The state of Florida continues to experience rapid population growth, creating challenges for almost every aspect of our utility infrastructure and resulting in ever-increasing water demands. The city of Port St. Lucie, located on the Atlantic Seaboard in St. Lucie County, has grown from approximately 10,000 residents to the current 135,000 residents in less than 20 years. During that period, the city's utility systems department has been tasked with providing and maintaining a public wastewater collection and water distribution system to serve these residents.

Starting in July 2003, the city added 12,689 people in a one-year period to reach a population of 118,396—an increase of 12 percent in 12 months. The four-year growth rate has also been significant—a 33.4-percent increase. As a result, Port St. Lucie was recently ranked as the nation's fastest-growing city of over 100,000 people, based on census data from 2003-2004. As this growth trend has emerged, the city council, city manager and the utility systems department have anticipated the need for updated, expandable supplies of potable water.

The city acquired the utility systems department in October 1994. At the time the utility was purchased, many residential customers relied upon private wells to supply their water and septic tanks to dispose of their wastewater. As the process of expanding the utility system and recommending additional facilities progressed, a small group of residents spoke on behalf of the entire community, stating that the facilities were not truly needed—that the community could exist and grow while relying upon its then-current water production method, the use of private wells, and individual point-of-use purification systems to improve quality. The city council put the measure before the community in a voting process that resulted in a resounding yes to move forward with improved facilities.

After water lines were completed in the initial expansion area, the city was tasked with satisfying the requests from a majority of citizens for potable-water connections. This accelerated demand led the utility systems department to closely examine and plan for timely expanded water production facilities.

Expanding the surficial-aquifer wellfield supplying the existing lime softening plant became problematic because of the number of wells required, the distance of the wells from the treatment plant, the difficulty in finding undeveloped property on which to site the wells, and impacts upon wetlands and existing residential wells. Brackish water in the Floridan Aquifer was identified as an alternative water source that could meet the city's needs.

In 1997 Port St. Lucie and its utility systems department determined that a reverse-osmosis (RO) water treatment plant would be the best method of providing the required additional capacity, while providing the high...

Figure 1

Figure 2

- 2004-05 data is through the first 10 months of the fiscal year.

Jesus Merejo is the utility director for the city of Port St. Lucie. Brad Macek is the city's assistant utility director. James Christopher is a vice president at the Orlando office of Tetra Tech HAI, which has served as the city's water treatment consultant for the last 10 years. Jarrett Kinslow is a membrane treatment specialist at the firm's Orlando office.
The James E. Anderson RO Water Treatment Facility was placed into service in early 2005, and currently supplies potable water to the northern service area in Port St. Lucie. The facility has an initial capacity of 6 MGD with the ability for the phased expansion to a capacity of 22 MGD.

The reverse-osmosis post-treatment consists of degasifiers and odor control scrubbers for removal of hydrogen sulfide, followed by disinfection and stabilization.

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area.

Working closely with the West Palm Beach Office of the FDEP, the city made the decision to begin water production at the newly constructed JEA facilities earlier than previously anticipated in an effort to meet increased demands and provide a higher distribution pressure to the St. Lucie West system. The facility went on line in less than one week after the need was identified and has been in operation since that time while the site work and construction of the ancillary facilities were completed.

As Phase 2 construction neared completion in July 2005, the city authorized the design and construction services for the full expansion of the JEA plant to 22 MGD. The expansion project is anticipated to be completed by the summer of 2008, with a likely intermediate milestone of 10 MGD in expanded capacity to be required by the spring of 2007.

The JEA plant expansion will consist of the following facilities and equipment:

- Seven Floridan Aquifer supply wells
- One Floridan Aquifer blend well
- Three feed-water micron filters
- Seven high-pressure feed pumps
- Seven RO treatment skids
- Three post-treatment degasifiers
- One two-stage odor-control wet scrubber system
- Two finished-water transfer pumps
- Five high-service pumps
- Additional process and yard piping
- Two 4.0-MG potable ground storage reservoirs
- Auxiliary power generator facilities
- Electrical gear & drives

The high-service pumping facilities are designed to allow phased expansion as the plant capacity increases.

Port St. Lucie
Utility System Milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>October 1st – Utility under city ownership</td>
</tr>
<tr>
<td></td>
<td>Connections: Water = 17,228; Wastewater = 10,800</td>
</tr>
<tr>
<td></td>
<td>Treatment Capacity: Water = 4 MGD; Wastewater = 4.7 MGD</td>
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<tr>
<td>2000</td>
<td>January 19th – Grand Opening of Prineville RO Water Plant with 4.0 MGD capacity</td>
</tr>
<tr>
<td>2003</td>
<td>April 23rd – 10.713 million gallons treated water demand</td>
</tr>
<tr>
<td></td>
<td>Treatment Capacity: 16.85 MGD</td>
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<tr>
<td>2004</td>
<td>October 1st – 10th Anniversary</td>
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<tr>
<td></td>
<td>Connections: Water = 48,156; Wastewater = 31,537</td>
</tr>
<tr>
<td>2005</td>
<td>Treatment Capacity: Water = 25.15 MGD; Wastewater = 10.8 MGD</td>
</tr>
<tr>
<td></td>
<td>Connections (June 1st): Water = 54,201; Wastewater = 36,711</td>
</tr>
</tbody>
</table>

From 1994 until the present, the number of connections has increased 315 percent and 340 percent for water and wastewater customers respectively. Much of that growth could not have been possible without the planning and resourcefulness of the utility systems department and their work with local developers to stay ahead of the growth curve. As many areas around the state try to cope with the demands of growth by moratorium and similar methods, it would be fair to say that smart planning by a utility with the assistance of local developers may be the best solution for all parties.