

Wastewater Treatment Facility Refurbishment Project

by James L. Jutras, Water Quality Superintendent

On February 8, 2011, the Village of Essex Junction Trustees authorized staff to proceed with a bond vote for a \$15,230,000 project facility refurbishment at the Cascade Street wastewater treatment facility. Ongoing maintenance leaves the facility tanks and buildings in reasonable shape. Major maintenance is planned to address components that will be prone to failure in the next several years or where there is process or permit need. If failures occur and we discharge pollutants, the State can fine the Village.

The project is based on the recently completed comprehensive facility evaluation and engineering study. These evaluations included condition assessment of the facility components, major deficiencies, estimated remaining useful life and permit changes. In the coming months, the design will refine the plan and layout to provide the best value for the proposed work and will consider all reasonable alternatives.

The current facility was upgraded in 1985 for improved treatment and to treat sewage from the Towns of Essex and Williston. This facility is now over 25 years old and is in need of major refurbishment for continued reliable operation. Our communities have ongoing environmental responsibility to clean wastewater prior to recycling to the environment. The facility age and flows are at a point that makes upgrade sensible. Delay will result in increasing equipment failure and performance reduction while costs will also increase.

The Essex Junction wastewater treatment facility is owned by the Village of Essex Jct. with the 3,300,000 gallon per day treatment capacity distributed under contract to Williston, Essex and Essex Junction. Each community has a percentage of the capacity ownership in the facility: Essex 33.33% Williston 29.70% and Essex Junction 36.97%. This translates the project's cost share for each community to \$5,076,159 for Essex, \$4,523,310 for Williston, \$5,630,531 for Essex Junction.

The funding process is a bond vote by the Village of Essex Junction. The individual communities pay their share of the project through user rates. This payment structure is common with utilities and is covered by the contract that governs wastewater plant operations.

Wastewater treatment began in the village in 1965 with a major upgrade completed in 1985. The current facility has a designed useful life of 20 years with a current operating age of 26 years. Some systems within the current facility do not meet current standards and are marginal in meeting performance standards. Due to the level of investment in the facility over the operating life, these proposed upgrades are estimated to be at a lower cost than at most other facilities. Recent improvements include: 1999 - Flow equalization, 2003 - Co-generation (fuel and electrical savings) and 2004 - Solids Thickening.

Funding opportunities are limited to State low interest loans and tax-exempt municipal bonds. Grants and other alternative revenue sources are being pursued.

The scope of the proposed work includes:

Administration/lab: This building heating system will be converted to a non-electric heat source. The basement that houses the laboratory will be claimed for the headworks rehabilitation.

Headworks: This building houses the screening and grit removal systems that protect the balance of the wastewater treatment process. This environment is constantly wet and the

electrical equipment must be replaced. The influent screen will be reused but the shell of the building, the grit collection system and the electrical system will require major repair. Heating and ventilation equipment upgrades required by current building code.

Flow Equalization: This building was constructed in 1999. Electrical modifications only.

Primary Clarification: The primary clarifiers are the first process settling tanks. The concrete tanks will be cleaned. The main flow diversion wall will be sandblasted and renovated as will other hardware. The interior steel structure will be sandblasted and repainted. Flow collection weirs will be replaced. The access walkway will be brought up to safety code requirements

Aeration Basins: The aeration basins are where the biological wastewater treatment process occurs. Naturally occurring bacteria consume the waste in the process water. The end result is clean water for recycling back to the environment. Aeration processes have changed over the past 25 years. Proposed modifications will allow for better treatment using less energy with improved reliability. A new mixing zone will control undesirable microorganisms while improving phosphorus removal using less chemical.

Secondary Clarification: This secondary settling process separates the microorganisms that treat the wastewater. The existing clarifiers are undersized by current design standards. We cannot take a system out of service without the potential to violate operating permits. The plan is to construct a third secondary clarifier tank and rehabilitate the two existing clarifier tanks. This work will bring the facility up to standard and provide the required backup systems.

Effluent Filtration: The existing effluent filter is outdated and heavily corroded. There is not a second filter to put on line while rehabilitation of the single filter occurs. The engineering evaluation recommends replacement of the filter in a new structure that will provide the needed filtration and provide the backup required by today's standards. The existing filter area will be repurposed into bulk chemical storage freeing up other needed floor space.

Anaerobic Digestion: The existing conventional anaerobic digestion tanks will stay but internal gas handling and mixing equipment will be replaced. The gas holding structure and internal structure will be evaluated for corrosion and replaced if necessary. Electrical controls in the building must be upgraded as they do not meet safety requirements for anaerobic digesters.

Sludge Dewatering: Dewatering of process solids is by contracted service. On site dewatering will be evaluated to control the costs of treatment and to address changes in regulations.

Repurposing of existing space: The design will maximize use of our buildings and tanks while accommodating needed improvements. The existing bulk chemical storage area will be relocated to the old filter structure. The balance of the filter building will house the laboratory relocated for other use. Other areas will be relocated to minimize building construction costs.

Throughout construction, the facility must remain operational and in compliance with all operating permits during construction. The investment in the facility is an investment in water quality for Lake Champlain and in keeping the facility operating in a cost effective way while preventing further degradation of the existing system. Maintenance of the existing system is essential in assuring long term viability of the existing infrastructure that was provided with grants when the plant was upgraded in 1985.

For more information, visit www.essexjunction.org or call 802 878-6943 ext 201.