

CASE STUDIES

Daphne Utilities Water Reclamation Facility Daphne, Alabama

Project Background

Daphne Utilities, situated on the eastern shore of Mobile Bay in Alabama, provides water, sewer and natural gas service to a population of approximately 25,000. Their Water Reclamation Facility (WRF) treats residential and light commercial wastewater at a peak flow of 9 MGD.

Two independent biological treatment trains (activated sludge systems) are serviced by a common headworks and a TrojanUV disinfection system. Treated wastewater is then discharged by gravity into Blakely River.

During a process review in 2009, the headworks and effluent outfall lines were found to be areas of concern that were preventing the WRF from reaching its permitted capacity of 4.17 MGD. Peak flows were exceeding hydraulic capacities and high influent BOD and TSS concentrations exceeded design and were negatively impacting downstream treatment processes. Sand and trash were making their way through the headworks which plugged and damaged aerators.

Permit compliance was being maintained since flow and ammonia loadings had not yet exceeded design parameters. However, Daphne Utilities knew they had improvements to make. An upgrade project began, starting with staff members and consulting engineers reviewing various equipment options.

Equipment Selection

The foundation of Daphne Utilities centers on providing uninterrupted service to their customers using innovative, efficient and cost-effective solutions. As a result, equipment reliability, durability and ease of maintenance were important considerations. Small footprint was also a key factor, as the WRF had space limitations for expansions (Figure 1). Overall, finding a long-term solution with the lowest possible cost would help provide the best value to their customers.

The Salsnes Filter system met their criteria and was piloted for grit removal, solids separation, sludge thickening and dewatering. It proved to be highly effective delivering significant BOD (30%) and TSS (50%) reductions in influent loading during normal operating conditions. This outcome was able to reduce total loading back to within original plant design. With these positive pilot results, two SF:6000 Salsnes Filters were added to the upgrade plan.



System Parameters

Salsnes Filter SF:6000

Treatment Capacity: 5 MGD (220 l/s)

TSS Removal: 50 - 65%

BOD Removal: 30 - 40%

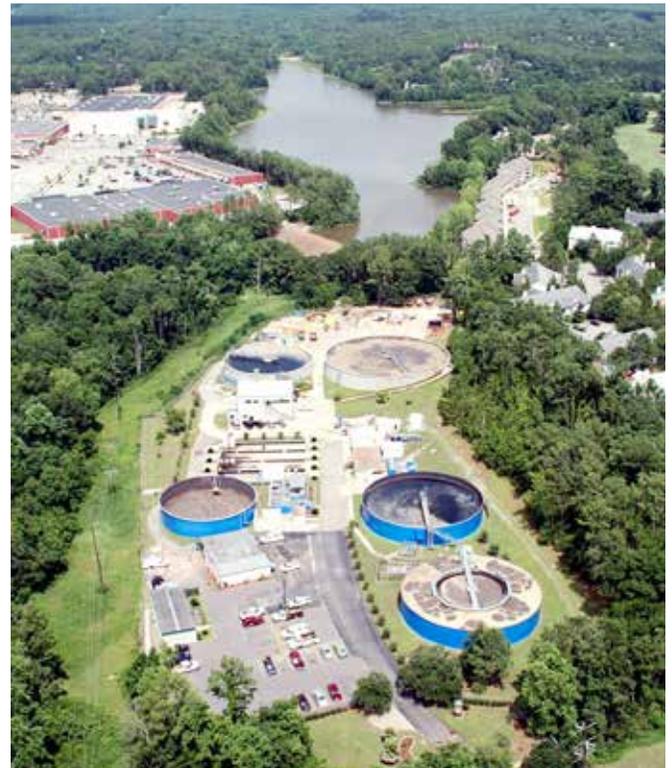


Figure 1. Daphne Utilities' Water Reclamation Facility had space limitations for new equipment

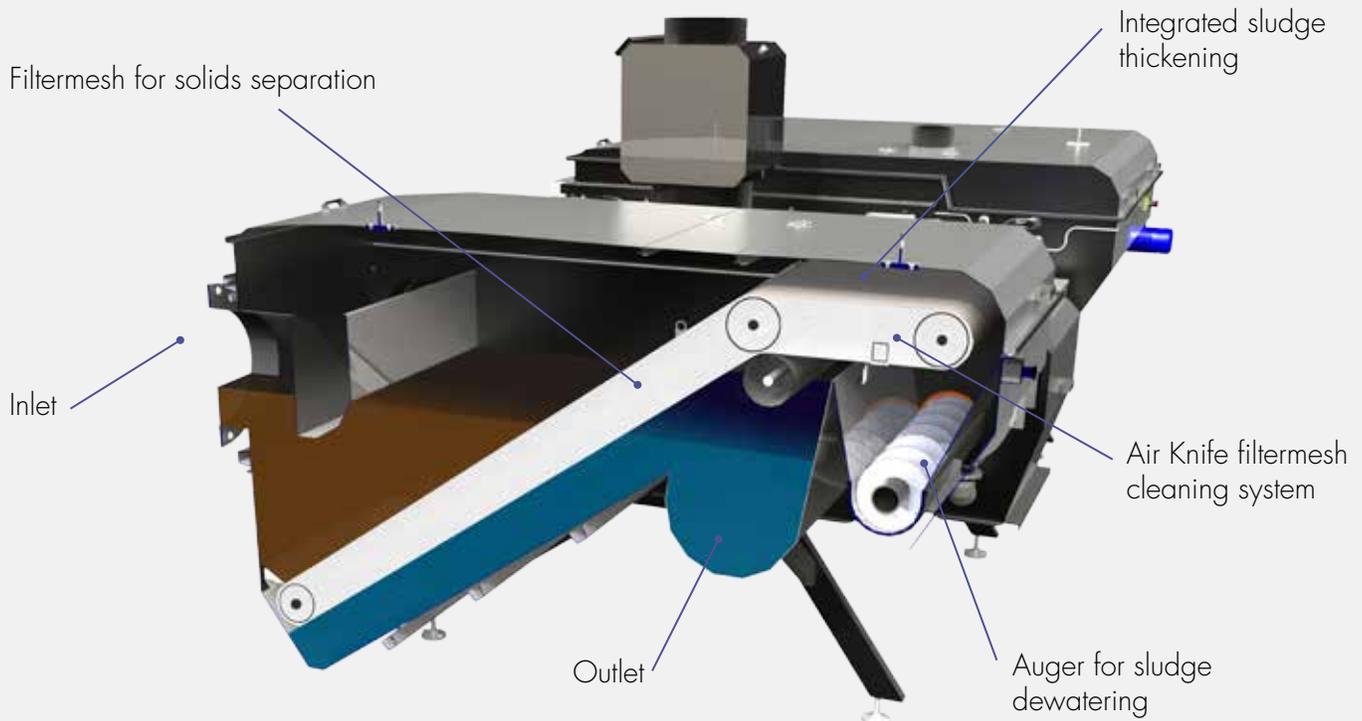


Figure 2. The Salsnes Filter system has integrated solids separation, sludge thickening and dewatering. It also features an automatic Air Knife filtermesh cleaning system.

The Salsnes Filter Solution

Once installed, their Salsnes Filter system was even more effective than during piloting. Today, BOD loadings are reduced by 30 - 40% and TSS is reduced by 50 - 65%. Sludge is thickened and dewatered within the unit and then transported by screw conveyors into a dumpster. These operations are all automated by a Programmable Logic Controller (PLC). A sensor tells the PLC when to initiate filtermesh rotation which then automatically starts the Air Knife filtermesh cleaning system and sludge dewatering.

The Air Knife cleaning system automatically cleans the rotating filtermesh using a blade of compressed air. Compared to scrapers, brushes or water-based cleaning systems, air is gentler on the mesh to prolong its life and keeps sludge drier for more effective dewatering (Figure 2).

TSS and BOD reductions from the Salsnes Filter have improved the performance of downstream processes. Aerators are virtually trash and sand free which has

drastically cut back on maintenance and repairs. It has also eased the demand on blowers which has reduced energy consumption.

Loading reductions have not only restored previously lost capacity but have created surplus capacity. This gained capacity, while not reflected in the current permit, can be utilized in the future to reduce the amount of "new plant construction" required during future upgrades.

Conclusion

The Salsnes Filter system was able to cost-effectively integrate with other complex and innovative systems in the plant upgrade to successfully address the concerns identified in the headworks. It is part of the best long-term solution for Daphne Utilities, designed to meet current and future wastewater flows, loadings, and wet weather flows.

"We are extremely pleased with the performance of our Salsnes Filter system. It has been reliable, easy to maintain and it has significantly reduced TSS and BOD loadings. This has enabled us to recover lost treatment capacity at our facility in a cost effective manner. Another plus is the small footprint of the system which allowed it to easily fit into a very limited space within our plant."

Danny Lyndall
General Manager
Daphne Utilities