Outlook

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JOHNSON ENGINEERING
Fall 2017

"Your project. Our passion."

CAUTION: FLOOD ZONE AHEAD

Low lying areas throughout Southwest Florida are susceptible to increased flooding during an above average rainy season. Understanding water flow can help explain how easily flooding can occur and help guide cost vs. benefit decisions in the future.

Most of us have seen the media coverage of the recent flooding problems throughout Southwest Florida. These images on the evening news illustrate how rainfall drives water levels in this area which contributes to flooding events. Despite the high water levels we're experiencing now, the rainfall in late 2016 and early 2017 was 60% below average per South Florida Water Management District records, with water levels in ponds across Southwest Florida up to several feet below the control elevation by the late spring of 2017. However, rainfall in June, July, and August was well above average—up to double in some locations--and water levels in ponds and canals rose in response.

September brought even more rainfall, much of it associated with an unwelcomed Hurricane Irma. From a historical perspective, wet-season rainfall depths in south Lee County for 2017 are similar to those experienced in 1995 when similar flooding occurred in Bonita Springs. Rainfall in 1995 was about 60" for the months of June through September, nearly the same amount as experienced for 2017 from June through the middle of September as measured by a gauge near the intersection of Williams Road and Three Oaks Parkway. For comparison, annual rainfall totals average 55" in Southwest Florida. Southwest Florida receives approximately 70% of its annual rainfall from June through September and the remaining 30% from October through May.

In 1995 similar flooding occurred in Bonita Springs when 60" of rain fell that summer from June through September.

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In This Issue:

PEOPLE & PROJECTS: *ON THE MOVE*

Marina Guirguis has joined our Planning & Landscape Architecture team as a Planning Technician. Marina holds a Master of Design in Sustainable Urban Environments

Travis Giafaglione, E.I. has joined our Development team as an Engineer Intern. Travis earned his B.S. in Civil Engineering from FGCU and interned for Lee County GIS during his studies.

Lindsay Clark has joined our Planning & Landscape Architecture team as a Project Landscape Designer. Lindsay brings 14 years of experience with landscape drafting, design, and project management.

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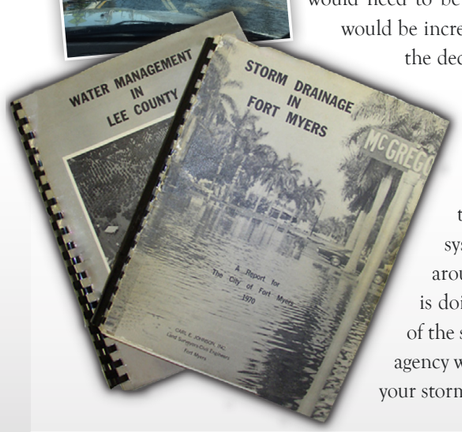
The rainfall that precedes major storm events is also important in determining the stage water levels reached. An example of this occurred in The Brooks community in Estero where above-average rainfall in late August, 13.49" over 5 days, raised water levels in the ponds to an elevation of 15.2' relative to the National Geodetic Vertical Datum of 1929 (NGVD29). A couple of weeks later when Hurricane Irma hit, The Brooks "only" received 3.9" of rainfall, but the peak stage in the ponds rose to 15.7 feet NGVD29. Other areas in Southwest Florida also experienced high water levels during this same period, like Bonita Springs, north Lee County, and north Charlotte County. The Bonita Springs area can receive water from Corkscrew Swamp and all the way up to the southwest side of the Immokalee Rise, located in Hendry and Collier Counties. The watershed area actually increases in larger rainfall events as other outfalls are restricted in the amount of flow they can convey, resulting in smaller, discrete watersheds under lower water conditions merging to form a much larger watershed under high water conditions. This phenomenon occurs in several areas in South Florida, due to the low-relief terrain. Similarly, north Lee County receives sheetflow from southern Charlotte County when water levels get high. However, not all interbasin water transfers require sheetflow conditions: canals in northern Charlotte County may receive flow from canals in southern Sarasota County when stage becomes high enough. If only water could be trained to stay in the county where the rain fell, many flooding complaints could be eliminated!

How do all these numbers compare to how residential and commercial developments are designed? Various infrastructure components are built to different design standards, and design standards have changed over time. Much of the development today is designed under a permitting framework that has minimum design levels for each of the components. And cost is often the driving force. The cost to replace or repair a building that is flooded is much greater than for a parking lot or residential street that is flooded for a short period of time. For this reason, the design storm for building floor elevations is usually a storm with a 1% chance to occur each year (100-year storm event), but the parking lot design is often allowed to flood in a storm that has a 20% chance of occurring each year (5-year storm event).

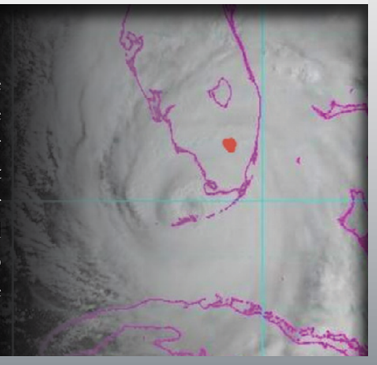
Of course, it is possible to build the roads near the elevation of the building floors so they would not flood in the smaller events. However, it would require more fill under the roads, and the size of the detention ponds would need to be larger to store the volume displaced by the roads and parking at higher elevations. There would be increased cost to the end users of the homes or commercial buildings to pay for the extra fill, and the decreased amount of land available for sale due to the increased pond area would in turn either decrease the developer's profit or drive-up the cost of the remaining land. As with most things in life, the cost-benefit needs to be weighed.



Of course, all of this is predicated on a well-maintained stormwater system. Debris over inlet grates and in pipes, or vegetation growing in swales or ditches will impede the flow and cause the water to stage-up to elevations greater than anticipated in the original design. Stormwater systems are not "set it and forget it" designs. Each of us can do our part by maintaining swales around our homes and making sure the entity responsible for the larger ditches, ponds, and outfalls is doing their part to keep the systems maintained. Another part is to make sure the construction of the stormwater system has been certified to the agency that permitted it. Without certification, the agency will not know if it was built correctly and functioning properly. If you need help or guidance on your stormwater system, contact Andy Tilton, P.E. at 863.612.4055 or atilton@johnsoneng.com. ■

PERMIT EXTENSIONS AVAILABLE DUE TO HURRICANE IRMA

Hurricane Irma has affected the State in many ways. A positive outcome from the declaration by the Governor of a State of Emergency is that most State and local permits may be extended by law. The permittee is required to write a letter to the agency that issued the permit to make the request for extension. The State law is found in Florida Statute 252.363. It provides an extension of the permit duration equal to the emergency period plus six months. The permittee must write the request letter within 90 days of the end of the last emergency period as some emergency periods receive increased amount of time. This State of Emergency is known as Executive Order Number 17-235 and applies to all 67 counties. It is for sixty days unless extended. Should you need assistance with this process, please contact Andy Tilton, P.E. at 863.612.4055 or atilton@johnsoneng.com. ■



A NIGHT ON LAKE OKEECHOBEE FOR OPERATION OUTDOOR FREEDOM

Johnson Engineering president, Lonnie V. Howard, and his youngest son Gavin were able to be a part of giving a wounded veteran a unique experience he won't soon forget, Frogging on Lake Okeechobee.

The two donated their time, local knowledge, and airboat for this year's annual Operation Outdoor Freedom event in Glades County.

Operation Outdoor Freedom is a program through the Florida Forest Service, under the guidance of Commissioner of Agriculture Adam Putnam, which offers honorably discharged military veterans who have a service-connected disability, free opportunities to hunt, fish, and explore state and agricultural lands throughout Florida.

At this year's event, organized by Angela Colegrove, GCEM Director and Danny Callahan, FFS Senior Ranger, seven wounded veterans were able to participate in the two-night frog hunting event with the help of six volunteer airboat guides.

For more information on Operation Outdoor Freedom eligibility, visit www.operationoutdoorfreedom.com. ■

HYDROGRAPHIC SURVEYING TECHNOLOGY ALLOWS SURVEY TEAM TO SEE MORE CLEARLY

Our surveying and mapping team recently added new echolocation sounding equipment to their hydrographic surveying equipment arsenal. Hydrographic surveys are meant to measure the depth and bottom configuration of water bodies. The Echotrac CVM's dual frequency transducer allows our team to determine an actual bottom depth by penetrating through the vegetation, giving a better idea of where the actual bottom is. This technology is a valuable resource when surveying Florida waterways, where objects such as seagrass or other water plants can often mislead outdated equipment and provide inaccurate readings.

This highly specialized surveying is performed by our team using either our 20' Kencraft Bay Rider with 115 HP Yamaha Outboard, a 14' Jon Boat with 15 HP Yamaha Outboard, or our 10' Jon Boat with 9.9 HP Yamaha Outboard, based on the needs and size of the project. Each can be equipped with the Echotrac CVM Odom, Single and Dual Frequency Hydrographic Echo Sounders, a Trimble R5800 GPS Receiver, Stand-Alone RTK Capabilities, and Hypack Max Software on Toughbook Laptops.

Once the data is collected and verified, CADD technicians create a model in AutoCAD Civil 3-D to show marine geological features that may pose a hazard to navigation such as rocks, shoals, and reefs. The data produced also may be required prior to an engineering design and may be necessary to obtain permits.

For more information on how this advanced technology could help your next project, please contact Mark Texter at 239.461.2433 or mtexter@johnsoneng.com. ■

An artist's rendition showing how this process scans and maps the sea floor.

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SUSTAINABLE FORESTRY INITIATIVE PEFC

SFWMD RELEASES LOWER WEST COAST WATER SUPPLY PLAN UPDATE FOR PUBLIC COMMENT

The South Florida Water Management District (SFWMD) has released a draft of the 2017 Lower West Coast Regional Water Supply Plan Update (LWCWSP) for public comment, and anticipates approval by the Governing Board at its November 9th meeting.

The Lower West Coast Water Supply Planning Region covers all of Lee County, and portions of Collier, Hendry, Glades, Charlotte, and Monroe Counties. At approximately 5-year intervals, the SFWMD updates each of its Regional Water Supply Plans, which address water resource availability and water supply development projects needed to meet projected demands over at least a 20-year planning period. The SFWMD coordinates with utilities, local governments, and other stakeholders on development of the plan. The SFWMD held the final of three stakeholder workshops on August 30th to present the LWCWSP draft.

Written public comments on the LWCWSP can be made until October 27th (extended due to Hurricane Irma).

Drafts of the LWCWSP and its appendices may be found at:
https://www.sfwmd.gov/sites/default/files/documents/lwcwsp_2017_plan_planning_document.pdf
https://www.sfwmd.gov/sites/default/files/documents/lwcwsp_2017_plan_appendices.pdf

Following approval of the LWCWSP by the Governing Board, local governments have 18 months to prepare their own 10-Year Water Supply Facilities Work Plans, pursuant to Ch. 163.3177(6)(c)3, F.S. Johnson Engineering has assisted several local governments with preparation of 10-Year Water Supply Facilities Work Plans.

If you would like to discuss how we might help you, please contact Kim Arnold, P.G. at karnold@johnsoneng.com. ■