixed and moving rings to press and dewater liquid sludge with the aid of polymer. Cake sludge is collected in a roll-off container and then transported to the landfill.

FAST FACTS

OWNER: Tellico Area Services System

PLANT LOCATION: 137 Tellico Port Road, Vonore, TN 37885

PLANT CAPACITY: 1.5 MGD

SERVICE AREA: Loudon & Monroe Counties

DESIGN ENGINEER: Vaughn & Melton Consulting Engineers, Inc.

GENERAL CONTRACTOR: Phase I-Haren Construction; Phase II-Judy Construction

CONSTRUCTION TIME: August 2008-March 2011

TOTAL CONSTRUCTION COST: \$8,934,444

FUNDING: State Revolving Fund (SRF), Economic Development Administration (EDA) & Appalachian Regional Commission (ARC)