



TONKA EQUIPMENT COMPANY

Project Profile

**Forge Village and Nutting Road Water Treatment Plants
Westford, MA**

WESTFORD WATER DEPARTMENT

Contact: Warren Sweetser
Superintendent
978-692-5529

Contact: Robert Worthley
Water Treatment Manager
978-692-5529

DESIGN ENGINEER

Dufresne-Henry
Contact: Tom Mahanna, P.E.
978-692-1913

TONKA REPRESENTATIVE

BAU/Hopkins, Inc.
Contact: Terry Reasa
603-588-2827

GENERAL CONTRACTOR

Methuen Construction
Contact: Rory Moulton
603-328-2222



APPLICATION:

Iron and Manganese Removal
From groundwater under the influence of surface water

TONKA PROCESS EQUIPMENT:

Each plant incorporates:

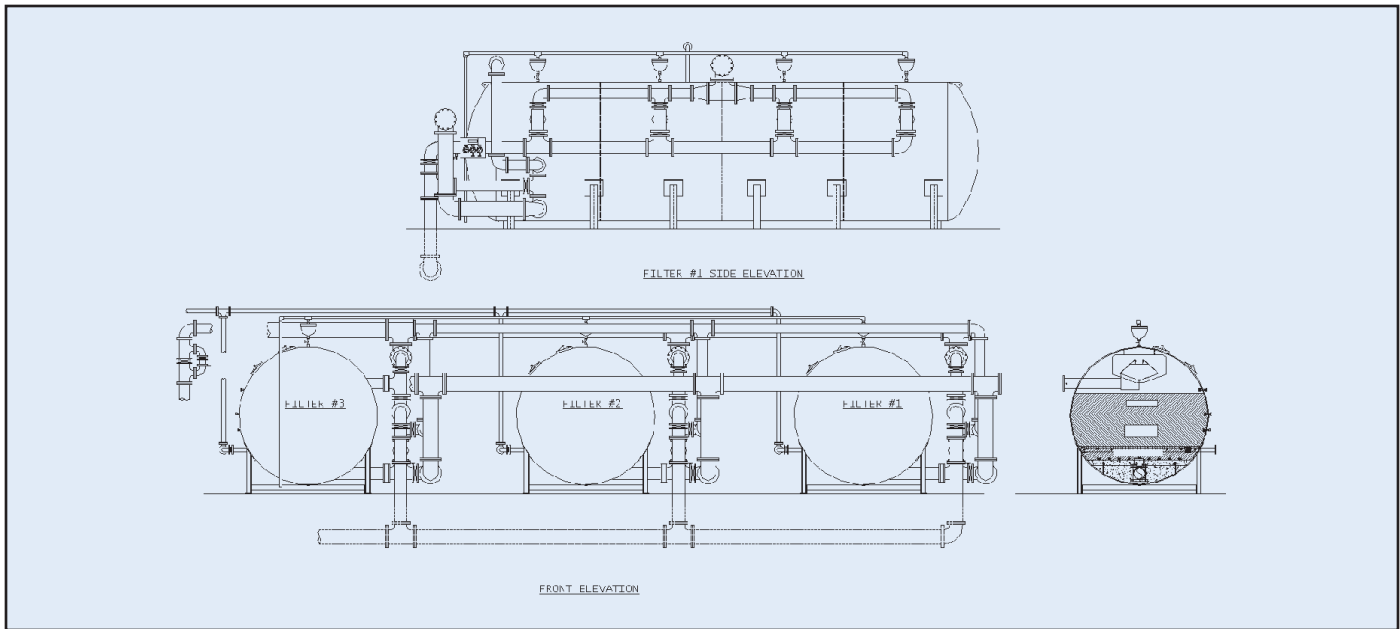
- Three 10' diameter x 37' OAL horizontal filters
- Manganese greensand/anthracite dual media
- Tonka's Simul-Wash™ backwash system

PROJECT

Westford is a rapidly growing community outside of Boston and receives its water from eight groundwater wells. While the town has an ample raw water supply, treatment is needed to meet ever-stringent water quality standards. The Town hired Dufresne-Henry to study, design, and administer the construction of two new treatment plants to meet these needs. After evaluating several treatment options, the Town and Engineer chose to work with Tonka Equipment Company to customize solutions for the Forge Village and Nutting Road treatment plants. Each plant has a design capacity of three million gallons per day. The plants were successfully commissioned in 2003.

PROCESS

Each cutting edge treatment plant consists of onsite hypochlorite generation for disinfection and iron oxidation, potassium permanganate feed for manganese oxidation, and filtration. Each plant has three 10' diameter x 37' long horizontal pressure filters using a dual-media filter bed of manganese greensand and anthracite. The anthracite removes the larger iron and manganese precipitates, while the greensand removes the smaller manganese dioxide solids that pass through the anthracite.



Each filter includes the value-added Simul-Wash™ backwash system. This unique backwash system uses air and water simultaneously, at sub-fluidized rates, to provide the most effective means of backwashing granular filter media.¹ Tonka’s media rejecting Simul-Wash™ trough enables the air and water backwash cycle to continue indefinitely without media loss. This results in optimal filter cleaning efficiency and prolonged filter runs, while saving approximately 50% of backwash wastewater compared to conventional methods. The filters are designed to operate with either a continuous feed or intermittent feed of potassium permanganate depending on water quality parameters.

The system is controlled by Tonka’s PLC-based automatic control panels which have been customized to automatically backwash the filters by loss of head, time, or operator initiation. The duration of the backwash and other functions is selectable and adjustable by the operator through an Allen-Bradley PanelView 1000 color touchscreen.

PERFORMANCE

The raw water analysis summarized below reflects high concentrations of iron and manganese existing in the water. The treatment process has been highly effective in delivering quality water as indicated below.

	Raw Water	Finished Water
Iron (Fe)	1.8 mg/l	0.01 mg/l
Manganese (Mn)	0.7 mg/l	0.02 mg/l

FOR ADDITIONAL DETAILS, CONTACT:

Tonka Equipment Company

¹Amirtharajah, Appiah, et al. Optimum Backwash of Dual Media Filters and GAC Filter-Adsorbers With Air Scour, AWWA Research Foundation and American Water Works Association, 1991.



TONKA EQUIPMENT COMPANY

763-55-WATER • 763-559-2837 • FAX: 763-559-1979 • www.tonkawater.com
 P.O. BOX 41126 • PLYMOUTH, MINNESOTA 55441-0126 • 13305 WATERTOWER CIRCLE • PLYMOUTH, MINNESOTA 55441