

Client
City of Pompano Beach

Scope of Services
Development of unidirectional flushing and valve exercising program for the City of Pompano Beach's transmission/distribution system.

Contact
Randolph Brown
Utilities Director
City of Pompano Beach
1205 NE 5th Avenue
Pompano Beach, FL 33060
954 545.7043
randolph.brown@copbfl.com

Start Date
03/2011

Completion Date
03/2013

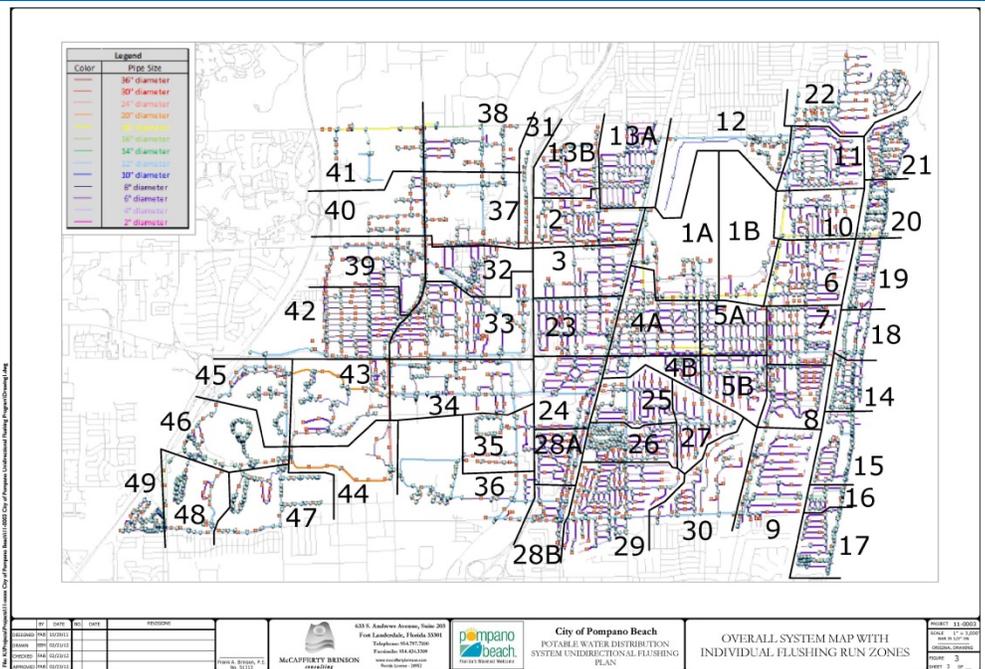
Construction Cost
Not Applicable

Key MBC Staff
Frank Brinson, P.E.
Eelhard Meneses, P.E.

Key Features
This long-term program is intended to prevent age-related water quality issues by comprehensively flushing the City's transmission and distribution system according to a systematic and structured plan. The observed benefits of this program were removal of sediments and stale water, maintenance of good disinfectant residual levels, elimination of taste and odor issue, and reduction of bacteriological growth in the distribution system.

Unidirectional Flushing and Valve Exercising Program

Pompano Beach, Florida



Background

Municipal potable water transmission and distribution systems are typically designed to meet fire flow demands which, in most cases, are substantially greater than domestic or commercial demands. Under most conditions, flow velocities are lower than scouring velocities, allowing sedimentation of solids, high water age, and degradation of disinfectant residual levels. These issues can cause color, odor, and taste problems. These problems can be exacerbated in remote, peripheral areas of the system and areas with low demands. Most water utilities address these issues by flushing.

Traditional flushing (i.e., periodically opening one or more hydrants in problem areas) is only marginally effective due to the difficulties in achieving good scouring velocities as well as the potential for “re-contaminating” previously flushed mains. A much more effective approach is to implement a comprehensive, structured, long-term plan for flushing the entire transmission/distribution system from the primary source(s) (usually the water treatment plant(s)) outward to the periphery of the system.

Unidirectional flushing (UDF) is a systematic and controlled flushing method that has been developed in response to the growing need for better maintenance of distribution water quality. In contrast to conventional flushing, unidirectional flushing leverages engineering analyses of the system, including hydraulic modeling, for the design of the flushing program. By systematically closing valves and opening hydrants, utility operators can isolate certain sections and runs of piping, greatly increasing flushing velocities, resulting in better cleaning, and minimizing the potential for recontamination of previously flushed areas.

The City of Pompano Beach owns and operates a drinking water system consisting of a 50 million gallon per day water treatment plant, high service pumping and finished water storage, and a finished water transmission/distribution system to provide water service to customers within the City's service area. As part of the City of Pompano Beach's continuing efforts to maintain good water quality in the distribution system and to maintain the level of service to City customers, the City of Pompano Beach retained MBC to develop a UDF program for their transmission/distribution system. The objectives of this program are to prevent age-related water quality issues such as sedimentation, taste and odor problems, low chloramines residual levels, and bacteriological growth in the system. To make the most cost-effective use of the City's labor forces who execute the UDF program, a routine valve exercising program was incorporated into the UDF program to be completed concurrently in the field.

The Project

The scope of MBC's engineering services included:

- Literature Review. Engineering publications and guidance documents relative to UDF were reviewed to develop a technical foundation for the program designed specifically for the City's system, leveraging the City's existing computerized hydraulic model, the latest modeling technology, and real-world experience of similar utility systems, consistent with the state of the art within the industry.
- Data Compilation and Review. MBC compiled, tabulated, reviewed, and analyzed the system-specific data provided by the City, including historical distribution system chlorine residual levels, color, iron, bacteriological sampling results, and customer complaints. These data, in combination with hydraulic modeling results, were used to identify high-risk areas of the distribution system.
- Hydraulic Model Simulations. The City maintains a computerized hydraulic model based on H2O MAP modeling software. The hydraulic model was utilized to identify high-risk (low-velocity and high water age) areas of the distribution system, as well as to simulate flushing operations to confirm sufficient flushing velocities.

- Design of Flushing Program. MBC prepared a program for systematic and controlled flushing of the distribution system. The program consisted of a written, step-by-step description of routine procedures to be conducted by City's staff. A recommended flushing frequency was determined in order to maintain high water quality in the system.
- Report Preparation. The final report contained written flushing program procedures, summarized data utilized in the development of the program, and recommendations for methods for evaluating the effectiveness of the flushing in order to comply with the current rules.
- Project and Quality Management. MBC maintained a program of Quality Assurance (QA) on the project. The QA was provided via internal reviews of each deliverable by MBC's principal engineer, and monthly written progress reports summarizing activities completed, work remaining, and identifying any ongoing or anticipated problems will be given to the City.

In March 2013, MBC submitted the final report to the City. The City is currently executing the program on a continuing basis and has reported substantial improvements in water quality and progress towards achieving the objectives of the program.

