



REVERSE OSMOSIS WTP PRELIMINARY ENGINEERING REPORT



SUBMITTED TO:

TOWN OF BELLEAIR DRAFT EXECUTIVE SUMMARY - UPDATED OCTOBER 30, 2020

SUBMITTED BY:

MCKIM & CREED | CLEARWATER, FL



Executive Summary

The Town of Belleair (Town) operates an existing water treatment plant (WTP) that was designed to produce 2.2 million gallons per day (MGD). The WTP treats groundwater from seven (7) existing wells and produces an average flow of approximately 800,000 gallons per day (gpd) of potable water to supply the Town's utility customers. The levels of chloride and total dissolved solids (TDS) in the wells have been increasing and are projected to continue increasing in the future. Because of these conditions, the potable water produced by the plant has chloride and TDS levels that periodically approach the Florida Department of Environmental Protection (FDEP) secondary drinking water limit of 250 mg/L and 500 mg/L, respectively.

Additionally, the WTP is nearing the end of its useful life and there are items that need to be addressed as soon as possible. This Preliminary Engineering Report (PER) included evaluations of the Town's existing water supply and treatment systems and considered the following:

1. Drinking water regulations
2. Condition of WTP existing systems and equipment
3. Condition of wells; above- and below-ground
4. Current and projected potable water demands
5. Groundwater supply and quality projections
6. Ability of existing systems to treat projected water quality

If the Town wishes to continue with potable water production, a new Reverse Osmosis (RO) treatment plant is recommended to reduce chloride and TDS concentrations and to address ongoing operational, maintenance and safety concerns at the WTP.

Besides developing preliminary engineering requirements for the proposed RO WTP systems, this PER was developed to provide the Town with capital and operations & maintenance (O&M) costs for the proposed WTP. Also, a potential phased implementation plan was developed that focuses on using the existing WTP infrastructure to the extent possible to reduce initial capital costs. In addition, the phased approach implements new treatment processes and modifications, only as needed, to address chloride and TDS levels projected to increase over time.

The use of a "conventional" RO process was compared with a relatively new high-recovery RO process called "Closed-Circuit RO (CCRO)." In general, the conventional RO process is able to utilize approximately 80% of the water supplied to the process to produce drinking water; whereas the CCRO process is able utilize approximately 90 to 95-percent. The evaluation and comparison of the two (2) processes are detailed in this PER.

Total capital costs for the proposed RO plant were developed and compared with a phased approach. These costs are shown in **Tables ES-1 and ES-2**.

Table ES-1– Proposed Facility Cost Summary

Item	Traditional RO System	High-Recovery CCRO System
Mobilization/Demobilization	\$175,000	\$175,000
Sitework & Demolition	\$325,000	\$325,000
Booster Pump Station	\$142,000	\$142,000
Pressurized Filters and Backwash Holding Tank	\$969,000	\$969,000
Chemical Building	\$84,000	\$84,000
Chemical Systems	\$362,000	\$362,000
RO System	\$1,044,000	\$1,488,000
RO Building	\$434,000	\$434,000
High Service Pump Station	\$338,000	\$338,000
Deep Injection Well	\$750,000	-----
Yard Piping	\$500,000	\$500,000
Electrical	\$738,000	\$677,000
Instrumentation	\$554,000	\$508,000
Upper Floridian Wells (4) and Well Rehabilitation	\$1,450,000	\$1,450,000
Total Construction Cost	\$7,865,000	\$7,452,000
Contingency (30%)	\$2,360,000	\$2,236,000
Sub Total	\$10,225,000	\$9,688,000
Engineering - Design and Legal (15%)	\$1,534,000	\$1,454,000
TOTAL PROJECT COST	\$11,759,000	\$11,142,000

Table ES-2 – Phased Implementation Plan Summary

Phase / Description of Major Systems	Approximate Implementation Year	Project Cost
Phase 1		
1) Clearwell Roof Rehabilitation 2) Additional Well 3) Deep Injection Well 4) Booster Pump Station 5) Filtration System 6) Chemical Systems 7) Yard Piping 8) RO System 9) RO Building 10) Additional Chemical Systems	2024	\$10,378,000
Phase 2		
1) RO System Addition 2) RO Building Addition 3) New High Service Pump Station 4) Yard Piping	2034	\$2,282,000
TOTAL COST WITH PHASED IMPLEMENTATION		\$12,660,000

Based on the evaluations performed in this PER, McKim & Creed recommends that the Town either begins constructing the proposed RO treatment (either in phases or overall plant) or decommissions the existing WTP and begin utilizing potable water from Pinellas County by the end of calendar year 2020. The recommended schedule would allow either the complete, or the phased approach, to be on-line by the first quarter of 2024.