



**AQUA-AEROBIC SYSTEMS, INC.**  
A Metawater Company

# SUCCESS STORIES

## PLANT NAME AND LOCATION

**MILLERSVILLE BOROUGH WWTP - MILLERSVILLE, PA**

## DESIGN DAILY FLOW / PEAK FLOW

**1.85 MGD (7003 M<sup>3</sup>/DAY) / 3.70 MGD (14,006 M<sup>3</sup>/DAY)**

## AQUA-AEROBIC SOLUTION

**2-BASIN AquaSBR® SYSTEM**



## **MILLERSVILLE BOROUGH SELECTED AN AquaSBR® SYSTEM FOR ITS COST-EFFECTIVENESS!**

In the mid-1960s, Millersville Borough replaced their trickling filter plant, which was constructed in 1941, with a contact stabilization plant. The plant was designed to treat an average flow of 1.0 mgd for wastewater received from Millersville State Teachers College and the developed areas of the Borough.

Growth of both the college and Borough community resulted in a significant increase in peak hydraulic loading, as well as BOD and ammonia loadings in excess of the plant's design capacity. This prompted an upgrade to the plant in the late 1970s. The upgrade included the installation of a new final clarifier and new influent equalization basin, and replacement of the existing aeration system.

From 1987 to 1989, additional upgrades were completed to meet revised NPDES permit levels issued by the Pennsylvania Department of Environmental Protection and to accommodate the increased hydraulic capacity due to continued growth of the college and Borough development.

Because the upgraded treatment system still proved to be inadequate for meeting the updated effluent criteria, Millersville decided to evaluate their treatment objectives and other possible secondary treatment systems for plant expansion.

As a result of the evaluation, the Borough and their consultant selected an AquaSBR treatment system. The



The AquaSBR® system was constructed adjacent to the existing plant.

AquaSBR system was chosen because it was the most cost-effective, and because it would accommodate anticipated future growth.

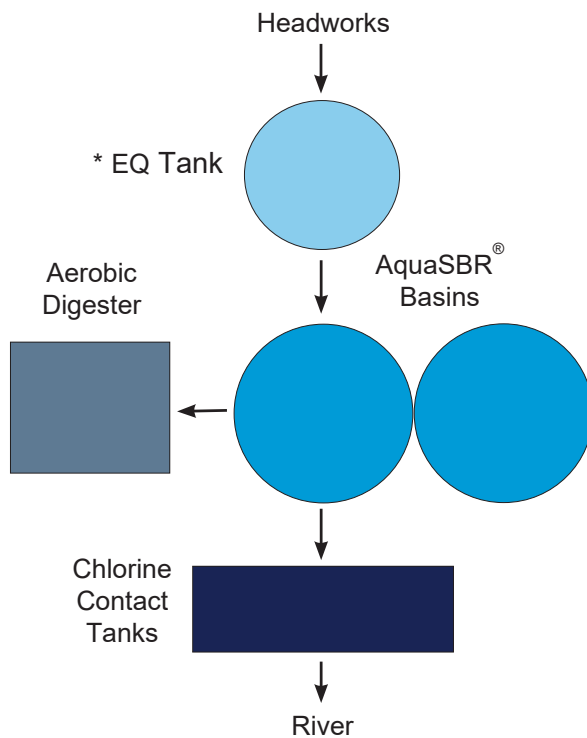
Construction for the expansion began in December of 1993 and the new dual-basin AquaSBR system went online in April of 1995. Total cost for the plant expansion was approximately \$4.3 million, which was below the engineer's estimated cost.

## AquaSBR® SYSTEM PROCESS

AquaSBR systems operate on a simple concept of introducing a quantity of waste to a reactor, treating the waste in an adequate time period, and subsequently discharging a volume of effluent plus waste sludge that is equal to the original volume of waste introduced to the reactor. This “Fill and Draw” principle of operation involves the basic steps of Fill, React, Settle, Decant, and Sludge Waste. The system may be designed to include seven individual phases of operation but the inclusion or duration of any individual phase is based upon specific waste characteristics and effluent objectives.

Where nutrient removal is required, a simple adjustment to the SBR's operating strategies permits nitrification, denitrification, and biological phosphorus removal. Optimum performance is attained when two or more reactors are utilized in a predetermined sequence of operation.

### CURRENT PROCESS FLOW



\* The existing influent equalization basin was retained and converted to a submersible pump station to pump the influent from the headworks to the AquaSBR® system.

## DESIGN CHARACTERISTICS

Millersville's AquaSBR system was designed for an average daily flow of 1.85 MGD, with the capacity to allow for 25 years of anticipated growth and to maximize the use of existing facilities.

The primary settling tank now functions mainly as a skimming/gross solids removal tank. The existing aeration tanks were converted to sludge digester tanks and the existing final settling tanks were converted to additional chlorine contact tankage. A new control building was also constructed.

### AVERAGE ANNUAL OPERATING DATA

LOADING	DESIGN INFLUENT	AVG INFLUENT	DESIGN EFFLUENT	AVG EFFLUENT
AVG Flow mgd	1.85	0.63	----	----
Peak Flow mgd	3.7	----	----	----
BOD <sub>5</sub> mg/l	500	205	25	2
TSS mg/l	250	211	30	4.9
Total P mg/l	10	6	2	1.2

### AquaSBR® SYSTEM ADVANTAGES

- All components available as retrievable
- Tolerates variable hydraulic loads
- Controls filamentous growth
- Tolerates variable organic loads
- Provides quiescent settling
- Separation of aeration and mixing
- Lower installation costs
- Return activated sludge pumping eliminated
- Small footprint
- Simple to expand or upgrade
- One company accountability