

**Client**  
City of Boca Raton

**Scope of Services**  
Engineering design,  
permitting, bidding services,  
construction administration,  
and resident project  
representative services.

**Contact**  
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**Start Date**  
10/2016

**Completion Date**  
07/2019

**Construction Cost**  
\$1.28 million

**Key MBC Staff**  
Frank A. Brinson, P.E.  
Andrew Barba, P.E.  
Melissa Campbell, E.I

**Key Features**  
Project included demolition of  
the existing system, provision  
of a temporary carbon dioxide  
system storage system during  
construction, and installation  
of a new system consisting of  
two 18-ton storage tanks and  
two pressurized solution feed  
panels.

## Replacement of the Carbon Dioxide System Design and SDCs Boca Raton, Florida



### Background

The City of Boca Raton's Glades Road Water Treatment Plant utilizes a 30 million gallon per day (mgd) capacity conventional lime softening process in parallel with a 40 mgd membrane softening process. The lime softening process includes a recarbonation system to inject carbonic acid solution, prepared from gaseous carbon dioxide, downstream of the lime softening units, and upstream of the multimedia gravity filters for pH adjustment. The purpose of lowering the pH prior to the filters is to prevent the precipitation of calcium carbonate in the filters which can cause "cementing" of the filter media. Recarbonation maintains the quality of the filter media and improves filter performance. The existing recarbonation system had been in continuous operation since its installation in 2001 and had reached the end of its useful life. To provide enhanced system reliability and redundancy, the City elected to replace the existing single 60-ton storage tank with two 18-ton storage tanks, along with all system piping and two pressurized solution feed (PSF) injection panels.

## The Project

MBC's scope of services included preparation of construction drawings and technical specifications, opinions of probable construction cost, permitting, bidding services, construction contract administration, review of shop drawings, periodic site visits, review of pay applications, resident project representative (RPR) services, and project close-out. The technical specifications for the project included development of a detailed construction sequencing plan including the provision of a temporary carbon dioxide system and phased staging of the tank and panel replacement to complete construction without disrupting operation of the lime softening process. The key components of the project included the following:



- Replacement of the existing single 60-ton carbon dioxide storage tank with two 18-ton tanks.
- Replacement of the existing PSF panel for each of the City's two lime softening treatment units with new stainless steel PSF panels.
- Installation of new carbon dioxide gas lines from the storage tanks to each PSF panel and installation of new carbonic acid solution piping and diffusers from the PSF panels to the application points.
- Replacement of existing pH instruments and other control instrumentation for the system.

The contract for construction of the project was awarded to TLC Diversified, Inc with a Notice to Proceed issued June 4, 2018. The project reached final completion on December 18, 2019 with less than 10% of Owner requested change orders.

