

## New York State Environmental Excellence Awards

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### **Project Name**

Farmington Wastewater Treatment Facility

### **Project Summary**

The Town of Farmington Town Board had the foresight and made the commitment to move forward with an expansion project when the Town's wastewater treatment plant reached 85 percent of its rated capacity. The Farmington Wastewater Treatment Plant services an area that includes the Town of Farmington, much of the Town of Victor including Eastview Mall, and a northern portion of the Town of Canandaigua. The Farmington Town Board realized that upgrades to the facility would soon be urgently needed to keep pace with the rapid growth and ECONOMIC EXPANSION taking place within the region as well as the importance of producing a high quality wastewater effluent discharging to Mud Creek. To answer this need, the Town Board authorized MRB Group to begin preparing plans that would double the treatment plant capacity from 2.0 million gallons a day (MGD) to a new average daily flow of 4.0 MGD. The total project cost was approximately \$13.5 million. Construction began in the fall of 2004. In the summer of 2005 this project evolved into a long-term project due to the FAILURE OF EXISTING COMPONENTS that were originally intended to remain in service. The Town once again made a commitment to REPAIR AND REPLACE where needed any existing facilities experiencing failure. This commitment to MITIGATE ENVIRONMENTAL ISSUES raised the original project cost to \$18+ million. The project was substantially complete and in operation in June 2007.

### **General Project Description**

The Town of Farmington Wastewater Treatment Facility (WWTF) is located a 1216 McMahan Road in the town of Victor, County of Ontario, State of New York. The Town of Farmington WWTF was planned as a regional facility to serve the Town of Farmington, Town of Victor, Northern portion of the Town of Canandaigua, and eventually the Village of Victor. This location along McMahan Road adjacent to Mud Creek (the receiving stream) in the Town of Victor provided this regional opportunity. As the facility approached its 2.0 million gallon per day (MGD) permitted capacity, the Farmington Town Board recognized the need to expand in order to MEET REGIONAL GROWTH and to continue to produce a high quality wastewater effluent discharge to Mud Creek. The commitment was made by the Town Board to expand the WWTF to a rate capacity of 4.0 MGD. The 2.0 MGD rated plant had the following conditions to address:

- Insufficient capacity to handle proposed additional future flows.

- Outdated equipment and process components which were original to the plant construction which were OUT OF DATE AND NOT ENVIRONMENTALLY SOUND.
- Odor complaints related to sludge management RAISED CONCERNS WITH RESIDENTIAL HOUSING directly downwind from the facility.

The upgrade to 4.0 MGD rated capacity (referred to as Phase 1 Improvements) incorporated the following elements:

- Wastewater Flow
  - Interceptor sewer improvements on McMahan Road.
  - Influent Building Addition - new channel grinder with auger, new vortex grit chamber, existing Pista vortex and mechanical bar screen to remain in service to bypass flows.
  - Primary Clarifiers - one (1) new 45' diameter center feed unit.
  - Existing Biotower Lift Station – improvements.
  - Existing two Biotowers - Distributer arm replacement units.
  - New pump Station and Wetwells – new structure biotowers and RBC's, including (5) biotower pumps and (3) RBC pumps.
  - Biotowers – two (2) new 60 feet diameter by 24 feet structures with covers.
  - Final Clarifiers – two (2) new 60' diameter peripheral feed units (with new pump station constructed between tanks for sludge floe to thicken). Phosphorus removal at finals.
  - Sand Filters – determination was made to RECONDITION existing facility including traveling bridges and pumps, media, underdrains, channel improvements, building improvements for heating, venting, electrical and finishes.
  - Post Aeration Tank – one (1) new aeration instated in existing tank.
  - Plant Water Recycle System - pump station to draw out effluent to reuse water on site as plant water to maintain all plant functions thus saving municipal water.
- Sludge Flow and Solids Handling
  - Primary Clarifier Sludge Pumps – four (4) new positive displacement pumps in basement.
  - Final Clarifier Sludge Pumps – two (2) new positive displacement pumps in new pumps station at new final clarifier.
  - Primary Digester – CONVERT existing secondary digester to primary unit and REUSE existing gasholder cover, construct one (1) new 45 feet diameter structure gas holder cover, and new mixing and heating system for existing primary digester structure.
  - Secondary Digester – one (1) new 36 feet diameter unit with gasholder cover.
  - Methane Gas Digester Heating – one (1) new dual fuel boiler, three (3) heating loop chopper pumps, three (3) new spiral heat exchangers, ALTERNATIVELY FUELED WITH METHANE GAS Produced in the

sludge stabilization process within the anaerobic digester UTILIZING METHANE GAS PRODUCED ON SITE.

- Digester Mixing – (3) new mixing loop chopper pumps in basement addition, mixing nozzle assemblies in each primary digester.
- Belt Filter Press – Relocate existing unit to first floor of digester building addition with enclosed solids bay. REUSE existing rotary lobe pump, add one (1) new rotary lobe pump, polymer feed system and accessories.
- Mechanical and Electrical
  - Electrical service upgrades conforming to current building codes and MAXIMIZING ENERGY EFFICIENT DESIGN, MATERIALS AND FIXTURES.
  - Lighting, heating, and ventilation at new structure MAXIMIZING ENERGY EFFICIENT DESIGN, MATERIALS AND FIXTURES.
  - New HIGH EFFICIENCY Boiler for domestic heat MAXIMIZING ENERGY EFFICIENT DESIGN, MATERIALS AND FIXTURES.
  - Auxiliary ENERGY EFFICIENT Generator.
  - Upgrade Scada System.
- New Dual Purpose/Multi Use Garage Structure
  - New 36' x 96' metal building structure to house equipment. Construct building within footprint of old sludge drying bed, REQUIRING NO FURTHER DISTURBANCE OF SURROUNDING GREEN SPACES. This building was founded on helical screw piles to MINIMIZE THE REQUIREMENT FOR NATURAL MATERIALS which would have been required for the deep foundations called for on this site. DAYLIGHTING was utilized within this new structure to minimize the energy draw for this process.
  - Plant Water system – New pump and hydro-pneumatic tank system located in New Garage building. Connect to existing plant water distribution system. Connect to post Aeration tank for water source.

The Phase 2 improvements which were authorized to correct deteriorating components consisted of:

- Primary Clarifier No. 4 – new structure and piping.
- New plastic media in two (2) existing trickling filters.
- New Biotower to replace to MITIGATE THE NEGATIVE ENVIRONMENTAL IMPACTS OF THE DETERIORATING ROTATING BIOLOGICAL CONTRACTOR UNITS WHOSE INTEGRITY WAS SEVERELY COMPROMISED CREATING POOR PERFORMANCE AND UNSAFE CONDITIONS.
- New Plastermill Pump Station to replace existing station serving the majority of the Town of Victor wastewater flow to the WWTF.

## **Innovation, Sustainability and Partnerships**

This project not only was enhanced by the partnerships of the Towns of Farmington, Victor and Canandaigua, but also by the partnership with the NYS Environmental Facilities Corporation. To help secure financing in the project, the Farmington Town Board retained B.P. Donegan, Inc. as their Municipal Financial Advisors with their Council, the Town working closely with the New York State Environmental Facilities Corporation to secure both short term and long term low interest loans through the New York State Clean Water Revolving Fund. Receipt of the low interest loans will save the Communities millions of dollars in interest payments over the financing term.

Partnerships were formed with the Town Board, Superintendent of Water and Sewer, Crew of Operators, the Community and MRB Group.

**ENVIRONMENTAL PROTECTION:** These improvements protect the water quality of Mud Creek and therefore **PROTECTING ALL OF THE ECOSYSTEMS THAT MUD CREEK SUPPORTS** and **PROTECTING THE AIR QUALITY** of the surrounding community. This project mitigated concerns of the community with the emittance from the digester. The new digester not only increased the capacity but also **EXCEEDED COMMUNITY EXPECTATIONS** with digester cover that contained odors greatly minimizing community complaints.

These partnerships resulted in the increased sustainability of environmental resources and improvements to air and water quality of the region while maintaining an equitable sewer user rate the completion of the project. Residential sewer rates are \$65 per quarter.

## **Superior Practices**

One practice that helps achieve environmental benefit beyond standard techniques is the use of New Motor Driven Rotary Distributors on all bio-towers. Not only due the new distributors apply a more uniform application of wastewater on the synthetic media but the electric motors control the speed of rotation thus maximizing biological action. “Old Style” distributors were driven hydraulically consequently more flow resulted in faster rotation. In the new system speed of rotation is controlled by electric motors on the distributors and flow is controlled by variable frequently drives on the feed pumps. This provides enhanced treatment resulting in environmental benefit.

A second practice that achieves enhanced environmental benefit is the new mixing and heating systems in the anaerobic digesters. Hydraulic nozzles inside the tanks are strategically located to provide thorough mixing and uniform temperature control. The sludge becomes stabilized producing little odor while maximizing the gas production which is then used to fuel the plant boilers.

With the treatment process complete, the effluent limits exceed the state regulatory requirements.

| Parameter        |             | State Requirement for Discharge | Annual Average Discharge |
|------------------|-------------|---------------------------------|--------------------------|
| CBOD             | mg/l        | 5                               | 3.4                      |
| Suspended Solids | mg/l        | 10                              | 5.8                      |
| NH3              | Winter mg/l | 2                               | 0.36                     |
|                  | Summer mg/l | 1.2                             |                          |

### **Measurable Environmental Benefits**

The environmental improvements made as a result of this project are significant. The wastewater effluent values exceed New York State Dept. of Environmental Conservation Requirements and the percent removal of BOD and suspended solids exceeds 95%. Water quality is preserved by this level of treatment.

Air quality is enhanced by new anaerobic digestion equipment. Area residents no longer complain about odors from the facility.

Energy resources are minimized by use of the Fixed Film Biological Process. This process is more energy efficient than most aeration treatment processes.

The Belt Filter Press was installed so that the Town is no longer hauling liquid waste material to other plants for processing, therefore reducing the fuel required for hauling and reducing the burden on surrounding facilities.

### **Commitment and Leadership in Pursuit of Environmental Excellence**

The Town of Farmington not only made a commitment to Phase 1 improvements of \$13.3 million, but also extended that commitment to the Phase 2 improvements which increased the expenditure to \$18.7 million. This is a **SIGNIFICANT COMMITMENT TO PROTECTING THE ENVIRONMENT.**

Making the decision to proceed with the project **DEMONSTRATED STRONG LEADERSHIP** by the Farmington Town Board. Had their decision been postponed, construction costs would have been significantly higher. The cost of synthetic media in the bio-towers is directly related to fuel costs.

The Town committed to have MRB Group personnel on site to observe that construction activities were performed in accordance with the design plans and specifications. The Town Board also committed to operator training sessions during the of course construction. Two (2) 40hr training sessions were conducted by MRB Group personnel with the wastewater plant staff. These training sessions gave the operating staff a better understanding of the new processes and equipment and enabled them to introduce a high quality effluent into the environment.

### **Transferability to Other Users**

The Town and MRB Group provided not only training for the WWTF staff, but also hosted public tours called “Follow the Flow Tour”. This tour was held for High School Students and Special Needs Students. Special “Follow the Flow Tour” were held for local political figures to present the technology and team efforts so that others would be educated and inspired to carry these environmentally sound initiatives.

### **Funding Sources**

The Town of Farmington initially funded the development of design plans and specifications that were construction ready. With this commitment the Town was able to increase its funding score with the New York State Environmental Facilities Corporation and qualify for low interest loans. This partnership has enabled the Town to save considerable interest expense over the life of the loans. The Town of Victor has also committed to funding a portion of the Phase 2 improvements that directly benefits them. These funding partnerships have allowed the sewer user rate within the service area to be only \$65 per quarter.

### **Supporting Information**

See attached