

Automated Pump Stations Keep Citizens Safe

Upgrades improve efficiency of critical stormwater facilities.

By Deodat Budhu
and Jeff Charles

Stormy weather is common in Florida. If not monitored properly, stormwater runoff causes many problems, including pond overflow and flooding of streets and homes. Orange County's Roads and Drainage Division focuses full time on maintaining county roadways within unincorporated boundaries to prevent or minimize the flooding of public and private property.

The roads and drainage division has infrastructure designed to help alleviate potential hazards. Some stormwater is managed by routing via gravity to one of 1,400 county owned and maintained retention ponds. Another way the division mitigates potential flooding is with the operation of fixed pump stations.

Orange County currently operates 17 fixed pump stations, which convey runoff from local roadways to receiving systems with sufficient storage capabilities. The pump stations were designed and constructed on an as needed basis to eliminate problematic areas that were impacted negatively from intense rainfall and excessive runoff. Although many of the pump stations are not obvious to the public, they play a vital role in ensuring the safety of our residents.

The roads and drainage division has made great strides in improving the efficiency of existing pump stations. In the past, when a heavy storm event was forecast for the Central Florida area, a crew of two would have to visit pump stations located within one of the 12

drainage basins in Orange County and manually turn on the pumps. In addition, crew members were required to be present at pump stations around the clock during pumping operations.

Station Retrofits

To improve operations, staff researched and identified retrofits that would greatly improve the pump stations. The retrofits included a float system that would allow the pump station to be operated automatically. The pump would be turned on when the water level inside the well box rose to a set elevation, and turned off when the water level was lowered by pumping. The automated float system was a major improvement and eliminated the need to call out a crew in the night during a major rainfall event.

Telemetry was another beneficial retrofit project identified and implemented shortly after the automated float system was installed. Sensors at our pump stations are programmed to monitor high level alarm, power outages, pump over-heat alarm, pump running alarm, system reset and power back on alert, and pump off. The telemetry equipment notifies crews through their phones or pagers whenever a problem is identified at any one of the pump stations.

This system has been successful because various trained staff and crew reside within a few miles of the pump stations, allowing the situation to be resolved quickly once the message is relayed. In 2004, Orange County was hit with three major hurricanes—Charlie on August 13, Frances on September 6, and Jeanne on September 26—each of which produced significant rainfall. The automated pump stations



Improved pump controls and the addition of telemetry have improved the operation of Orange County's fixed pump stations.


activated during the storm and helped minimize flooding of streets and residential areas. Moreover, crews did not have to go out in the peak of the hurricanes to address any problems.

As Orange County moves into the future we will continue to improve our current operation to keep our residents free from worries of flooding. Other pump station improvements include:

- Emergency back up generators added at priority locations so when power outages occur pumping can continue.

- Backup electric pumps added at those stations where diesel-powered pumps are in place.
- Retrofitting electrical systems and other pump station infrastructure that had become outdated.
- Routine inspections and repairs of pump station pipelines and outfalls.
- Regular weekly preventive maintenance of all pump stations.

Although the automated system immediately improved pump station operations and allowed for quicker

drainage of low lying areas, other alternatives are still being researched to continue with the enhancement of the stations. Currently the use of radio telemetry is being explored because there is no physical connection that can be cut or damaged. This instrumentation, if cost-effective, will enable us to collect and view data as it is happening and correct some problems from a laptop. 

Mr. Budhu, P.E., is the manager and Mr. Charles is the drainage coordinator with Orange County's Roads and Drainage Division.