

Client
City of Boca Raton

Scope of Services
Professional engineering services for preparing construction drawings, technical specifications, and opinion of probable cost and permitting.

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Start Date
04/2020

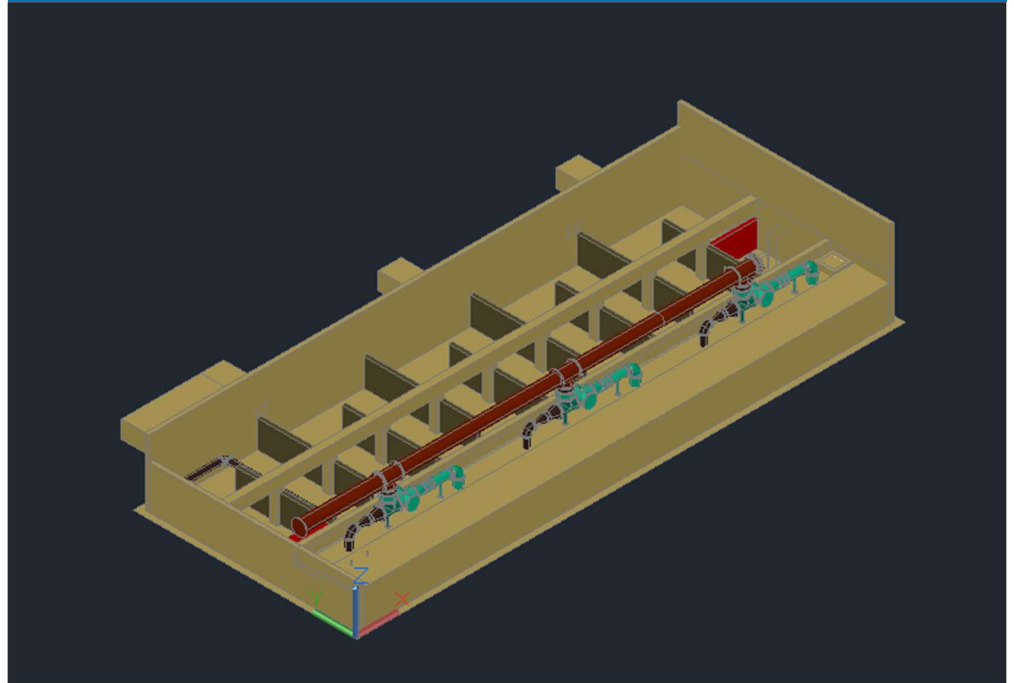
Completion Date
10/2022

Key MBC Staff
Frank A. Brinson, P.E.
Andrew H. Barba, P.E.
Robert Landrum, E.I.

Key Features
Design of the filter-to-waste process improvements, clearwell modifications for four-log virus disinfection optimization improvements, and ammonia system replacement.

Water Treatment Plant Four-Log Virus Treatment Upgrades Design

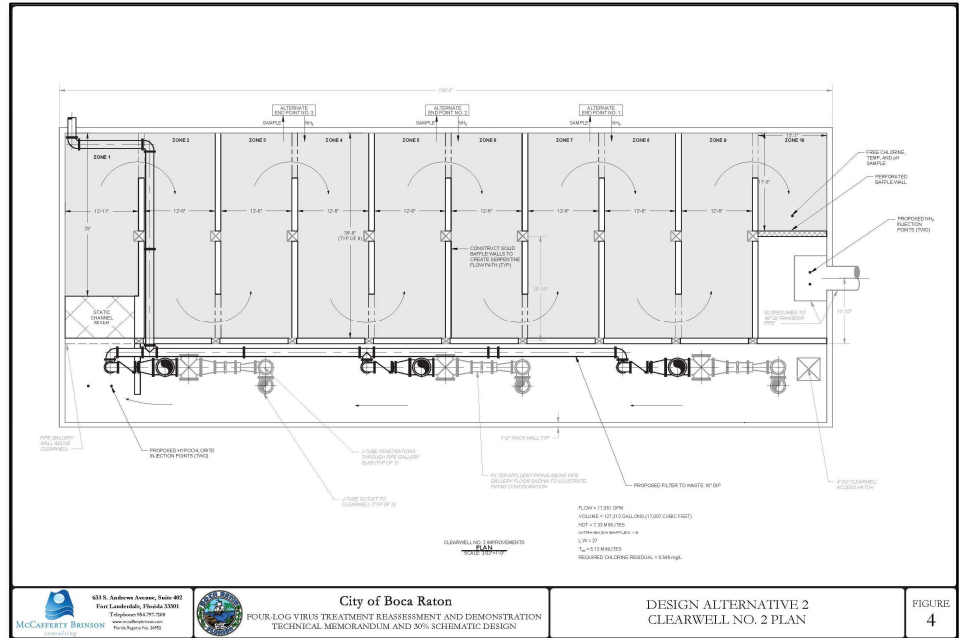
Boca Raton, Florida



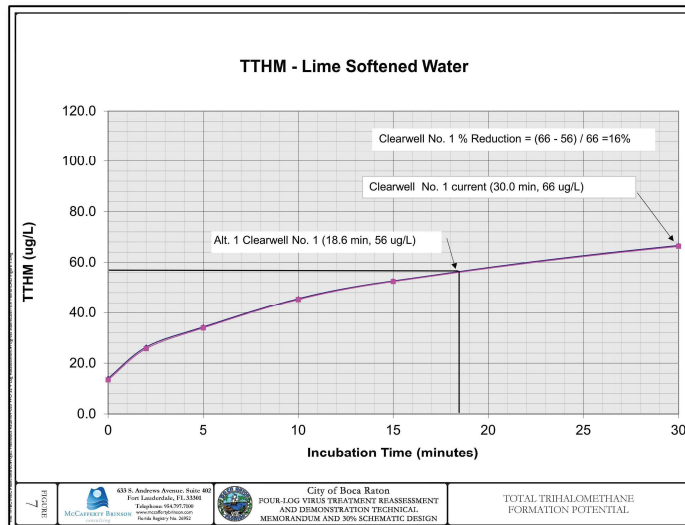
Background

The City of Boca Raton owns and operates the Glades Road Water Treatment Plant (WTP) which consists of a 40-million gallon per day (mgd) capacity nanofiltration (NF) process and a 30 mgd conventional lime softening process. The treated waters from the two processes are blended at a 2:1 membrane permeate to lime softened water (NF:LS) blend ratio to produce the finished water supply. In 2009, McCafferty Brinson Consulting, LLC (MBC) assisted the City with obtaining a Determination of Four-Log Virus Treatment of Ground Water for the water treatment plant from the Florida Department of Environmental Protection (FDEP) and the Palm Beach County Health Department (PBCHD).

The City early 2020, the City began investigating options for optimizing the four-log virus treatment process (i.e., chemical disinfection with free chlorine) with respect to compliance with the Disinfectants/Disinfection By-Product Rule (D/DBPR). The City's objective was to minimize the formation of undesirable DBPs while maintaining the general approach to four-log virus treatment and compliance with the four-log virus treatment requirements of the Ground Water Rule (GWR).



In June 2020, MBC completed a study entitled *Four-Log Virus Treatment Reassessment and Demonstration* that concluded that the City could realize a substantial reduction in DBP formation by installing intra-basin baffling in the two clearwells that receive treated water from the lime softening process, and relocating the chlorine injection points and four-log virus treatment compliance sampling points. The study included three-dimensional modeling of the clearwells, and evaluation of various design alternatives relative to four-log virus treatment criteria, constructability, ease of operations, and construction cost. The conceptual design of the selected alternative was approved by the FDHPBC on July 22, 2020. This study provided the basis for final design of the Four-Log Virus Treatment Upgrades. In addition to the four-log virus treatment process improvements, the project included installation of filter-to-waste piping, valves, and controls, as well as replacement of the ammoniators at the water treatment plant.



The Project

MBC's scope of services for this project included the following:

- The addition of filter-to-waste piping with motorized control valves and turbidimeters to route the filter effluent to the washwater recovery basin for a short operator-adjustable time period following a backwash. The design includes automated control instrumentation and programming to incorporate the filter-to-waste step in the existing filter control protocol.
- Installation of fiberglass-reinforced plastic (FRP) baffling in the clearwells to create, within each clearwell, a serpentine flow path in the free chlorine contact zone of the clearwell. Redundant hypochlorite injection points were placed at the entrance to the contact zone, followed by a fabricated stainless steel channel mixer. Redundant sample points and ammonia injection points were located at the end of the free chlorine contact zone.
- Replacement of the existing ammoniators with new, more accurate, thermal mass flow controllers.
- Addition of underground 48-inch diameter bypass piping between the existing lime softening process clearwell transfer piping, the transfer pump station, and the existing membrane softening process clearwell transfer piping.
- A full electrical renovation of the two buildings; including structural and electrical improvements to support the above-described process improvements.

The design phase for this project was completed in October 2022. Construction is currently underway and is anticipated to be complete in October 2024.