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Dual Traveling Bridge Filtration System
City of Rochester Water Department
Rochester, New Hampshire

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ON THE COVER

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On the cover is the City of Rochester's dual traveling bridge filtration and backwash system at its surface water treatment facility. Originally designed in 1987 by Whitman and Howard, the system was recently redesigned by Wright-Pierce and rebuilt between 2015 and 2016 by Apex Construction Inc. at a cost of approximately $2 million.

Under normal operation, clarified water is piped to the traveling bridge filter units. Primary filtration of clarified water is achieved through a monomedia sand bed, enhanced seasonally with chemical addition. Sand filter effluent then proceeds to the mixed media anthracite bed for final polishing before disinfection and storage in the finished water clearwell. Each unit can operate separately or in parallel for maintenance or demand needs.

The traveling bridge filter system consists of slotted orifice PVC underdrain laterals, the traveling bridge assembly, washwater pump and hood assembly, backwash pump assembly, backwash shoe assembly, festooning system, air scour system, flow meters, indexing system, drive track assembly, and control panels. Each bridge is networked to the main plant control system, but is capable of completely autonomous operation.

Each filter basin functions as a series of individual cells (miniature filters) that are progressively backwashed by the traveling bridge mechanism. Effluent turbidity and/or headloss levels trigger backwash initiation, which causes the entire bridge to travel (index) by rail tie to each individual cell.

A backwash supply pump in the filter effluent channel supplies hydraulic pressure to seat a sealing boot against each cell lateral and provide reverse flow for cleaning the media. Filtered water and air is pumped into the active (washed) lateral to fluidize the media and carry waste upward into the collection hood, where a washwater pump sends waste to the overhead trough for delivery into the recycle or lagoon system.

During a backwash event, each pair of cells adjacent to the washed cell are isolated and suction is applied to create a filter-to-filter cycle by returning the effluent to the top of the filter, which facilitates the seasoning of fresh filter cells and emulates a filter-to-waste process. Backwash waste can be recycled through the plant via the existing recycle line into the treated headworks influent trough. Excess backwash is delivered to dedicated hydrosolids lagoons.

Information and Photo Courtesy of:

Water System Chief Operator and NHWWA President Ian Rohrbacher; Director of City Services Peter Nourse; and City Engineer Michael Bezanson