PLANNING COMMISSION
September 19, 2018

AGENDA

The Isle of Palms Planning Commission will hold its regular meeting on Wednesday, September 19, 2018 at 4:30 p.m. in the City Hall Conference Room, second floor, 1207 Palm Boulevard.

A. Call to order and acknowledgment that the press and the public were duly notified in accordance with state law

B. Public comments

C. Approval of minutes:	August 15, 2018
D. Old business:	discuss development of Memorandum of Understanding regarding future sewer expansion
	discuss outfall RFP responses
E. New business	
F. Miscellaneous business	discuss upcoming meeting schedule

G. Adjourn

MINUTES OF THE ISLE OF PALMS
PLANNING COMMISSION MEETING
August 15, 2018

The Isle of Palms Planning Commission met in the City Hall conference room, 1207 Palm Boulevard on August 15, 2018 at 4:30 p.m. Members attending included Ron Denton, Vince DiGangi, Richard Ferencz, Bill Mills, Phillip Pounds, and Lisa Safford; the Director of Planning Douglas Kerr was present as well. Lewis Gregory was absent. Mr. Ferencz acknowledged that the press had been notified of the meeting and the agenda for the meeting was posted in City Hall and the Building Department to comply with the Freedom of Information Act.

PUBLIC COMMENTS

Mr. Daniel Habbock, 9 Wills Way, explained that his neighborhood floods during rain events. He explained that he and his family do their best to try to keep the drainage system clear, but the water does not seem to enter into the system.

Ms. Safford, explained that she was Mr. Habbock's neighbor and she could attest to the fact that the water did not enter into the system.

Mr. Kerr explained that he was confused to hear that there was a piped system in the back yards, as he had always believed that there was an area in the backyards that was a swale, but he was unaware of a piped system. He explained that he could ask Charleston County to investigate the system to try to determine what was keeping the water from entering into the system and he could report back to the Commission at their next meeting.

APPROVAL OF MINUTES

Mr. Ferencz explained that the next item on the agenda was the approval of the July 11, 2018 minutes and Mr. Denton made a motion to approve the minutes as submitted and Mr. Pounds seconded the motion. The vote was unanimous in favor of the motion.

DISCUSSION OF MEMORANDUM OF UNDERSTANDING REGARDING FUTURE SEWER EXPANSION

Mr. Ferencz explained that the next item on the agenda was the discussion of the development of a Memorandum of Understanding (MOU) between the City and the Isle of Palms Water and Sewer Commission (IOPWSC) regarding the future expansion of the public sewer system to all parts of the island.

City Administrator Emerita Tucker explained that she had been making good and steady process on this assignment and she had been meeting regularly with the IOPWSC staff as well as the engineer working on the project. She explained that the group was

focusing on an old study done by an engineer, G. Robert George, and they were trying to obtain additional data from that study.

She added that the IOPWSC had applied for a Rural Infrastructure Grant to expand sewer into the areas around 29th Avenue and they were unsuccessful in their first attempt, but they were hopeful that they could take the feedback from the first attempt, improve the request, and be successful in a subsequent request for the same project. She explained that the IOPWSC was working toward having at least 75% of the owners adjacent to the proposed project being committed to tying into the system.

Ms. Tucker added that the IOPWSC had been successful in being awarded a FEMA grant for the expansion of the treatment facility at Forest Trails that would allow the IOPWSC to abandon the Wild Dunes facility and consolidated into one facility.

She added that the IOPWSC had hired a rate consultant to investigate the impact fees being charged and the consultant has made recommendations. Mr. Kerr explained that in the joint workshop between City Council and the IOPWSC it was his impression that the sewer staff believed that the rate consultant would be able to analyze how to raise funds to expand the system and provide recommendations. Ms. Tucker answered that this would be a separate project from the work that has been done and she believed that the master plan update work that is underway would need to be complete before this study is done.

Ms. Tucker explained that the Commission members had received a draft of the MOU and she explained that she knew that the current draft was missing elements, including an arbitration clause, a need for periodic meetings, and progress updates, and a transition in the draft out of background information and into actual goals and strategies.

Mr. Ferencz explained that he agreed that in its current form the MOU primarily provides background information and he thought that for the document to be useful, it should include specific tasks that the group will work together on to achieve the goals. He added that he thought the document should include language about the groups being more transparent with each other and sharing information with one another.

Mr. Mills asked if this MOU would be a final product or would it need continued work into the future to be successful. He asked what would happen with the MOU once Ms. Tucker retired. Ms. Tucker answered that the process of expanding sewer would go on for many years and she thought that the City Hall staff, once they were back up to full employment, would continue work on the project. She indicated that if she were requested to continue to work on the project after her retirement, she would be available.

Mr. DiGangi explained that he thought it would be useful if the structure that exists between the City and the IOPWSC was explained in the MOU. He indicated that he was still unclear on whether the IOPWCS could initiate major water and sewer projects without the City and vice-versa or if one group took any direction from the other on the issues. Mr. Tucker answered that she could add some details, but in short the two operate independently, with the exception that the IOPWSC cannot be issued a bond without prior approval by the City.

Ms. Tucker indicated that she felt like she had good input to update the MOU and she would plan on meeting with the IOPWSC staff on the matter to get their input, and she would then like to provide a new draft at the next Planning Commission meeting.

The Planning Commission agreed that they would meet again at their September 12th meeting.

DISCUSSION OF STORMWATER REQUEST FOR PROPOSALS

Mr. Kerr explained that earlier in the day, the City held a mandatory meeting with all companies interested in submitting proposals for this work and he felt the turnout was good. He said that there were a lot of questions about the fact that the City had indicated that the future improvements should be designed to a level that would have kept structures within the associated drainage basins from being damaged by Hurricane Joaquin. He said that the engineers expressed concerns that this would imply that the design should be to a point of being able to deal with a 1,000-year storm, which was a very high objective and would result in a costly project.

The Commission discussed how to plan to develop a recommendation for City Council. It was generally agreed that the Commission would review the proposals at the regular September 12th meeting, and then try to cull the respondents down to the top two or three at a special September 28th meeting at 10am, and then interview the top respondents at their October 10th meeting at 4:30, with a goal of having a recommendation ready for the appropriate committee of City Council prior to the November committee meetings, allowing for an award of a contract at the full Council meeting on November 27th.

Mr. Mills asked which Committee of City Council should review the Planning Commission's recommendation. Mr. Kerr indicated that he would ask the City Hall staff and provide feedback on this question at the next meeting.

NEW BUSINESS- DISCUSSION OF PERVIOUS CONCRETE

Mr. Ferencz indicated that he asked to have this topic put on the agenda at the request of several Council members. He indicated that he has learned that pervious concrete is superior in performance to pervious pavers because the entire surface is pervious, and it requires less maintenance. He indicated that it has been reported to him that the cost is approximately twice that of regular concrete.

Mr. Kerr explained that the City already acknowledges pervious concrete is a viable option to receive pervious credit in terms of lot coverage and he asked if it was his intention to require it in all hardscape applications. Mr. Ferencz answered yes, that it be considered in all hardscaping applications.

Mr. Denton explained that he felt that if this was required without reducing the allowable lot coverage on a lot, this could lead to an unintended consequence of larger houses covering more of the lot than they already do. He said that typically in the design of a house, the house is scaled to a point where some area is left for other impervious surfaces. If the other surfaces are all pervious, and the limit is still 40%, owners will see this as an opportunity to cover more lot with house.

Mr. Kerr reminded the Commission that they had just finalized a recommendation to City Council on the issue of lot coverage, including new guidance on what qualifies as pervious as well as requiring a drainage plan on all new houses and projects larger than 650 square feet.

ADJOURNMENT

With there being no further business, the meeting was adjourned at 6:20 p.m.
Respectfully submitted, Richard Ferencz, Chairman

STATE OF SOUTH CAROLINA	)	MEMORANDUM OF UNDERSTANDING
	)	
COUNTY OF CHARLESTON	)	

This Memorandum of Understanding ("MOU") is entered by and between the City of Isle of Palms ("City") and the Commissioners of Public Works of the City of Isle of Palms doing business as the IOP WSC, ("WSC"). The City of Isle of Palms is an incorporated municipality (1953) with a nine member elected body in a Council form of Government. The Isle of Palms Water and Sewer Commission is a water and wastewater utility with a five member elected body. Both public entities serve the same citizen customers in the same geographic area, but operate separately except that in order for the Isle of Palms Water and Sewer Commission to borrow money, bond issues must be approved, via ordinance, by the City of Isle of Palms City Council.

PREAMBLE

BACKGROUND OF MOU

1. In 2015, the Isle of Palms Planning Commission received a request from City Council to investigate ways to expand the Commissioners of Public Works of the City of Isle of Palms public wastewater collection and treatment system. This work was accomplished over a series of months culminating in a presentation to City Council on August 22, 2017 where the Planning Commission presented suggestions regarding possible courses of action to facilitate that effort and goal.
2. In October 4, 2015, October of 2016 and again in September of 2017, the City experienced flooding associated with three extreme weather events. During two of these events, the flooding caused individual septic systems to malfunction, rendered homes uninhabitable, and created unsanitary conditions in flood waters.

3. Following these weather events, two citizen forums were organized to discuss citizen priorities for Council action. The citizens identified, among other items, drainage and extension of the public sewer as priorities. The City and WSC met on March 21, 2018, to discuss various forms of wastewater treatment to address these citizen concerns. The City and WSC have jointly expressed an interest in investigating the requirements necessary to provide sewer service to the areas of the Isle of Palms not presently receiving sewer service from the WSC.

~~3.~~ CURRENT EVENTS 2018

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4. The City of Isle of Palms budgeted and adopted $50,000 in the Fiscal Year 2019 budget to facilitate its ability to fund the updated cost estimates for expansion of the public sewer system.

5. On May 30, 2018, the City and WSC entered into an initial Memorandum of Understanding agreeing to a 50:50 cost share of a $38,600 study to update the island's sewer master plan.

6. Thomas and Hutton was engaged to perform the tasks detailed in the initial MOU based on their history and their participation in the original sewer master plan for WSC in the 90's.

7. The City of Isle of Palms and WSC further agree that the proliferation of non-traditional treatment systems, like grinder pump systems, are less than ideal, unsightly, rarely have alternative power supplies making them non-functional during periods of power outages.

8. WSC has previously taken the proactive position in their agreements with customers having grinder pump systems that when public sewer becomes available, those

customers are required to abandon the grinder pump systems and connect to the public sewer at their expense.

9. WSC has engaged the services of a rate consultant who has completed a study on impact fee increases, and this modeling will facilitate gathering of needed rate and cost information for future extensions.

~~9.~~ FUTURE EXPECTATIONS

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10. The City and WSC commit to a goal to improve the barrier island environment, increase sustainability and improve property values. This MOU is intended to provide a road map of working together to so t~~T~~he parties to this agreement shall~~plan to~~ achieve this goal by systematically expanding WSC's public sewer system in a planned, safe sequence that is not only economically viable but also maximizes grant resources to mitigate costs to the customers.

11. The City and WSC agree that they are providing public service to the same customers.

~~11.~~12. The City and WSC set a target of realizing this goal for their citizen customers by no later than ten (10) years from the date of this agreement.

~~12.~~13. This work and analysis will comprise data provided by Thomas & Hutton, as well as information on flood complaints; repetitive losses from flooding; the concentration of grinder pumps, new grinders and grinder requests; malfunctioning septic tanks; requests for sewer service; areas lacking service; and downstream improvements/impacts.

~~13.~~14. The City and WSC agree to support one another in the pursuit of available grant funding for areas which may qualify. Funding, and issues related to proximity to the treatment

plant, may also become a determining factor in the timing and location of phases towards accomplishing the goal.

~~14.~~15. When necessary, the City and the WSC shall develop any required ordinances as a means of facilitating individual homeowners connecting their properties to the system, once available, without undue financial hardship to the homeowners. Factors to be considered might be length of home ownership, owner occupancy and Homestead Exemption. Properties with alternative grinder systems, by previous agreement with the Commission, must connect to the system when available.

16. The City and WSC commit to understanding that transparency and sharing of documentation, while still protecting sensitive information and not risking vulnerabilities, serves both entities in service to citizen customers.

~~15.~~17. The City and WSC will improve~~ving~~ and facilitate~~ting~~ communication during the budgetary process and planning process, continuing ~~to continue~~ to create awareness of the stated goals, ~~and~~will share reports, and work to~~to~~ coordinate projects for~~and~~ possible cost saving opportunities created by economies of scale.

18. The City and WSC commit to maximizing grant sources and identifying potential sources of funds in accordance with the attached draft funding plan, to support and facilitate the necessary upgrades to accommodate the connection of all individual systems to the City System.

~~16.~~19. Represented fully and inclusively, the City and the WSC shall acknowledge the need to trust that both are moving in the same direction with the same goal to serve the same citizen customers and so will participate together in meetings and, at least, annually

review the goals, performance and accomplishments of this Memorandum of Understanding.

NOW, therefore, the City and WSC agree that it is the intent of this Memorandum of Understanding to formalize their agreement to cooperate in this endeavor and to the terms of this MOU and the City requests WSC to sign this Memorandum of Understanding and proceed as diligently as possible with achieving the overall goal by the target ten-year deadline.

In Witness Whereof, the parties hereto have duly approved this MOU and their respective representatives have duly signed, sealed, and delivered this MOU as of the dates indicated by each parties' signature.

CITY OF ISLE OF PALMS

Date: _____ By: _____

Mayor, City of Isle of Palms

IOP WSC

Date: _____ By: _____

Dana Love, Chair

City of Isle of Palms
Isle of Palms Water and Sewer Commission

Goal: The City of Isle of Palms and Isle of Palms Water and Sewer Commission have agreed that it is a goal to have 100% of structures, within the service area of the Isle of Palms Water and Sewer Commission, to be connected to the public sanitary sewer system. As of 2018, only approximately 1/3rd of the island's structures have public sewer service. The remaining 2/3rds have either individual septic systems or grinder pump systems.

Identified Grant Funding Sources

Federal: U.S. Department of Commerce, Economic Development Administration (contemplates one application in service areas adjacent to high concentration of tourist)

Federal/State: Federal Emergency Management Agency, Pre-Disaster Mitigation Program Hazard Mitigation Grant Program (contemplates one application in areas which are the most flood prone)

Federal/County: Department of Housing and Urban Development Urban Entitlement, Administered by Charleston County. (contemplates applications for identified, qualifying elderly or handicap citizens to cover expenses associated with connection of their home plumbing to the system)

State: South Carolina Rural Infrastructure Authority (contemplates a favorable track record with RIA and an 18 month grant construction period, possibly a new service area for each application encompassing approximately four different areas which might span from 2018-2026. RIA requires a grant to be complete before submitting a new application; however, the City and the Commission may each have an application, or they may submit a joint application)

Private: Kresge Foundation
Joanna Foundation
State Farm Foundation

Other

U.S. Department of Commerce, Economic Development Administration (EDA)

In April of 2018, a notice of funding opportunity was issued by EDA for Disaster Supplemental Funds related to the many disasters that occurred in recent years. This funding is for **$587M** in grants to assist communities in TX, LA, FL, GA, **SC**, PR, & VI. These funds are available until they are all spent. Regionally, the Atlanta office, which serves SC, was allocated **$147,362,000** of the $587M.

Eligibility: Recovery projects such as rebuilding damaged infrastructure/construction projects, capitalizing revolving loan funds to assist companies impacted by disaster, **disaster resilience activities,** other projects eligible for support under the Economic Adjustment Assistance program so long as assistance is related to disaster recovery.

Requirements: Projects must have a nexus to investment priorities which are recovery and resilience, critical infrastructure, workforce development and manufacturing, exports and foreign direct investments. And the project must have a nexus with disaster recovery and resilience. Project should tie to an economic study or analysis like a County-wide water and sewer analysis. The following document or CEDS identifies elements needed for economic resiliency and EDA projects should be consistent with this document:
https://bcdcog.com/wp-content/uploads/2016/12/BCD_CEDS_Final.pdf
Note: Information in the document in this link speaks to the tourism industry and lack of adequate infrastructure.

Grant pays for: Up to 50% of the scope of work or approved project cost with no other federal grant involved. Can be increased to 80% or 100%, reviewed on a case-by-case basis by EDA.

Deadline: None, applications accepted on a rolling basis until funds are expended.

Contact: Robin Cooley
Economic Development Representative
US Department of Commerce
Economic Development Administration
1835 Assembly Street, Suite 1075
Columbia, SC 29201
Phone: 803-253-3640
Fax: 803-253-3642
rcooley@eda.gov
EDA's website: www.eda.gov

Federal Emergency Management Agency, Pre-Disaster Mitigation Program (FEMA PDM)*

On August 21, 2018, FEMA released the Notice of Funding Opportunity for the 2018 Pre-Disaster Mitigation Program (PDM). This funding is a national competition, so any project submitted must successfully compete against other projects submitted from all over the United States. (Note: The City of Isle of Palms and the Isle of Palms Water and Sewer Commission successfully received funding under this program several years after Hurricane Hugo.) The funding is for $150M in grants spread among all 50 states and territories. PDM grants are awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

Eligibility: Government entities, Special Purpose Districts and certain non-profits are eligible to apply for projects which mitigate disasters.

Requirements: Projects must implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future flood hazards. Projects should reduce reliance on federal intervention in future disasters. The intent of this program is to reduce overall risk to people and property, while also minimizing the cost of disaster recovery. Funding is available from the application period and ends no later than 36 months from the date of application (funding) selection. Projects must demonstrate success under FEMA's benefit cost analysis which is a prescribed formula provided to the applicants.

Grant pays for: 75% of cost not to exceed a federal share of $4,000,000.

Deadline: Funding opens October 1, 2018 and applications may be submitted from October 1st to the final deadline for submission of 1.17.2019

Contact: Charlotte C. Foster
Mitigation Specialist
South Carolina Emergency Management
2779 Fish Hatchery Road
West Columbia, SC 29172
Desk: 803-737-8592
Mobile: 803-394-2943
Fax: 803-737-8570
Email: cfoster@emd.sc.gov

Alternative Contact: Allen Fountain
afountain@emd.sc.gov
803-413-5242

*There are three hazard mitigation related programs—Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA). Since Isle of Palms Water and Sewer Commission has already won an active HMGP grant, focus in this analysis is on the PDM program. FMA's focuses mostly on relocating flood prone structures to more disaster resistant areas.

Department of Housing and Urban Development (HUD) Urban Entitlement, Funding Grant Administered by Charleston County

In approximately December or early January each year, Charleston County publicly notices the availability of funds under this program. These are funds appropriated by Congress and then allocated to the States and administered by Charleston County. Information was not immediately available on the amount of funds which Charleston County receives each year; however, funds may be used to administer the program as well as to make grants for eligible activities. Funds are divided into several separate categories. By way of example, using prior years as a guide, it is expected that Charleston County will receive $1.6 million in CDBG funds, $575,000 in home funds and $140,000 in emergency solutions grant

Eligibility: Local governments within Charleston County, community, neighborhood, faith-based and non-profits engaged in public service whose proposed projects meet the goals outlined in Charleston County's Consolidated Plan (PY2016 – PY 2020) are eligible.

Requirements: Generally speaking, these programs must benefit low to moderate income, handicap or elderly persons. The requirement must be met utilizing a pre-screening to conclude eligibility. The City of Isle of Palms has twice received funding for a couple of projects using these funds for a portion of the cost of a project: a portion of the cost to construct the **handicap** ramp at 21st Avenue and a portion of the cost to air condition the gym at the Rec because it was used for meetings of the Keenagers, an older population of island residents who meet regularly at the Rec. Note: this grant was awarded prior to the Rec Expansion when the gym was the only meeting space available.

Grant pays for: Typically, no more than 75% of the cost of eligible projects. Grants range from $65-99,000 under the CDBG program and in the $6,000/eligible applicant for the well upgrade/septic upgrade/connection to existing lines program.

Deadline: Funding for the CDGB program is accepted early in the year and awards generally in August or September. For the well, septic, connection program, application acceptance--one may apply anytime.

Contact: Anna E. Eskridge, Ph.D.
Community Development Program Manager
Charleston County
Phone: 843.202.6986
Email: aeskridge@charlestoncounty.org

South Carolina Rural Infrastructure Authority (RIA)

The South Carolina Rural Infrastructure Authority operates both grant and loan programs which may be used for water, wastewater and drainage. Grants are for basic infrastructure or Economic Development Infrastructure and information disseminated for FY18 showed $25,000,000 in funds available. The purpose of the authority is, in part, to close the gap in financial resources for infrastructure improvements. Revolving loan funds typically involve larger, more comprehensive projects. The Authority works to increase community sustainability by helping to maintain reliable and affordable infrastructure, improve the quality of life by addressing public health, environmental and regulatory concerns and create opportunities for economic impact by building the infrastructure capacity necessary to support economic development.

Eligibility: Local governments, special purpose and public service districts, and public works commissions are eligible applicants. For the Isle of Palms, both the City and the Isle of Palms Water and Sewer Commission may be applicants for funds or the two entities might submit a joint application. Eligible activities include upgrades, improvements or extensions of water, sewer infrastructure or storm water drainage.

Requirements: Basic infrastructure projects must meet certain priorities.

- Projects that address US Environmental Protection Agency (EPA) or SC Department of Health and Environmental Control (DHEC) consent orders or unsatisfactory ratings related to public health or environmental quality or emergency projects that will resolve an imminent public health or environmental threat that has become critical in the past six months.
- Projects that address system components identified in DHEC sanitary surveys or compliance evaluation inspections as needing improvement or that have resulted in frequent violations of DHEC water quality standards.
- Projects that improve existing infrastructure that has reached the end of its useful life or is in severely deteriorating condition and negatively impacting the system.
- Other system enhancements that significantly impact system capacity.

Grant pays for: Up to $500,000 of the construction cost. Minimum match requirement of 25% of construction. Applicant is responsible for all soft cost like engineering.

Deadline: There are two funding cycles, one in the fall and one in the Spring. The fall funding cycle for 2018 had a deadline of September 10th. The Spring funding deadline is March 11, 2019.

Contact: Bonnie Ammons or
Jackie Calvi Mack, Senior Program Manager
jmack@ria.sc.gov
1201 Main Street, Suite 1600
Columbia, SC 29201
803 737 0390

Kresge Foundation

Expanding opportunities in Cities: Focus from their webpage: "Strengthening a community's resilience requires: Reducing the greenhouse gas emissions that drive climate change; Planning for the effects of climate change that are underway or anticipated; and Fostering social cohesion and inclusion."

Kresge's website indicates that communities that address climate change directly will be better prepared for the new challenges and uncertainties it introduces. By explicitly factoring climate change into decisions about infrastructure investments, land-use, building codes, public health, and other urban planning issues, urban leaders can make their communities stronger, more equitable and more resilient. To Kresge, climate resilience means the capacity not just to withstand stresses and shocks but also to prosper under a wide range of climate-influenced circumstances.

Eligibility: Kresge might be a source of funding for keeping the work of the Memorandum of Understanding (MOU) going since the MOU represents a collaborative effort between two public entities to be better prepared for the future of sea level rise associated with climate change. Kresge does not accept unsolicited proposals but iterates on their website that strengthening a community's resilience requires: reducing the greenhouse gas emissions that drive climate change; **Planning** for the effects of climate change that are underway or anticipated; and fostering social cohesion and inclusion.

Requirements: Kresge's work is intended to help urban leaders across the public, private and nonprofit sectors consider a two-part climate question as they make decisions that will shape the form and function of their communities. Funding opportunities are announced via the following:

subscribe to the newsletter, or by following @kresgefdn or @kresgenviro on Twitter.
Environment Program Team

Contact: https://kresge.org/

Joanna Foundation

The Joanna Foundations purpose is to support organizations and programs that strengthen community capacity and enhance individual involvement in achieving a better quality of life. The eligible geographic areas are Berkeley, Charleston and Dorchester Counties and the communities of Joanna and Newberry in South Carolina.

Eligibility: IRS tax exempt status. Applicants must first complete a pre-proposal and then if invited, complete a proposal. The Joanna Foundation makes grants only to organizations qualifying as tax-exempt under the Internal Revenue Code and not classified as private foundations.

Requirements: The Foundation will consider requests for:

- Seed money
- **Special projects**
- Matching funds
- General operations
- Capital campaigns

Grant pays for: Concerns like those mentioned above. Applicants can see to whom grants have been made in the past by reviewing the website. The information provided does not indicate the amount of the funding; however, according to the foundation website, there is no set limit that an organization may request. Most grants made by The Joanna Foundation are in the range of $1,000 to $3,000 for one year. Larger grants in the $5,000 to $10,000 range are less common and grants exceeding $10,000 are exceptional. Multi-year commitments are rare and by invitation only. The Joanna Foundation's total distribution to all grantees averages less than $150,000/year.

Deadline: Pre-proposals accepted three times per year: January 15, April 15 and September 15.

Contact: Margaret P. Schachte
Executive Vice President
The Joanna Foundation
P.O. Box 308
Sullivan's Island, SC 29482-0308
https://joannafoundation.org/

State Farm Foundation

State Farm Foundation's mission is to build safer, stronger and better educated communities across the United States. Information on their website indicates that the focus is on three areas: safety, education, and community development.

Eligibility: The Foundation funds educational institutions, municipal, county, state or federal governmental entities so long as the project is consistent with their focus. Additionally, 501 C (4) Volunteer fire companies and 501 C (6) Chamber of Commerce entities are eligible applicants.

Requirements: The Foundation has both an education and a community development component. Among that which is funded is neighborhood revitalization.

Grant Pays for: $5,000 or more for projects consistent with safety, driver education, **disaster preparedness and disaster recovery.**

Deadline: Applications accepted in the window between September 1, 2018 and October 31st, 2018. Grant decisions communicated in the first quarter of 2019

Contact: https://www.statefarm.com/about-us/community-involvement/community-grants/good-neighbor-citizenship-grants

Other: A sampling of organizations whose missions indicate that there may be some opportunity to interface with the goal of eliminating septic systems and grinder pump systems by extending the Isle of Palms Water and Sewer Commission's public sewer collection system to collect, pump, treat and discharge clean wastewater from the City of Isle of Palms.

Change Happen Foundation
http://changehappens.us/Grantees#

Toyota USA Foundation
https://www.toyota.com/usa/community/grant-guidelines-applications/overview.html#!/how-to-apply

REQUEST FOR PROPOSALS 2018-02

CITY OF ISLE OF PALMS · SC

PHASE 3 DRAINAGE OUTFALL DESIGN & PERMITTING

SEPTEMBER 5 · 2018 · 2PM

THOMAS & HUTTON

682 Johnnie Dodds Blvd., Suite 100 | Mt. Pleasant, SC 29464 | 843.849.0200

WELCOME TO THE
Isle of
Palms

THOMAS & HUTTON
682 JOHNNIE DODDS BOULEVARD, SUITE 100 | POST OFFICE BOX 1522
MT. PLEASANT, SC 29464 | 843.849.0200
WWW.THOMASANDHUTTON.COM

September 5, 2018

Mr. Douglas Kerr
Director of Building and Planning
City of Isle of Palms
1207 Palm Boulevard
Isle of Palms, South Carolina 29451

Re: Request for Proposals 2018-02
Phase 3 Drainage Outfall Design and Permitting

Dear Mr. Kerr:

The City of Isle of Palms has experienced continual flooding problems throughout the Island due to more frequent and intense rainfall events, extremely high "king" tides, sea level rise, a high-water table, and coastal storms, combined with an inadequate stormwater management system. To address ongoing flooding issues, the City is soliciting proposals from engineering consultants to provide services for Phase 3 Drainage Outfall Design and Permitting. Thomas & Hutton has the local, in-house capabilities and staff to perform all services and our team has the expertise, experience, and resources to accomplish this very challenging project within a time frame acceptable to the City.

In considering our proposal, we would like to highlight the following points:

- ✓ **Stormwater Management Expertise** – Whether the issue is poor drainage and flooding, impaired water quality, or developing a complex and long-term stormwater management master plan, Thomas & Hutton has the proven expertise in assessing all types of water resources issues, developing practical solutions, and producing results. We have addressed local drainage issues with municipalities and private land owners, prepared basin-wide, city-wide, and county-wide improvement plans, and have worked on regional and state level water resources management issues. This expertise in all areas of stormwater management (including analysis, modeling, design, permitting, management, etc.) will allow us to develop a design that is ***realistic, comprehensive, and implementable.***

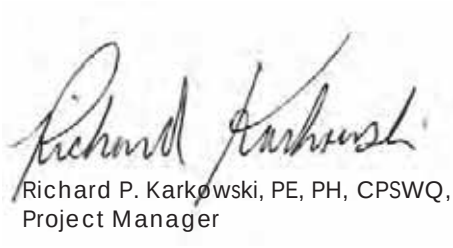
- ✓ **Local and Integrated Experience** – Thomas & Hutton has extensive direct experience in studying, analyzing, and designing stormwater management system improvements. Our team has been involved in numerous similar drainage studies and system assessments resulting in recommended projects that have been successfully implemented. We've recently provided services to address drainage improvements for clients, including City of Charleston, Town of Mount Pleasant, Town of Sullivan's Island, Town of Summerville, Horry County, and Charleston County (including work in the following municipalities - Folly Beach, Isle of Palms, Sullivan's Island, McClellanville, and James Island). We've also worked extensively with many clients on identifying and applying for alternative funding grants. These clients include Charleston County (Main Road Drainage Improvements), City of Lake City (Acline Drainage Improvements), Town of Sullivan's Island (Drainage Improvements), and the Isle of Palms Water and Sewer Commission (Forest Trails WWTP Floodproofing). This past experience with other jurisdictions and with project funding (among other experience) will allow the City of Isle of Palms to confidently **rely on Thomas & Hutton for all services that may be necessary for this project.**

- ✓ **Depth of Resources** – Thomas & Hutton has the local staff and resources to address the project's needs and schedule. We can successfully address this project in a systematic approach. In addition to the resources identified in this proposal, Thomas & Hutton has over 270 employees competent in the areas of civil, environmental, structural, and marine engineering; land surveying; land planning; landscape architecture; Geographic Information Systems (GIS); and construction administration that can be called upon - if needed. Our resources will be dedicated to the City of Isle of Palms' needs and to the completion of the project in a ***professional, efficient, and timely manner***.

Thomas & Hutton's team of highly qualified and experienced personnel are eager to work on this project. **We are committed to exceeding your expectations of quality and service.** We welcome the opportunity to discuss this important project in greater detail and thank you for your careful consideration of our qualifications and proposal. Tony Woody will be the Principal-in-Charge of this project and is a Vice President of Thomas & Hutton. Tony is authorized to make representations on behalf of Thomas & Hutton and to bind Thomas & Hutton to a contract with the City. We have identified Rick Karkowski as our Project Manager. Should you have any questions or concerns, Rick can be reached at (843)725-5280 or karkowski.r@thomasandhutton.com.

Very Truly Yours,

THOMAS & HUTTON



Richard P. Karkowski, PE, PH, CPSWQ, D.WRE
Project Manager

Tony Woody, PE
Principal-in-Charge/Vice President

EXECUTIVE SUMMARY

INTRODUCTION

Thomas & Hutton understands the purpose of the City of Isle of Palms' Phase 3 Drainage Outfall Design and Permitting project is to study, design, permit, and construct improved outfall systems at three locations including 30th Avenue, Forest Trails, and 41st Avenue. These outfalls are generally to start on the south side of Waterway Boulevard and extend to the Intracoastal Waterway. We understand that the City has design goals to be considered in the development of the project. We further understand that the City is seeking assistance in developing a phasing plan for the implementation of the outfall projects, as well as identifying potential funding sources.

We are very familiar with the three project sites and have an extensive background of working on the Isle of Palms and in the area of the outfalls. We have extensive experience in implementing projects of similar complexity with similar design goals and site constraints. To prepare for this proposal, we visited the outfall sites and contributing basins, assessed data from our in-house GIS library, and prepared individual outfall exhibits and basin delineations.

WORK HISTORY AND REFERENCES

In addition to our extensive drainage improvement project experience, our project team has the necessary skills and background to provide all the associated services that may be needed to successfully implement this project. The Thomas & Hutton team has successfully implemented similarly sized projects for other jurisdictions in the area. Most of the projects have been completed for long-term and repeat clients, including the City of Charleston, the Town of Mount Pleasant, and Charleston County.

PROJECT TEAM

Our project team consists of a tight-knit group of professionals based in our Charleston office, which is less than nine miles from City Hall and the project outfall sites. This team is composed of stormwater management specialists from our Water Resources Department, as well as many others to support this effort. We have dedicated to your project a team that has successfully accomplished similar drainage improvement projects in the local area. Our team will bring that experience to bear on your project.

SUB-CONSULTANTS

We have identified needing assistance from two sub-consultants to complete this project successfully: Terracon and Arcadis. Terracon will provide geotechnical investigation and engineering services, wetland/critical area permitting assistance, and grant funding advising services. Arcadis will assist in providing grant funding advising services. Thomas & Hutton has worked closely with both sub-consultants on similar drainage improvement projects where similar project services were provided by the sub-consultants.

PROJECT APPROACH

Based on the City's Request for Proposals and our significant past experience with similar drainage improvement projects, we have provided a detail project approach to meet your projects needs and accomplish the City's goals. We believe this project approach can be implemented to efficiently and effectively study, design, permit, and construct the three outfall improvements. We also believe that we can help the City identify grant opportunities and successfully develop a phasing plan based on these grants and City's other financial resources. For the comprehensive services that the Thomas & Hutton team has proposed to provide the City, we have developed a project budget that is inclusive of all the anticipated services for the project.

CLOSING

As outlined in our cover letter, we believe the Thomas & Hutton team is the best choice for the City of Isle of Palms for the Phase 3 Drainage Outfall Design and Permitting project for the following simple reasons:

- Stormwater Management Expertise
- Local and Integrated Experience
- Depth of Resources


Isle of
Palms

QUALIFICATIONS

In 1946, former US Army Corps of Engineers Officers, Hue Thomas and Joe Hutton, joined forces and opened an engineering firm in the historic city of Savannah, Georgia. Our founders envisioned tremendous opportunities in providing professional consulting services to municipalities in the region, as well as private entities seeking to develop in the area. Today, **THOMAS & HUTTON** stands as one of the most well respected and established consulting and engineering firms in the region. With 11 offices in the southeast, more than 270 staff, and 72 years of continuous experience, Thomas & Hutton is confident in having the technology and associated technical resources available to provide the necessary services for the City of Isle of Palm's Phase 3 Drainage Outfall Design and Permitting Project.

Thomas & Hutton designs infrastructure with the future in mind. Our talented staff are passionate and stand firmly behind designing facilities that ultimately create the essential framework of healthy and thriving communities. To provide quality professional services and project support to our clients, our technical competencies include stormwater, municipal services, civil, transportation, environmental, structural and marine engineering, land planning, landscape architecture, land surveying, Geographic Information Systems (GIS), and construction administration. We are licensed to practice engineering and land surveying in South Carolina (COA 00285). We provide knowledge and expertise in working in, and with, the City of Isle of Palms and have tremendous experience with the various permitting and regulatory requirements. Our clients find that our strong relationships with local, state, and federal agencies are very helpful to expedite project approvals.

FIRM LOCATION

We offer the City of Isle of Palms a strong local presence and provide cost-effective solutions, based on our knowledge and experience on the Isle of Palms and the surrounding areas.

We have a wealth of experience in all aspects of project management, quality assurance, and interdisciplinary technical expertise across all tasks required for this contract. Service to the City will be provided from our Mount Pleasant office, located approximately nine miles from the City offices. We are in close proximity and can be present at the job site within 30 minutes. Nearly all staff proposed for this project are located in our local Mount Pleasant office.

All members identified on the Thomas & Hutton team are available to begin work immediately upon notice to proceed for any of the project tasks. It is important to note our team philosophy that once a team member is assigned to a project, they are dedicated to that particular project until completed. Our team believes this as a core

STORMWATER CONSULTING SERVICES

The Thomas & Hutton team has an extensive history of performing stormwater management services for clients throughout the southeastern United States. Our team provides comprehensive expertise and can provide the City of Isle of Palms a "full service" experience for this project. Through the collaborative experience of our team members, we can provide the City the following services:

MUNICIPAL/COUNTY STORMWATER SERVICES

Stormwater Capital Improvement Projects
Stormwater Inventory/GIS Database Preparation
Regional Stormwater BMP Design
Canal/Riverine Improvements
Storm Drainage System Remediation Rehabilitation
Storm Drainage System Maintenance Planning
Stormwater Master Plans
MS4 Consulting

STUDIES/MODELING

Feasibility Studies
Watershed Management Planning
Hydrologic, Hydraulic, and Water Quality Modeling
Water Quality Studies and Sampling
Site Specific Stormwater Studies
Sour Analysis
Riverine and Coastal Studies

DESIGN

Geotechnical, Groundwater, and Infiltration Evaluation
Stormwater Master Plans
Stormwater Capital Improvement Construction Plans
Structural Design
Roadway Design
Traditional Pavement/Pervious Pavement
Regional Best Management Practices
Canal/Riverine Improvements
Stormwater System Remediation/Rehabilitation
Storm Drainage System Maintenance Planning
Permitting Assistance

CONSTRUCTION

Bid Assistance
Construction Observation
SWPPP Book Preparation
Project Closeout

FEMA RELATED SERVICES

Base Flood Elevation Determination
Hydrologic & Hydraulic Analysis
Community Consulting
GIS Integrated FEMA Analysis and Mapping
Letter of Map Revision/Letter of Map Amendments
Public Assistance/HMGP/Other Funding Assistance

principle in our vision of client care standards. The project team assembled is dedicated to meeting the needs of the City of Isle of Palms. Thomas & Hutton's Mount Pleasant office is staffed with over 80 employees that are always easily accessible. Our dedicated project team has an abundance of employees and technical resources available to meet client demands, schedules, and budgets. Employees and resources can be brought in, as necessary, to complete the required tasks, should the situation warrant. As our team has succeeded in the past, we will assure that project tasks are efficiently completed according to the project scope, schedule, and budget.

The Thomas & Hutton team works closely with our clients maintaining open and consistent lines of communication to ensure project deliverables, schedules, and budgets are clear from the commencement of the project. Our firm keeps our clients informed of project progress by sending periodically updated plans throughout the design process.

STORMWATER MANAGEMENT: GENERAL OVERVIEW OF SERVICES

Thomas & Hutton's team of surveyors, engineers, hydrologists, and GIS specialists provide state-of-the-art technological services for small, medium, and large-scale projects. We utilize GIS data, analytical tools, and spatiotemporal reasoning to assist clients throughout all phases of a project. Through careful master planning, Thomas & Hutton can develop automated processes to establish precise, up-to-date maps and data for the planning and design phases.

DRAINAGE AND WATERSHED STUDIES

Thomas & Hutton has conducted literally hundreds of drainage and watershed studies. The studies have been conducted for numerous public sector clients including all branches of government: municipal, county, state, and federal, as well as for private sector clients. These studies have been conducted for various purposes including:

- Stormwater Master Planning
- Capital Improvement Project Design
- Pre- and Post-Development Analysis
- Infiltration-Based Drainage Systems
- Stormwater System Capacity Upgrades
- Flood Control
- Base Flood Elevation Determination and Floodplain Mapping
- Water Quality Improvement

One of the principal components of drainage and watershed studies is management and integration of large quantities of geography-based data. Thomas & Hutton has integrated Geographic Information Systems (GIS) data in our drainage and watershed studies and has leveraged the GIS data for our clients. This also enables Thomas & Hutton to provide the data back to the client in an easily accessible format.

Realizing access to up-to-date and detailed geographic data is crucial to our ability to react quickly and comprehensively to our clients' requests and project needs, Thomas & Hutton maintains and constantly updates a geographical database of information that can be deployed at a moment's notice. Thomas & Hutton is committed to employing available data to the fullest extent possible and integrating the latest technologies as needed.

HYDROLOGIC/HYDRAULIC ANALYSIS AND DESIGN

Thomas & Hutton has extensive experience in hydrologic and hydraulic modeling and design. Our knowledge and experience in developing and applying models extend from simple site-scale analyses to comprehensive and complex basin-wide watershed analyses. The following is a partial list of models utilized by Thomas & Hutton on recent projects:

- Interconnected Pond Routing (ICPR), Ver. 3 and 4
- DHI MIKE 11
- XP-SWMM
- HEC-1/HEC-2
- HEC-HMS/HEC-RAS
- Sanitary and Storm Analysis (SSA)
- Hydra Flow
- HY-8 Culvert Analysis
- SRH2D

Whether a large-scale watershed analysis or a small site-scale design analysis, Thomas & Hutton knows that it is not the model technology that makes a project successful, it is the people and their local experience and expertise that make a project successful. Thomas & Hutton has exhibited a long-term commitment to being a leader in the Lowcountry's stormwater management. Our extensive, practical experience in the area of hydrologic and hydraulic analysis and design can assist the City in meeting the challenges of maintaining and operating an effective stormwater management system.

CULVERT ANALYSIS AND DESIGN

Culvert analysis and design is a challenging design category in low-lying areas with minimal topographic relief. With our

numerous water bodies and wetland systems and the need to cross them with roads, the use of culverts (and many times, the need to improve them) is extensive. Thomas & Hutton has extensive capabilities in the design and analysis of culverts and the special attention needed for this type of infrastructure.

CLOSED SYSTEM ANALYSIS AND DESIGN

Closed system analysis customarily is conducted utilizing several different hydrologic methods for determining peak runoff rates and the Manning's equation (or other similar equations) for calculating the hydraulic grade line (HGL) of the flow in the closed system. In addition, the analysis checks for inlet and outlet pipe control situations. Inlet (i.e. grate or hood) capacity must also be addressed as part of the closed system analysis or design.

Thomas & Hutton utilizes specially developed spreadsheets that partially automate the analysis and design of closed systems and can easily be communicated with others. For larger and more complex analyses and designs, Thomas & Hutton implements more advanced software (i.e. StormCAD) that integrates the peak flow analysis with the design/analysis of the pipes and inlets.

SPREAD ANALYSIS AND RECOMMENDATIONS

Similar to closed systems, several different hydrologic methods can be employed to analyze and design for gutter spread. The Manning's flow equation (or other similar equations) is used to determine the depth of flow in a gutter (or other) section. Gutter spread analyses also address appropriate sizing for inlet capacity.

Thomas & Hutton utilizes specially developed spreadsheets that partially automate the analysis of gutter spread and can easily communicate the analysis and design to others. Similarly, for larger and more complex analyses and designs, we implement more advanced software (i.e. StormCAD).

WATER QUALITY ANALYSIS/BMP DESIGN

Thomas & Hutton is a leader in stormwater engineering and has provided real solutions for water quality problems throughout the coastal areas of South Carolina, Georgia, and North Carolina. With the ever-increasing strain of stormwater run-off on the tidally-influenced receiving waters of the area, Thomas & Hutton is uniquely qualified to provide our practical knowledge of addressing stormwater quality problems.

SCOUR ANALYSIS AND RECOMMENDATIONS

Whether designing scour protection for a simple pipe outfall or protecting a bridge from failure due to scour, Thomas & Hutton employs a deliberate and site-based approach to the analysis of design. Based on various criteria (costs, size, risk of damage from failure, etc.), Thomas & Hutton can select and recommend the proper approach and design criteria for use in preventing or mitigating the effects of scour. For smaller issues, design nomographs readily available from local design manuals or references can be applied. For more complex situations (i.e. bridge scour), the procedures and recommendations of HEC-23 "Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance" may be more appropriate.

PUMP ANALYSIS AND DESIGN

Thomas & Hutton has extensive experience and capabilities in analyzing and designing stormwater pumping systems. We have completed several large-scale stormwater pumping station projects in the past. Our services have included watershed analysis, site selection and design, pump station design and phasing plans, pump selection and bidding, and start up. We were previously selected by the City of Charleston to analyze and design improvements for a watershed served by an existing undersized pump station. The project included the cost analysis of a new pump station and an alternative gravity outfall system.

ROADWAY DESIGN

The Thomas & Hutton team has the skills and knowledge to accommodate any potential roadway design needs necessary for this project. Our experience covers a wide range of project types including interstates, interchanges, roundabouts, widenings, intersection designs, and signal designs. We have experts available to handle drainage issues, traffic safety issues, construction issues, or any other concerns that may arise during the design process. Our engineers are well versed in all the local, state, and federal guidelines, the steps needed to complete a set of roadway design plans, and the submittals necessary to obtain the network.

CIVIL ENGINEERING

Thomas & Hutton is a leader in providing civil engineering solutions for a variety of projects throughout South Carolina. We understand the special needs of this sensitive area and evaluate the individual needs of each project carefully. Our engineers work closely with our surveyors to understand the existing conditions of the project, such as drainage and other

utility systems. Once a survey has been completed for a site, our engineers put "boots to the ground" by walking the site with a survey in hand to further their understanding of the existing conditions. One particular aspect of projects in coastal areas that requires careful consideration is stormwater control. We work closely with SCDHEC and other regulatory agencies to provide solutions to the drainage problems commonly found in low-lying areas. In addition to storm drainage systems for site developments and environmental design, our experience includes grading and paving design for roads and parking lots, studies and surveying, database preparation, concept development, preliminary plans, coordination of environmental consultants, assistance with federal, state, and local permitting, bridges, utilities, and construction administration.

EROSION AND SEDIMENT CONTROL DESIGN

Thomas & Hutton has developed an extensive erosion and sediment control (E&SC) design process (with standard symbols and details) based on the procedures and details recommended by South Carolina Department of Health and Environmental Control – Bureau of Water standards. The E&SC plans are easily communicated to the various review agencies and (if properly installed and maintained) can be demonstrated to meet state required standards.

PERMITTING & GRANT/FUNDING EXPERIENCE

Thomas & Hutton has developed and maintains strong professional relationships with representatives from various state resource agencies, the Corps of Engineers, and local, state, and federal regulatory agencies within our service region. These established relationships ensure timely discovery and resolution of any project issues identified during the course of a project and aid in expediting the permitting process.

We have also worked with multiple funding sources such as FEMA Mitigation Assistance and the Coastal Incentive Grants (CIG), which is a competitive pass-through sub-grant program made possible by a grant to DNR from the National Oceanic and Atmospheric Administration (NOAA). We have assisted multiple communities in accessing these federal funds (along with local matching funds) to develop master plans such as that being requested in this RFP.

EXAMPLE PROJECTS AND REFERENCES

The following five projects are representative of large-scale drainage improvement projects that Thomas & Hutton has provided services for within the last five years. The contact information for a client reference familiar with our work is included at the end of each project description.

OLD VILLAGE WATERSHED STUDY AND DRAINAGE IMPROVEMENTS DESIGN

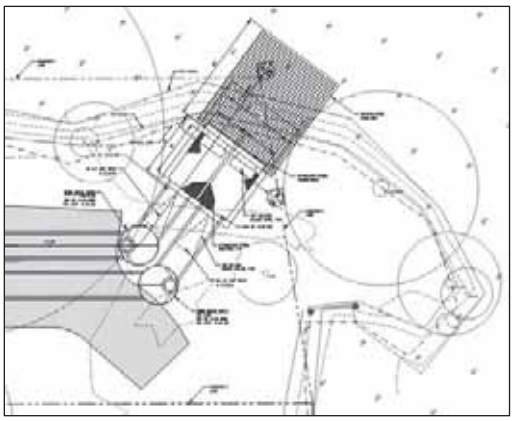
MOUNT PLEASANT, SOUTH CAROLINA

The Town of Mount Pleasant retained **THOMAS & HUTTON** to complete a comprehensive study of the Old Village Watershed. The study was commissioned to study the hydrology and hydraulics of the area, assess and make a formal report on the conditions of the Town's existing drainage system, and recommend infrastructure improvements. The Old Village study area has been identified as part of the Town's stormwater infrastructure in need of critical repair due to system/structural failures, issues related to tidal influences and sea level rise, and a lack of full engineering design at the time it was constructed. Before repairs and improvements to the stormwater infrastructure could be designed and constructed, an assessment of the existing drainage systems and problems needed to be performed.

The study included the following tasks:

- Data collection, including the Town's existing GIS stormwater inventory database, as-built drawings, construction permits, drainage service requests, and FEMA claims information
- Field inspections/survey to confirm/refine basin delineations and the existing stormwater inventory
- Development of a ranking system to prioritize drainage improvement needs
- A stormwater system assessment to determine the existing conditions level of service (LOS) of the stormwater infrastructure
- A future conditions assessment to determine the potential level of service of the stormwater infrastructure based on the estimate of redevelopment in the study area and incorporating researched changes in rainfall data
- Development of existing and future conditions hydrologic/hydraulic models
- Recommendations on drainage improvement scenarios and probable costs for multiple design storm events

As a result of the Old Village watershed study performed by **THOMAS & HUTTON** for the Town of Mount Pleasant, the Town determined that drainage improvements should be undertaken in the two identified highest priority watersheds, Royall Avenue and Edwards Park. Thomas & Hutton was retained by the Town to provide design, survey, permitting, utility relocation, and construction oversight services for the drainage improvement projects. The required improvements in the two watersheds (132 acres and 138 acres, respectively) will include tens of thousands of linear feet of pipe improvements/extensions, improvements related to delayed maintenance (mainly associated with swales and small driveway culverts), new inlet structures, pump station rehabilitation, and outfall improvements to address tidal influences. In addition, an alternate gravity outfall corridor was identified that will divert approximately 3/5 of the contributing area to the existing pump station and allow it to function at the intended design level.



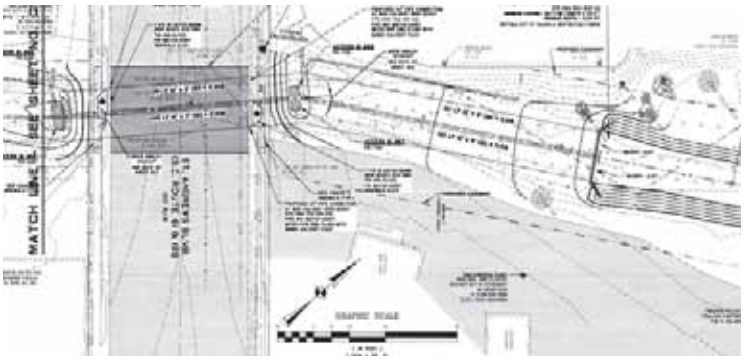
The H&H analysis and calculations will be conducted in conformance with the requirements of the Town, SCDHEC, and SCDOT. The proposed improvements will be refined and adjusted based on the findings of the H&H calculations. The alignment of the proposed improvements may be adjusted based on various factors including noted conflicts, economics, constructability, etc.

Thomas & Hutton is currently providing survey, design, permitting, plans production and other services for the design of the proposed improvements. The proposed improvements for the Royall Avenue and Edwards park basins are currently estimated at $12M.

CLIENT:	Town of Mount Pleasant
CONTACT:	Ken Rhye, 100 Ann Edwards Lane, Mount Pleasant, SC 29464, 843.849.2202, krhye@tompsc.com
COMPLETED:	2017
TEAM:	Richard Karkowski, PE, PH, CPSWQ, D.WRE; Hillary Aton, PE; Elliotte Quinn, PLS; Ken Nagel, PE; Mark Yodice, PE; Jen Hayes, PE, LEED AP, CPM; Bryan Shriver, PE (Terracon); Andy Ruocco, MS (Terracon)

FOREST ACRES DRAINAGE IMPROVEMENTS STUDY AND PHASE 1 DESIGN

CHARLESTON, SOUTH CAROLINA



The City of Charleston is improving the stormwater collection and conveyance system in the Forest Acres and 5th Avenue drainage basins in the West Ashley area of the City. The existing drainage systems in the two drainage basins were typified by undersized channels and road culvert systems. Drainage in the Forest Acres drainage basin is conveyed to an undersized stormwater pump station that outfalls through a limited gravity system in the 5th Avenue drainage basin.

The City retained **THOMAS & HUTTON** to confirm the need for the proposed improvements and design the initial phase of the improvements to increase the basins' outfall capacity. Thomas & Hutton's services included hydrologic and hydraulic modeling, conceptual design, public input coordination, and cost estimating. Based on the analysis of various factors, including drainage and flood control effectiveness, life cycle costs, environmental impacts, and others, Thomas & Hutton recommended that the City implement a gravity drainage option as the Phase 1 improvements for the basins. Thomas & Hutton worked with the City and other stakeholders to provide an effective project, with minimal environmental impact that could be efficiently operated and maintained.

After the findings and recommendations of the Drainage Improvements Study was provided to the City, Thomas & Hutton was retained to provide design, permitting, and bid phase services for the first phase of improvements in the combined Forest Acres/5th Avenue drainage basin. This project includes the survey, design, and permitting of the basin's main outfall system. The proposed Phase 1 improvements include over 2,500 linear feet of box culvert improvements, 2,000 linear feet of channel improvements, and improvements to various secondary systems in the 450-acre watershed

The Phase 1 design project included coordination and permitting with the South Carolina Department of Transportation, South Carolina Health and Environmental Control (including OCRM), and US Army Corps of Engineers. The project also includes the coordination of utility relocations with SCE&G (for gas and overhead power), Charleston Water Systems (for water and sewer), AT&T (for telecommunications), and various other minor utilities (traffic control, cable, etc.).

Thomas & Hutton is currently providing construction administration services for the approximately $10 million construction contract, which reached substantial completion in January 2018 (four months ahead of schedule). Thomas & Hutton also provided public outreach and communication services and coordinated independent laboratory quality assurance/quality control testing, vibration monitoring, and stormwater pollution prevention plan inspections. Thomas & Hutton is currently under contract with the City for design and construction phase services for Phase 2 of the project.

CLIENT:	City of Charleston
CONTACT:	Steven Kirk, 2 George Street, Suite 2100, Charleston, SC 29401, 843.579.7682
COMPLETED:	2012
TEAM:	Richard Karkowski, PE, PH, CPSWQ, D.WRE; Hillary Aton, PE, Elliotte Quinn, PLS; Ken Nagel, PE, Jen Hayes, PE, LEED AP, CPM

OCTOBER 2015 FLOOD DISASTER RECOVERY

CHARLESTON COUNTY, SOUTH CAROLINA

Since the historic flooding event of October 2015 throughout South Carolina, **THOMAS & HUTTON** has been assisting Charleston County in various recovery, restoration, and mitigation efforts. After the event, Charleston County was faced with the daunting task of restoring and repairing an extensive network of roads and drainage channels. Charleston County maintains hundreds of miles of drainage canals, stormwater ditches, and unpaved roadways, including canals and roads that are listed on the national register of historic places. Charleston County also assisted several municipalities within the County with recovery, restoration, and mitigation efforts.

Initially, Thomas & Hutton worked as a sub-consultant to the disaster recovery specialist, Rostan Solutions, LLC (Rostan). Rostan, with Thomas & Hutton's assistance, is coordinating with the Federal Emergency Management Agency (FEMA) and South Carolina's Emergency Management Division (SCEMD) on Charleston County's disaster recovery.

During the initial months after the flood event, Thomas & Hutton conducted investigations focused on documenting the extent and severity of damages at each road and identifying potential mitigation measures available to lessen the severity of impacts from future storms. Damages ranged from general loss of surface material and roadway profile degradation to extensive road base failure, requiring full road reconstruction. Culverts under many of the roads were also damaged from the event.

Thomas & Hutton inspected approximately 45 individual roads, totaling approximately 60 miles in length. Detailed reports were prepared for each road that documented the damages, estimated repair and restoration costs, and identified potential mitigation improvements that could be made. Over $17 million in road damages were identified.

In addition to inspecting damaged roads during the initial months after the event, Thomas & Hutton conducted inspections of various County-maintained drainage canal systems (including culverts and other system features). Thomas & Hutton inspected six individual canal systems, totaling approximately 6.5 miles in length. As with the roads, a detailed report was prepared for each canal system documenting the damages, estimated repair and restoration costs, and identified potential mitigation improvements that could be made. Over $1.4 million in canal damages where documented. The road and canal system damage information has been provided to FEMA for incorporation into project worksheets and has formed the basis for the County's request for public assistance.

CLIENT:	Rostan Solutions, LLC/Charleston County
CONTACT:	Sam Rosania, Executive Vice President, 3433 Lithia Pinecrest Road, Suite 287, Valrico, FL 33596, 813.505.1313 (Rostan) Jim Neal, Director, 4045 Bridge View Drive, North Charleston, SC 29405, 843.202.7600, jneal@charlestoncounty.org (Charleston County)
COMPLETED:	August 2016
TEAM:	Richard Karkowski, PE, PH, CPSWQ, D.WRE, Hillary Aton, PE

SULLIVAN'S ISLAND DRAINAGE IMPROVEMENT PROJECT

SULLIVAN'S ISLAND, SOUTH CAROLINA

The Town of Sullivan's Island (Town) is a barrier island approximately 3.2 miles long and 0.75 miles wide, with an estimated 1,000 parcels. The stormwater collection system was installed 60 to 80 years ago, prior to the development of the community. At that time, development was minimal on the Island and stormwater runoff was significantly less than the amount the drainage system is currently handling. Over time, large amounts of new development and changes in use have led to an increase in stormwater runoff ultimately exceeding the overall capacity of the existing stormwater collection system where it does exist.

A severe storm event took place October 1-5, 2015 and produced a total rainfall of approximately 14.1 inches. The amount of precipitation significantly exceeded the design for much of the stormwater drainage infrastructure throughout the Town, damaging several roadways, as well as private, public, and historic-designated properties on all sides of the Island. The Town subsequently hired **THOMAS & HUTTON** to study the Island to identify priority project areas to install infrastructure improvements to alleviate flooding in the most severely impacted areas.

Thomas & Hutton identified project areas which were characterized by substantial new development with little to no formal drainage. The shortage of detention storage, undersized drainage structures, and lack of any drainage pipes and inadequate outfall capacity are the primary causes of flooding problems in certain areas. To ensure the Sullivan's Island stormwater collection system meets the demands of the population and abides by new regulations, codes, and standards, Thomas & Hutton proposed a multi-site stormwater improvement project.

The project scope of work consists of best practices that have been proven to successfully mitigate and minimize flood related damages. To ensure that the project is compliant with all appropriate regulations, a preliminary Hydrologic and Hydraulic (H&H) Study is underway, ahead of final engineering and design of the improvements. Two basins were selected as the highest priority. The Station 18/Atlantic Avenue basins (Basins 7, 8, and 9) are contained within approximately 0.2 miles and house the U.S. Coast Guard Historical District designated on the National Register of Historic Places. The Marshall Boulevard/Brownell Avenue basins (Basins 15, 16, and 19) are contained within an estimated 0.3 miles and consist of approximately three blocks of residential properties.

A study included the following tasks:

- Data collection, including the Town's existing GIS stormwater inventory database, historic information, FEMA claims information, and Thomas & Hutton in-house data files
- Field inspections/survey to confirm/refine basin delineations and the existing stormwater inventory
- Utilizing information from the data collection exercise, field inspections, and research of available topographic, soils, land-use, and tidal data
- A ranking system resulting in the selection of two of the identified drainage basins with the most critical needs for designing and constructing improvements
- Development of existing and future conditions hydrologic/hydraulic models
- Recommendations for drainage improvements
- Opinion of probable cost for the stormwater improvements

Based on the results of the study, Thomas & Hutton proposed drainage infrastructure improvement projects (with resulting costs) and assisted with the preparation and submittal of a FEMA Hazard Mitigation Grant Program (HMGP) grant application. The Town was awarded a FEMA HMGP under DR-4241. The final H&H Study and development of construction plans commenced in early 2018.

CLIENT:	Town of Sullivan's Island
CONTACT:	Andy Benke, 1610 Middle Street, Sullivan's Island, SC 29482, 843.883.3198
COMPLETED:	Ongoing
TEAM:	Mark Yodice, PE; Richard Karkowski, PE, PH, CPSWQ, D.WRE; Ned Fernandez, CFM (Arcadis)

DRAINAGE, SIDEWALK, AND CROSSWALK IMPROVEMENT PROJECTS

CHARLESTON COUNTY, SOUTH CAROLINA

THOMAS & HUTTON has been selected for 16 on-call drainage improvement projects and six on-call sidewalk/crosswalk improvement projects for Charleston County from 2006 to present.

Project activities included coordination between the County, Town officials, SCDOT, and affected property owners. Field activities included topographic surveys, pipe videoing, wetland investigations, and the determination of jurisdictional freshwater wetland limits and OCRM critical lines. The design surveys of each area included existing drainage and utilities, roadways, adjacent structures, wetland lines, and trees/landscaped areas.

Designs were developed based on field survey data, available mapping, and field investigations. Proposed drainage, sidewalk, and pathway improvements were designed, and construction drawings were developed in accordance with the policies and practices of the SCDOT and Charleston County.

Additional activities included assisting with public meetings, preparation of technical specifications for all non-standard materials, and development of opinions of probable construction costs.

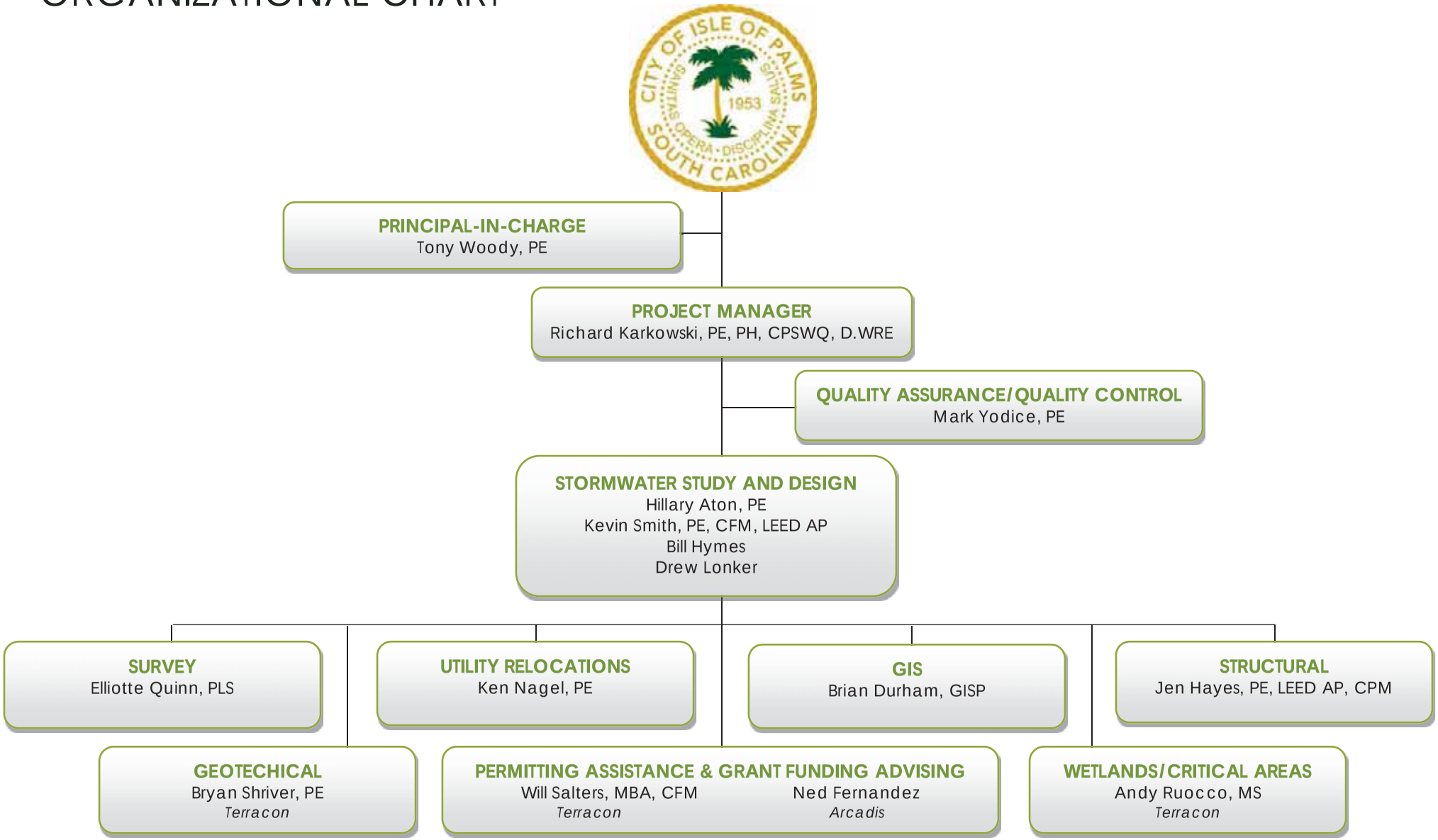
Completed or ongoing projects include:

- Old Georgetown Road Damage Repairs, McClellanville
- Steamboat Landing Road Damage Repairs, Edisto Island
- S. Grimball Road Drainage Improvements, James Island
- Phillips Community Drainage Improvements, Mount Pleasant
- Morrison Court Drainage Improvements, McClellanville
- Pinckney St Drainage Improvements, McClellanville
- N. Alert Rd Drainage Survey and Easement Plats, McClellanville
- Sta 19 and 21/22 at I'On Ave Drainage Improvements, Sullivan's Island
- 10th Street East Drainage Improvements, Folly Beach
- Legareville Drainage Improvements, James Island
- 3rd Street East Drainage Improvements, Folly Beach
- Lauden Street Drainage Improvements, Isle of Palms
- Lincolnville Drainage Improvements, Phase I/II
- Morrison Street Drainage Improvement, Folly Beach
- Sparrow Drive Drainage Improvements, Isle of Palms
- 6th Street East Drainage Improvements, Folly Beach
- 4th Street West Drainage Improvements, Folly Beach
- St. Pauls Drainage Study
- West Hudson Drainage Improvements, McClellanville
- Highway 61 Phase 2 and 3 Sidewalk Improvements, West Ashley area, Charleston
- Ben Sawyer Multi-Use Pathway Project, Mount Pleasant/Sullivan's Island
- Croghan's Landing Sidewalk and Crosswalk Improvements, West Ashley area, Charleston
- Camp Road/Dills Bluff Road Sidewalk Improvements, James Island
- Crosswalk Improvements, Ben Sawyer at Rifle Range, Mount Pleasant
- SC 171 Crosswalk Improvements, West Ashley area, Charleston

CLIENT:	Charleston County Transportation Department
CONTACT:	Jim Armstrong, 4045 Bridge View Drive, Suite C-204, North Charleston, SC 29405, 843.202.6140
COMPLETED:	Various
TEAM:	Ken Nagel, PE; Richard Karkowski, PE, PH, CPSWQ, D.WRE; Hillary Aton, PE

WELCOME TO THE
Isle of
Palms

ORGANIZATIONAL CHART



PROJECT PERSONNEL

Thomas & Hutton brings decades of water resources management, stormwater system assessment, and civil engineering and design experience to address the many facets of the services needed to successfully complete the City of Isle of Palms' Phase 3 Drainage Outfall Design and Permitting.

The Thomas & Hutton team includes a group of experienced staff from a wide variety of disciplines, including engineers, hydrologic and hydraulic (H&H) modelers, GIS specialists, environmental scientists, geotechnical engineers, and structural engineers, among others to address all the needs and requirements of the project. Our organizational chart outlines the leadership and expected roles of team members. Detailed information on personnel can be found in their resumes (*located in the at the end of this section*).

Richard Karkowski, PE, PH, CPSWQ, D. WRE will serve as the team's **PROJECT MANAGER** and will lead the effort for the City's Phase 3 Drainage Outfall Design and Permitting. Rick is Thomas & Hutton's Water Resources Department Manager and coordinates the department's activities, including budget creation and administration, quality assurance/quality control, training, supervising, and scheduling personnel. In addition, he serves as a technical resource and has an extensive background in hydrology/hydraulics, stormwater runoff management, erosion and sediment control, water quality assessment, flood studies/mapping, and regulatory compliance. A Professional Engineer in SC (18837), as well as in GA, NC, and FL, Rick will be the primary contact for the City and will coordinate all major activities performed by the team.

Tony Woody, PE will serve as **PRINCIPAL-IN-CHARGE** providing project delivery oversight, periodic contact with the City, and assure the best resources are applied to the project. As a Vice President and Civil Department Manager for Thomas & Hutton's Charleston office, his 29 years of experience includes site development and public infrastructure projects for both public and private clients. A Professional Engineer in SC (14545) and NC, Tony has extensive experience in management of design personnel, budgets, and schedules.

Mark Yodice, PE will be the **QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) MANAGER** providing senior review for the work. A Professional Engineer in SC (13293) and NC, his experience of 33 years includes storm drainage systems, grading and paving design for roads and parking lots, drainage studies, retrofit projects, capacity analyses, and stormwater system design.

Hillary Aton, PE is a **WATER RESOURCES ENGINEER** in Thomas & Hutton's Charleston office and will serve various roles in supporting the development of the drainage outfall design and permitting. With over six years of concentrated experience in the areas of water resources management, nearly exclusively in the coastal areas of South Carolina, and a Professional Engineer in SC (33521) and MD, she will support the team in various tasks such as data analysis, GIS mapping and analysis, hydrologic and hydraulic modeling and design, plan production, etc.

Kevin Smith, PE, CFM, LEED AP is a **WATER RESOURCES ENGINEER** with 19 years of experience in drainage and site development projects. His design experience is multi-disciplined and includes all aspects of small and large-scale drainage projects, residential site development, and commercial site development. A Professional Engineer in SC (23552), as well as GA, NC, and MO, Kevin will serve various roles in supporting the development of the drainage outfall design and permitting.

William (Bill) Hymes will serve as a **WATER RESOURCES DESIGNER** and has experience in planning, analyzing, and designing water resource-related projects, including stormwater drainage systems and water quality systems. He is experienced in the application of various types of hydrologic, hydraulic, and water quality models. Bill will assist with hydrologic and hydraulic modeling.

Andrew (Drew) Lonker is a **WATER RESOURCES DESIGNER** with two years of experience in site development and drainage projects. His design experience includes drainage development, hydrologic and hydraulic studies, stormwater modeling, storm drainage design, preparation of permit documents, technical specifications, and construction drawings. Drew has experience with stormwater modeling software including SSA, WHAFIS, and ICPR4. He will serve various roles in supporting the development of the drainage outfall design and permitting.

Elliotte Quinn, PLS will serve as **SURVEY MANAGER** and has 37 years of experience with many types of engineering and development projects, as well as general land surveying, for a variety of projects primarily located in South Carolina. He is a Professional Land Surveyor in SC (10292), as well as NC and GA.

Ken Nagel, PE will be the **UTILITY RELOCATION COORDINATOR**. A Professional Engineer in SC (18059), as well as NC and GA, he is a Project Manager/Engineer who has over 26 years of experience designing and permitting a variety of road and drainage improvement projects primarily located in the coastal areas of South Carolina. These road and drainage improvement projects have included the design of storm drainage systems, grading and paving design for roads and pathways/sidewalks, and crosswalk designs.

Brian Durham, GISP will be the team's **GIS ANALYST**. He has 11 years of GIS professional experience, including web-based GIS applications, mobile GIS, spatial data analysis, map standards creation and implementation, 3-dimensional modeling, data acquisition, database design, data interoperability, programming, and data organization. Brian will manage the day-to-day GIS data collection, analysis, and display that is anticipated for the project. He will also coordinate the integration of the stormwater inventory and assessment work with the GIS database.

Jennifer Hayes, PE, CPM, LEED AP will be the **STRUCTURAL ENGINEER** and has 18 years of experience, including analysis, design, and construction management of federal, commercial, healthcare, municipal, educational, industrial, and residential structures. Her experience with existing structures includes failure and deficiency analysis, as well as historic structure analysis. Jen is a Professional Engineer in SC (24727), as well as NC and FL. She is also a LEED Accredited Professional with detailed knowledge of sustainable design approaches and energy conservation measures and is a Certified Project Manager.

Bryan Shiver, PE is the **GEOTECHNICAL ENGINEER** and serves as a Senior Project Engineer in Terracon's Charleston office. A Professional Engineer in SC (27816), Bryan has gained experience on various types of geotechnical assessments, including water/wastewater investigations, residential, commercial, industrial, and transportation projects and has been involved in environmental site assessments, as well as construction oversight and quality control on many of his projects.

Will Salters, MBA, CFM will provide permitting assistance and grant funding advising for the project team. He is a Senior Scientist with 16 years of professional experience with specific expertise in environmental planning, coastal policy, floodplain management, hazard mitigation planning, emergency management and regulatory permitting. Driven by opportunities to connect technical science with state and local policy, Will has dedicated his career to promoting and protecting fragile coastal environments and has emerged as one of the most trusted, respected, and well-connected leaders in his field throughout South Carolina and the southeast region.

Andy Ruocco, MS, LEED AP BD+C is an Environmental Department Manager at Terracon with 15 years of professional experience. He will lead all **WETLANDS/CRITICAL AREAS PERMITTIN**g efforts.Andy's education and years of environmental and regulatory compliance experience have resulted in the development of specialized multi-disciplinary skills for use on wetland disturbance, urban and water development, transportation and industrial development, and corridor assessment/restoration projects. His areas of expertise includes project management involving Section 404/401 Clean Water Act permitting, mitigation analysis/design, development of complex alternatives analyses to support permitting for various large scale industrial, transportation, utility, and commercial projects. Andy also has expertise in threatened and endangered species surveys, habitat assessments, National Environmental Policy Act (NEPA) documentation, environmental site assessments, subsurface site investigations, environmental permitting and regulatory compliance, and soil and groundwater remediation. Andy serves as an Authorized Project Reviewer (APR) for natural resource services and Phase I environmental site assessments conducted as part of Terracon's quality control process.

Edward "Ned" Fernandez, CFM is a Senior Management Consultant with eight years of professional experience. He specializes in disaster planning, floodplain management, funding, and grants management. Ned provides ongoing support to several state, local, and non-profit organizations with grant application development and management. He has extensive experience developing Hazard Mitigation Assistance (HMGP/PDM/FMA) applications and 406 Hazard Mitigation Proposals, with a specialization in benefit-cost analysis. He has also developed methods for post-disaster loss avoidance assessment, in order to analyze return on investment for flood and wind hazard mitigation projects.

RICHARD KARKOWSKI, PE, PH, CPSWQ, D.WRE | PROJECT MANAGER

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EDUCATION

BS, Civil Engineering, 1989, University of Florida

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC, GA, NC, FL
Professional Hydrologist
Certified Professional in Stormwater Quality
Diplomate, Water Resources Engineer

CORE COMPETENCIES

- Project Management
- Stormwater Drainage Systems
- Water Quality Systems
- Hydrologic &Hydraulic Models
- Water Quality Models

Rick has over 28 years of experience in the planning, analysis, design, permitting, construction oversight, operation and maintenance of water resources-related projects, including stormwater drainage systems, flood control projects, and water quality systems. He is experienced in the application of all types of hydrologic, hydraulic, and water quality models.

PROJECT EXPERIENCE

October 2015 Flood, Public Assistance Support, Charleston County, SC, Project Manager assisting Charleston County in recovery and mitigation work resulting from the devastating October 2015 flood event that dropped as much as 27 inches of rain in some parts of the County. To date, services have included drainage system damage assessments (three regional systems and one large canal), road damage assessments (60 different roads), repair (permanent and mitigation) cost estimating, GIS data management and coordination, and FEMA reimbursement documentation. Future services will include preparation of bid documents, procurement support, construction engineering and inspections, and project close-out.

Forest Acres Drainage Improvements Phase 1, City of Charleston, SC, Project Manager/Engineer for the analysis and design of the initial (Phase 1) improvements to the Forest Acres and 5th Ave Drainage Basins in the West Ashley area of the City of Charleston. The project includes conceptual, preliminary, and final design of the basin's main outfall system. The proposed Phase 1 improvements include over 2,500 linear feet of box culvert improvements and 2,000 linear feet of channel improvements in the 450-acre watershed. The project included plans production and permitting, including NPDES MS4 approval, SCDOT encroachment, and USACE wetlands disturbance.

Royal Estates Drainage Study, Horry County, SC, Rain events in late 2015 resulted in flooding of garages and first floors for many homes in the Royal Estates subdivision watershed (approximately 30 acres), revealing problems with the drainage system. Project Manager in assisting Horry County with its plans to implement a 3-phased approach to improve the drainage situation in the area. The first and second phases included hydrology and hydraulic model development and alternatives analysis and improvement recommendations. The third phase will include the design and implementation of the recommended improvements.

Folly Beach/Lincolnville/McClellanville Drainage Projects, Charleston County Roadwise, Charleston County, SC, Provided survey, design, and permitting assistance associated with various roadside drainage areas prone to flooding. Responsibilities included coordination with adjacent property owners and local mayors/utility directors, preparation of maintenance easement plats, and preparation of construction documents.

Lakewood-Pirateland Swash Drainage Basin Study, Horry County, SC, Project Manager/Engineer for the drainage improvement study of the approximately 1,560-acre fully developed basin along US Highway 17 Business between Myrtle Beach and Surfside Beach. Structural flooding of several businesses and homes was recorded in the past. To date, the study included the development of a hydraulic and hydrologic model and identification of drainage issues, alternatives analysis, and recommendations improvements.

Parkers Ferry/South Santee Drainage Evaluations, Charleston County Public Works, Charleston County, SC, Evaluated various alternatives for alleviating flooding occurrences in two rural areas of Charleston County. For the South Santee Drainage Evaluation, we assisted the County in identifying, mapping, and prioritizing of areas of the roadside drainage systems requiring maintenance for completion by the SCDOT. For Parkers Ferry, we assisted the County in identifying and resolving structural flooding issues resulting from an earthen access road located in adjacent wetlands. Tasks included coordination of wetland permitting associated with the installation of culvert cross drains, as well as coordination of land appraisal associated with acquisition of construction and maintenance easements.

Warner Drive Drainage Improvement Study, Richland County, SC, Project Manager/Engineer for the drainage improvement study of two nearly fully developed basins. The Warner Drive study included the analysis of a 157-acre basin and the Danbury Drive study included the analysis of a 163-acre basin. The study included data collection, field reconnaissance, watershed and sub-basin mapping, existing conditions hydrology and hydraulics modeling, presentation of preliminary findings, improvement options listing and screening, selected improvements hydrology and hydraulic modeling, opinion of probable construction costs, presentation of final findings, and recommendation.

TONY WOODY, PE | VICE PRESIDENT/PRINCIPAL-IN-CHARGE

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EDUCATION

BS, Civil Engineering, 1986, North Carolina State University

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC, NC

PROFESSIONAL AFFILIATIONS

- Low Country Housing Trust, Chairman
- Developers Council of the Charleston Metro Chamber of Commerce, Past Chairman
- Charleston Metro Chamber, Member
- Charleston Metro Chamber, Public Policy Committee
- ACEC, Member
- ULI, Member

CORE COMPETENCIES

- Project Management
- Water Distribution Systems
- Water Storage Facilities
- Booster Pump Stations
- Wastewater Treatment Systems
- Wastewater Collection/Conveyance
- Wastewater Pump Station
- Water/Sewer Modeling
- Sanitary Sewer Evaluations
- Sanitary Sewer Rehabilitations
- Infrastructure Relocations
- Master Planning
- Rate Studies

Tony serves as a Vice President for Thomas & Hutton. His experience of 28 years includes site development and public infrastructure projects for both public and private clients. These projects include design for highways, streets, bike paths, neighborhoods, parks, parking areas, water distribution systems, sanitary sewer collection systems, and storm drainage systems. Tony has extensive experience at the management of design personnel, budgets, and schedules. He brings an in depth understanding of land usage, entitlements, area comprehensive plans and regional priorities to every new project.

PROJECT EXPERIENCE

Omni Commerce Park, Berkeley County, SC. Client Manager for the master planning of the storm drainage, water distribution, and sewer collection systems for a 2.8-million square foot industrial park located on 318 acres. Approximately 800,000 square feet has been designed, permitted, and is under construction.

Blackbaud Corporate Headquarters, Daniel Island, Berkeley County, SC. Project Manager for 175,000-square foot office building with a café, outdoor dining, outdoor amenities, loading dock, and 650 parking spaces located on Daniel Island, in Berkeley County, SC. Thomas & Hutton provided master planning, professional engineering, and permitting for all site grading and infrastructure design. The project is currently under construction.

Carnes Crossroads, Goose Creek, Berkeley County, SC. Project Manager for design of a 2,500-acre Planned Unit Development in the City of Goose Creek, Berkeley County. The development includes a wide array of road and infrastructure projects, multi-family, single-family, and commercial development. Roadways, stormwater systems and sewer infrastructure are reviewed and permitted through Berkeley County. This project is ongoing.

Johnnie Dodds Master Plan Phase 1, Mount Pleasant, SC. Program Manager for the redevelopment master plan for Johnnie Dodds Boulevard from the Ravenel Bridge to the Mark Clark Expressway.

Shem Creek, Mount Pleasant, SC. Program Manager for the redevelopment project at Shem Creek in Mount Pleasant. Services include surveying, master planning, preliminary dock design, permitting, and consulting services with the Town of Mount Pleasant for the master plan.

Porter-Gaud School, Charleston, SC. Project Manager for civil site design, permitting, and construction monitoring for the expansion of Porter-Gaud's existing campus, including the abandonment of an existing SC Department of Transportation (SCDOT) right-of-way, and a new 1,800-foot roadway that accommodates the vehicular stacking needed during drop-off and pick-up times at the K-12 school. Other improvements include 200 parking spaces, 8-lane track, football field, two soccer fields, baseball field, tennis courts, and the infrastructure to serve the new science building, and gymnasium.

River Golf Course at Kiawah Island, Charleston County, SC. Design Engineer and Project Manager for this 300-acre single-family, commercial, and golf course development. The project included nine interconnected stormwater lagoons, which were strategically located to provide aesthetic value to the single-family development and sized to meet the state's minimum requirements for retention/detention and sediment trapping efficiencies, 30,000-square foot clubhouse with associated parking, a 2,500-linear foot entry road, the design and permitting of a new effluent disposal system, a new effluent storage lagoon, and the master planning for the water distribution and wastewater collection system to serve approximately 250 future single-family lots.

Kiawah Island, SC. Project Manager for directed study and design of modification to stormwater system for the over 3000-acre Town of Kiawah Island; system design constraints required maintenance of prior water levels and assurance of no adverse water quality or flooding impacts.

RiverTowne Country Club, Mt. Pleasant, SC. Project Manager for modeling and design of stormwater system to support development of an 800-acre mixed use community containing a golf course, single-family residential and multi-family residential components.

MARK YODICE, PE | QUALITY ASSURANCE/QUALITY CONTROL

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EDUCATION

BS, Civil Engineering, 1983, Clemson University
MBA, 1985, University of South Carolina

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC and NC

PROFESSIONAL AFFILIATIONS

- AWWA, Member
- WEF, Member
- SCWQA, Member
- Chi Epsilon – Civil Engineers Honor Society, Member
- Rotary – East Cooper Breakfast Club, Member

CORE COMPETENCIES

- Project Management
- Water Distribution Systems
- Water Storage Facilities
- Wastewater Treatment Systems
- Wastewater Collection/Conveyance
- Wastewater Pump Station
- Water/Sewer Modeling
- Sanitary Sewer Evaluations
- Sanitary Sewer Rehabilitations
- Stormwater Drainage Systems
- Environmental Design
- Utility Mergers/Rate Reviews
- Infrastructure Relocations
- Master Planning
- Rate Studies

Mark is a Principal and Project Manager for a variety of projects. His experience of 32 years includes storm drainage systems, grading and paving design for roads and parking lots, drainage studies, retrofit projects, capacity analysis, and stormwater system design.

PROJECT EXPERIENCE

Market Common Development Utility Master Planning, Horry County, SC, Project Manager for the preparation of drainage master plans for a proposed multi-use, high-density development on the former Myrtle Beach Air Force Base. Activities included evaluation of anticipated runoff services, evaluation of various layout alternatives, and preparation of opinion of construction costs.

Baru Island, Columbia, South America, Project Engineer for drainage improvements for a remote island off Columbia, South America. Some uses included three golf courses, 450-room hotel, marina, 500 timeshares, 60 cabins, 1,030 single-family lots, 450 multi-family lots, and beach club on 710 acres of public land.

Rhoden's Island, Charleston, SC, Project Engineer for drainage study to development a stormwater management system. Rhodens Island is an 80-acre island residential subdivision consisting of approximately 150 single family lots. This island is located to the east of Daniel Island, situated between Ralston Creek and the Wando River, and is part of Daniel Island Park development at the north end of Daniel Island. This project includes BMP's to reduce runoff.

Sullivan's Island Stormwater Pump Station, Sullivan's Island, SC, Project Manager and Project Engineer for analyzing options to address a failed storm water pump station at Station 18 and Atlantic Avenue. Investigated the existing drainage basin and collection system associated with the existing storm water pump station at the intersection of Station 18 and Atlantic Avenue. Services included watershed planning/elevation, pump station assessment, alternatives analysis, cost estimating, and recommended improvements.

Shem Creek Drainage Improvements, **Charleston County, SC,** Project Engineer for drainage investigation and computer modeling to alleviate flooding. Recommend improvements and design said improvements. Basin covers about 54 acres.

Drainage Improvements-Bayonne Avenue, **Charleston County, SC,** Project Engineer for analysis, study, and computer modeling of a 60-acre drainage basin to identify flooding problems. Report with recommendations and cost projections.

Snee Farm Drainage Study, **Charleston County, SC,** Project Engineer for study with computer modeling of a 715-acre drainage basin. Recommended improvements to alleviate chronic flooding problems.

Parker Island Drainage Study, **Charleston County, SC,** Project Engineer for analysis of a 650-acre drainage basin. Recommendations for stormwater control.

Town of Sullivan's Island, Charleston County, SC, Project Manager and Project Engineer to globally assess flooding problems on Sullivan's Island. Determined flood areas and developed concept plans to alleviate flooding, then developed priorities for implementation. Subsequently prepared cost estimates to construct improvements. Provided input into FEMA's DR-4241 Hazard Mitigation Grant application (HMGP).

Morris Square, Charleston, SC, Project Manager and Project Engineer for an urban fill project in the City of Charleston. Smith Morris Neighborhood is in downtown Charleston at the northeast corner of the intersection of Smith Street and Morris Street. The master land use plan for the property had a maximum of 65 residential units plus limited commercial uses within designated zoning districts in less than 2 acres. The project consisted of the creation of two small parks, a playground, an urban corner park, opportunity for a small neighborhood store or café, and the restoration of an abandoned church as a community meeting center. There is one known flooding problem located just off-site. The project used a unique underground stormwater system so as not to increase the nearby flooding problem.

HILLARY ATON, PE | WATER RESOURCES ENGINEER

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EDUCATION

BS, Civil and Environmental Engineering, 2010, The Citadel
MS, Civil Engineering, 2011, Clemson University

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC, MD

CORE COMPETENCIES

- Water Resources Engineering
- Water Resources Planning
- Water Resource Design
- Permitting
- Storwmater Drainage Systems
- Water Quality Systems
- Hydrologic Modeling
- Hydraulic Modeling
- Water Quality Modeling

Hillary has six years of experience in planning, analyzing, designing, permitting, constructing, operating, and maintaining water resources-related projects, including stormwater drainage systems and water quality systems. She is experienced in the application of various types of hydrologic, hydraulic, and water quality models.

PROJECT EXPERIENCE

Forest Acres Drainage Improvements, City of Charleston, SC, Design Engineer assisting with the bidding process of Phase 1 and for the analysis and design of Phase 2 improvements to the Forest Acres and 5th Ave Drainage Basins in the West Ashley area of the City of Charleston. The project includes conceptual, preliminary, and final design of the basin's main outfall system. The project includes plan production and permitting – including NPDES MS4 approval, SCDOT encroachment, and USACE wetlands disturbance.

Old Village Watershed Study, Mount Pleasant, SC, Design Engineer for a detailed study and improvement recommendations for the Old Village watershed. The project involved the collection and study of data including reports of flooding, service requests, FEMA flood claims, and construction permits. A capacity analysis was performed for the existing stormwater infrastructure, which was then assigned a level-of-service for existing and future runoff conditions. The basins/drainage systems were scored and prioritized to identify the most critical basins in need of improvements.

Old Village Drainage Improvements, Mount Pleasant, SC, Design Engineer for the drainage improvements for the Royall Avenue and Edwards Park basins in the Old Village. The basis of the design was the recommended drainage improvements from the Old Village Watershed Study. Storm drain analyses were performed using Hydraflow Storm Sewers. The project requires plan production, permitting, and documentation of compliance with Town of Mount Pleasant and State of South Carolina regulatory requirements.

October 2015 Flood - Public Assistance Support, Charleston County, SC, Design Engineer for the Thomas & Hutton team working as a sub-consultant to assist Charleston County in recovery and mitigation work resulting from the devastating October 2015 flood event that dropped as much as 27 inches of rain in some parts of the County over three days. To date, Thomas & Hutton services have included road damage assessments (60 different roads); drainage system damage assessments (three regional systems and one large canal); repair (permanent and mitigation) cost estimating; GIS data management and coordination; and FEMA reimbursement documentation. Future services will include preparation of bid documents, procurement support, construction engineering and inspections, and project close-out.

Arbor Oaks Drainage Study, Summerville, SC, Design Engineer for a detailed drainage study and improvement recommendations for the Arbor Oaks neighborhood. Recent rain events have resulted in severe structural flooding, revealing problems with the drainage system. The first and second phases included hydrologic and hydraulic model development using Advanced Interconnected Channel and Pond Routing (ICPR) and GIS software, and an alternatives analysis and improvement recommendations. The third phase will include the design and implementation of the selected improvements, which may be completed at a future date. The Arbor Oaks watershed drains to the Sawmill Branch Canal.

Bay Road Drainage Study, Horry County, SC, Design Engineer for a detailed drainage study and improvement recommendations for the Bay Road watershed. The study includes hydrologic and hydraulic modeling using Advanced Interconnected Channel and Pond Routing (ICPR) and GIS software, and an alternatives analysis and improvement recommendations. Proposed improvements were designed to improve drainage and motorist safety along Bay Road.

Highway 9 & 57 Drainage Study, Horry County, SC, Design Engineer for a detailed drainage study and improvement recommendations for the main outfall system in the Highway 9 & 57 watershed. Rain events in late 2015 resulted in structural flooding of many homes in the Colonial Charters neighborhood, revealing problems with the drainage system. The first and second phases included hydrologic and hydraulic model development using Advanced Interconnected Channel and Pond Routing (ICPR) and GIS software, and an alternatives analysis and improvement recommendations. The third phase will include the design and implementation of the selected improvements, which may be completed at a future date. The Highway 9 & 57 watershed drains to the Waccamaw River.

THOMAS & HUTTON

KEVIN SMITH, PE, CFM, LEED AP | MS4/INTERLOCAL COORDINATION/GRANTS

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EDUCATION

BS, Natural Resources and Forest Engineering, 1998, SUNY Environmental Sciences and Forestry at Syracuse

PROFESSIONAL REGISTRATIONS

Professional Engineer in GA, SC, NC, MO
Erosion and Sedimentation Control Program Certified #12473
Certified Flood Plain Manager
LEED Accredited Professional

PROFESSIONAL AFFILIATIONS

- Order of the Engineer, Member
- ASCE, Member
- GA Society of Professional Engineers, Member

CORE COMPETENCIES

- Project Management
- Stormwater Systems
- Hazard Mitigation Planning
- Client Management
- Project Scheduling
- Project Coordination
- Design Team Supervision
- Water Distribution Systems
- Sanitary Sewer Systems
- Sedimentation and Erosion Control Systems
- Hydrologic/Hydraulic Studies
- Permitting
- Construction Cost Analysis

Kevin is a civil engineer with 19 years of experience in drainage and site development projects. His design experience is multi-disciplined and includes all aspects of small and large-scale drainage projects, residential site development, and commercial site development. Experience includes client management, project management, project scheduling, project coordination, design team supervision, calculations and design of water distribution systems, sanitary sewer systems, storm drainage systems, sedimentation and erosion control systems, and hydrologic/hydraulic studies, preparation/review/submittal of permit documents, construction cost analysis, contract documents, technical specifications, and construction drawings.

PROJECT EXPERIENCE

Hazard Mitigation Grant Program Assistance, Tybee, Georgia Subconsultant project consultant responsible for assisting with pre-application submittals for raising of pre-FIRM structures to elevations one foot above the 1% chance base flood elevation. Duties include assistance in identifying project scope, vetting qualified residents, elevation certificate preparation, preparation of general structure assessment checklist, general structure assessments, coordination with specialty contractors for pricing, cost opinions and public outreach.

Hazard Mitigation Grant Program Assistance, Telfair Regional Drainage Project, Garden City, GA, Project Manager responsible for providing information for preliminary and final Hazard Mitigation Grant Program (HMGP) applications to the Georgia Emergency Management Agency. Specific work tasks included preliminary HMGP application forms, hydrologic and hydraulic XPSWMM modeling to determine existing and proposed drainage system levels of service and 0.2% chance drainage improvements, determination of number buildings benefiting from the drainage projects, parcel acquisition, engineering opinion of probable construction costs and associated mapping required for submittal.

Hazard Mitigation Grant Program Assistance, Kingsland & Camden County, GA, Project Consultant responsible for providing information for preliminary Mitigation Grant Program (HMGP) applications to the Georgia Emergency Management Agency. Specific work tasks included assisting with preliminary HMGP application forms, hydrologic and hydraulic modeling using 2-Dimensional ICPRv4 to determine existing and proposed drainage system levels of service and proposed drainage improvements, determination of number buildings, roads and critical facilities benefiting from the drainage projects, parcel acquisition, engineering opinion of probable construction costs and associated mapping required for preliminary application submittal. This project is ongoing.

Garden City Stormwater Master Plan & CIP Identification, Garden City, GA, Client/Project Manager for the creation of a city-wide stormwater master plan in accordance with Coastal Incentive Grant Cycle 16. Tasks included delineation of major drainage basins, stormwater inventory field reconnaissance, basin assessments, hydrologic/hydraulic analysis using XPSWMM for existing and build-out conditions, identification of exiting system deficiencies, proposed improvement alternatives, generation of CIP list, CIP project costs, and preparation of stormwater master plan. Special districts were recommended where existing stormwater systems were inadequate with repetitive flooding. Special districts included post-development flow and volume requirements that were more stringent than those found in the existing GardenCity Local Design Manual.

GA Air National Guard Base-Wide Stormwater Management Study and Inventory, Savannah, GA, Project Engineer responsible for the preparation of an existing conditions XP-SWMM hydrologic and hydraulic model, stormwater infrastructure conditions assessment, stormwater system modeling (XP-SWMM) of existing conditions and future conditions (accounting for the base's Installation Development Plan). Conducted comprehensive stormwater master planning to address system capacity deficiencies for existing development as well as anticipated future development.

Civil Engineering Stormwater Services, Indefinite Delivery Contract (IDC), Chatham County, GA, Client/Program Manager for the Chatham County Stormwater IDC for study and design of several stormwater capital improvement projects. Typical project tasks include survey, hydrologic/hydraulic analysis, design of channel and closed conduit systems, traffic control, permitting and drainage improvement recommendations/design. Duties include client and project management, resource scheduling, preparation of drainage and grading plans/calculations, technical specifications, contract documents, and bidding of project tasks.

WILLIAM HYMES | PROJECT DESIGNER

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EDUCATION

BS, Civil and Environmental Engineering, 2017, The Citadel

CORE COMPETENCIES

- Water Resources Engineering
- Water Resources Planning
- Water Resource Design
- Permitting
- Storwmater Drainage Systems
- Water Quality Systems
- Hydrologic Modeling
- Hydraulic Modeling
- Water Quality Modeling

Bill has more than a year of experience in planning, analyzing, designing, permitting, constructing, operating, and maintaining water resources-related projects, including stormwater drainage systems and water quality systems. He is experienced in the application of various types of hydrologic, hydraulic, and water quality models.

PROJECT EXPERIENCE

Old Village Watershed Study, Mount Pleasant, SC, Design engineer for a detailed study and improvement recommendations for the Old Village watershed. The project involved the collection and study of data including reports of flooding, service requests, FEMA flood claims, and construction permits. A capacity analysis was performed for the existing stormwater infrastructure, which was then assigned a level-of-service for existing and future runoff conditions. The basins/drainage systems were scored and prioritized to identify the most critical basins in need of improvements.

Old Village Drainage Improvements, Mount Pleasant, SC, Design engineer for the drainage improvements for the Royall Avenue and Edwards Park basins in the Old Village. The basis of the design was the recommended drainage improvements from the Old Village Watershed Study. Storm drain analyses were performed using Hydraflow Storm Sewers. The project requires plan production, permitting, and documentation of compliance with Town of Mount Pleasant and State of South Carolina regulatory requirements.

NRCS Canal Repairs, Charleston County, SC, Designer that assisted with the preparation of canal repair plans and bid documents for five drainage canals). The work is a part of a Natural Resource Conservation Service (NRCS) grant to the County to address hurricane and flood damage to canals previous constructed by the NRCS. Repairs include bank restoration and stabilization, culvert repair and/or replacement, and culvert end treatment repairs.

Forest Acres Drainage Improvements, City of Charleston, SC, Designer assisting with the analysis and design of Phase 2 improvements to the Forest Acres and 5th Ave Drainage Basins in the West Ashley area of the City of Charleston. The project includes conceptual, preliminary, and final design of the basin's main outfall system. The project includes plan production and permitting – including NPDES MS4 approval, SCDOT encroachment, and USACE wetlands disturbance.

Bay Road Drainage Study, Horry County, SC, Design Engineer for a detailed drainage study and improvement recommendations for the Bay Road watershed. The study includes hydrologic and hydraulic modeling using Advanced Interconnected Channel and Pond Routing (ICPR) and GIS software, and an alternatives analysis and improvement recommendations. Proposed improvements were designed to improve drainage and motorist safety along Bay Road.

Heather Glen, Horry County, SC, Designer assisting with the analysis and design of the stormwater masterplan for the proposed development. The project site is an existing 430-acre tract that is currently an 18-hole golf course. The golf course will close in October 2017 and the property will be redeveloped. The current development plan is for a large-scale master planned community of approximately 1,100 units consisting of a mix of single family lots, duplex units, and amenities.

Cainhoy Plantation, City of Charleston, Berkeley County, SC, Design Engineer for the analysis and design of a stormwater masterplan for the 9,375-acre development. The plantation is currently managed for timber production and is generally undeveloped. The proposed project is to include a mixed-use community plan that includes neighborhoods, schools, retail and recreation. Over 50% of the property will remain undeveloped natural areas, including extensive and extensive wetland sanctuary, 9,000 homes are anticipated to be built on the property. The project consists of large-scale watershed studies and extensive stormwater modeling.

The Parks at Carolina Forest, Horry County, SC, Designer assisting with the analysis and design of the stormwater masterplan for the proposed development. The project consisted of residential housing with an extensive stormwater pond system which required extensive modeling.

Cougar Point Clubhouse, Kiawah Island, SC, Designer for the analysis and design of the stormwater plan for the proposed development of the Clubhouse. The project is a redevelopment of an existing structure to include the addition of stormwater infrastructure. The project requires plan production, permitting, and documentation.

THOMAS & HUTTON

ANDREW LONKER | DESIGNER

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Savannah, GA 31405

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912.721.4158 Direct

EDUCATION

BS, Civil Engineering, 2016, North Carolina State University

CORE COMPETENCIES

- Drainage Development
- Hydrologic Analysis
- Hydrologic Analysis
- Stormwater Modeling
- Stormwater System Design
- Water Resources Design

Drew is a designer with one year of experience in site development and drainage projects. His design experience includes drainage development, hydrologic and hydraulic studies, stormwater modeling, storm drainage design, preparation of permit documents, technical specifications, and construction drawings. Drew has experience with stormwater modeling software including SSA, WHAFIS, and ICPR4.

PROJECT EXPERIENCE

Site Plan Review, City of Richmond Hill, GA, Staff Engineer for performing site plan review for conformance with applicable City of Richmond Hill Codes. Duties include stormwater management plan review for conformance with the City of Richmond Hill Stormwater Ordinance, application completeness review, site plan review, and preparation of comment/recommendation letters to city staff.

Jackson Street Plaza and Parking, Dublin GA, Design Engineer for the Jackson Street Plaza and parking lot. The project is ongoing and includes site and storm drainage design for a plaza area with walkways, water features, and subsequent parking that utilizes pervious pavers, swales, and inlets to facilitate drainage. Design challenges include a complex grading design scheme to conform to varying finished floor elevations and maintaining ADA routes over a large elevation differential over short horizontal distances. Duties include grading design, storm drainage system design, and plan production.

South Harbor Subdivision, Chatham County, GA, Design Engineer for the development of several existing and proposed condition Wave Height Analysis Flood Insurance Study (WHAFIS) models. These models are used to determine the effects of fill material placed within the floodplain from the construction of residential homes. The study encompassed the modeling of 14 undeveloped residential lots, located on Skidaway Island in Chatham County, GA to determine compliance with the Chatham County Floodplain Ordinance. Duties included site reconnaissance, model development, report development, and exhibit preparation.

Harrington Subdivision, Greenville County, SC, Project Designer for the hydraulic and hydrologic analysis for a 150-acre residential development located in Greenville, SC. The project included subdivision site design, the design of four dry detention ponds, and the design of the corresponding stormwater drainage system. Responsibilities included stormwater drainage modeling, design, and the generation of a stormwater management report. Stormwater models used in design include Hydraflow Hydrographs and Hydraflow Storm Sewers.

Savannah Crossgate Industrial Site, Chatham County, GA, Project Designer for performing hydraulic and hydrologic analysis for a 520,000-square foot industrial building and subsequent parking. The project included grading, storm drainage, and parking area design. Duties included creating an existing and proposed conditions model using Storm and Sanitary Analysis (SSA) to design the site stormwater drainage system as well as generating a stormwater management report for the site.

Confederate Ditch Repairs, Mount Pleasant, SC, Project Designer for a ditch rehabilitation located on the Boone Hall Plantation in Mount Pleasant, SC. The project included grading to rehabilitate a ditch and designing a culvert beneath Oak Ave to better convey stormwater flow. Responsibilities included culvert sizing, ditch grading, and plan production.

South Island Water Reclamation Facility, Hilton Head Island, SC, Project Engineer for performing grading design and stormwater drainage design for the site development of a chlorination building, sludge building, and roadway improvements at a water treatment plant in Hilton Head Island, SC. Roadway design included the widening and realignment of internal roadways for truck access. Duties with the ongoing project include site grading, stormwater drainage design, roadway layout, and loading dock area design.

Shaw Creek Solar, Aiken County, SC, Project Engineer for design plans for the South Carolina Electric and Gas (SCE&G) switchyard located at the future Shaw Creek Solar Farm in Aiken County, SC. The project consisted of switchyard site grading, stormwater drainage system design, and the design of a switchyard access road. Duties included plan production, hydrologic and hydraulic analysis, and permitting through SCDOT, Aiken County, and SCDHEC.

Adger Solar Farms, SC, Design Engineer for the development of conceptual layouts for several solar farms sites throughout the state of South Carolina. Conceptual layout design includes site access point, setback, and buffer layout to determine the feasibility of a proposed solar site. Conceptual layouts were used to determine site and panel layout practicality, as well as to gaged public perception of proposed projects at public meetings.

F. ELLIOTTE QUINN, PLS | INVENTORY/INSPECTIONS SURVEY MANAGER

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EDUCATION

AAS, Civil Engineering Technology – Survey Option, 1980, Midlands Technical College

PROFESSIONAL REGISTRATIONS

Professional Land Surveyor in SC

PROFESSIONAL AFFILIATIONS

- NSPS, Member
- NC Society of Surveyors, Member
- SC Society of Professional Land Surveyors, President, Past District Director, Past Chapter President

CORE COMPETENCIES

- Project Management
- Easements
- Boundary Surveys
- Utility Route Surveys

Elliotte has 38 years of experience with many types of engineering and development projects, as well as general land surveying, for a variety of projects primarily located in South Carolina.

PROJECT EXPERIENCE

Seabrook Island Drainage Improvements, Seabrook Island, SC, Survey Manager for coordination and processing of all surveys, drainage study and subsequent improvements for portions of Seabrook Island, South Carolina including all golf courses.

Town of Mt. Pleasant Old Village Drainage Inventory Phase 1, Mt. Pleasant, SC, Surveyor-in-Charge for the stormwater system inventory in the Royall Avenue Watershed utilizing GPS data collection for entry into GIS.

Stormwater System Inventory and Assessment, City of Augusta, GA, Surveyor-in-Charge for the stormwater system inventory in the Rocky Creek Watershed utilizing GPS data collection for entry into GIS.

Parris Island Drainage Study, Beaufort County, SC, Survey Manager for coordination of surveying activities associated with a drainage study of a 1,600-acre portion of the U.S. Marine Corps Parris Island training facility. Surveys included storm water structure inventory including surveyed elevations and locations.

Sullivan's Island Maritime Forest Tree Inventory, Town of Sullivan's Island, SC, Project Manager of inventory of trees located within the Town owned maritime forest and creating of GIS database for analysis to include trees (species, sizes, condition), buffers, parcel boundaries, OCRM setback lines and zoning data.

Isle of Palms Water & Sewer System Improvements, Isle of Palms Water & Sewer Commission, Charleston County, SC, Surveyor-in-Charge of surveys for multiple projects on the Isle of Palms over the period of 22 years. Surveys have included route surveys for both water and sewer projects, boundary and topographic surveys of treatment plant and pump station sites, and easement platting.

Camp Hall Gas Main, S.C. Electric & Gas Company; Berkeley & Dorchester Counties, SC Surveyor-in-Charge of preliminary surveys for design of a 5-mile gas main, preparation of easement (17) plats, staking for construction and GPS data collection of pipe data during construction and preparation of and entry into GIS.

Poplar Grove Gas Main, S.C. Electric & Gas Company; Charleston County, SC. Surveyor-in-Charge of preliminary surveys for design of a 3-mile gas main, preparation of easement (13) plats, staking for construction and GPS data collection of pipe data during construction and preparation of and entry into GIS.

S.C Hwy. 170 Gas Main Relocation, S.C. Electric & Gas Company; Beaufort County, SC. Surveyor-in-Charge of GPS data collection of pipe data during construction and preparation of and entry into GIS.

SCE&G PeeDee 6-inch Gas Transmission Main Phase 1, Horry County, SC, Surveyor-in-Charge of preliminary surveys for design of a 3.5-mile gas main, preparation of easement (32) plats, staking for construction and GPS data collection of pipe data during construction and preparation of and entry into GIS.

McKewn Plantation Phase II Pump Station, Dorchester County, SC, Survey Manager for preliminary surveys for design of a new pump station with 6,800 feet of 10-inch diameter force main..

Cane Bay Pump Stations, Berkeley County, SC, Survey Manager for preliminary surveys for design of four pump stations and associated 42,900 linear feet of force mains and platting of twelve easements across private property..

Central Berkeley Wastewater Treatment Plant Flow Diversion West, Berkeley County, SC Survey Manager for preliminary surveys for design of proposed Pump Stations #111 and #112 including 40,000 linear feet of associated force mains.

KEN E. NAGEL, PE | PROJECT ENGINEER

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EDUCATION

BS, Civil Engineering, 1991, Georgia Institute of Technology

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC, NC, GA, TX
Level II Erosion and Sedimentation Control Certified
Certified Erosion and Prevention and Sediment Control Inspector

PROFESSIONAL AFFILIATIONS

- APWA, Member
- ASCE, Member
- Society of American Military Engineers, Member

CORE COMPETENCIES

- Project Management
- Drainage Improvements
- Utility Infrastructure Relocations
- Utility Master Planning
- Roadway Improvements
- Bike & Pedestrian Improvements
- Water/Sewer Modeling
- Sanitary Sewer Evaluations
- Sanitary Sewer Rehabilitations
- Funding Assistance
- Public Outreach/Speaking

Ken is a Project Manager/Engineer who has over 26 years of experience designing and permitting a variety of road and drainage improvement projects primarily located in the coastal areas of South Carolina. These road and drainage improvement projects have included the design of storm drainage systems, grading and paving design for roads and pathways/sidewalks, and crosswalk designs. He has provided similar services to Charleston County since 2007.

PROJECT EXPERIENCE

2006 Folly Beach Drainage Improvements, Charleston County, Folly Beach, SC, Project Engineer for the completion of drainage improvements near the intersection of West Hudson Avenue with 3rd Street West on Folly Beach. The drainage issue consisted of low-lying areas along West Hudson Avenue, which didn't drain adequately, sometimes flooding West Hudson Avenue. Project consisted of installation of a piped system to convey stormwater from the intersection to an existing drainage canal. The scope included survey, conceptual design phase, preliminary and final design phase, utility relocation design and coordination, and permitting assistance with the Town of Folly Beach, SCDOT, and SCDHEC-OCRM.

October 2015 Flood, Public Assistance Support, Charleston County, SC, Project Engineer assisting Charleston County in recovery and mitigation work resulting from the devastating October 2015 flood event that dropped as much as 27 inches of rain in some parts of the County. To date, services have included drainage system damage assessments (three regional systems and five canals), road damage assessments (60 different roads), repair (permanent and mitigation) cost estimating, GIS data management and coordination, FEMA reimbursement documentation (including hazard mitigation funding applications) preparation of bid documents, procurement support, construction engineering and inspections, and project close-out.

Forest Acres Drainage Improvements, City of Charleston, SC, Project Engineer for the design of drainage improvements for the Forest Acres and 5th Ave Drainage Basins in the West Ashley area of the City of Charleston. The project includes conceptual, preliminary, and final design of the basin's main outfall system. The proposed improvements include over 2,500 linear feet of box culvert improvements and 2,000 linear feet of channel improvements in the 450-acre watershed. Project responsibilities included coordination of survey and design activities; utility relocation design and coordination; permit coordination with the USACE, OCRM and SCDOT; public bid procurement, contract administration, and construction monitoring.

Transportation Sales Tax (TST) Drainage Improvements, Charleston County RoadWise, Various Locations, SC, Project Manager/Engineer for the completion of multiple road and drainage improvement projects including Folly Beach (4th Street West/West Ashley Ave, 3rd Street at East Huron Ave, 6th Street East, and 10th Street East), Isle of Palms (Lauden St/30th Ave, Sparrow Drive), Sullivan's Island (Stations 19 and 22), Johns Island (Legareville), McClellanville (Pinckney Street and North Alert Road), and six areas located within the Town of Lincolnville, SC. The scope of work consisted of providing design and permitting services including survey, preliminary and final design, utility relocation design and coordination, and permitting coordination with the Corps of Engineers, SCDOT, and SCDHEC-OCRM.

Morrison Street Drainage Improvements, Charleston County, McClellanville, SC, Project Engineer for the completion of drainage improvements near the intersection of Morrison Street (S-10-1191) with Baker Street in McClellanville, South Carolina. Project consisted of installation of a piped system to convey stormwater from the north side of Morrison Street to the south side, discharging to Jeremy Creek. The scope included survey, conceptual design, preliminary and final design, preparation of drainage easement plats, and permitting coordination with the Town of McClellanville, SCDOT, and SCDHEC-OCRM.

Parkers Ferry/South Santee Drainage Evaluations, Charleston County Public Works, Charleston County, SC, Project Engineer for evaluating various alternatives for alleviating flooding in two rural areas of Charleston County. For the South Santee Drainage Evaluation, we assisted the County in identifying, mapping, and prioritizing areas of the roadside drainage systems requiring maintenance for completion by the SCDOT. For Parkers Ferry, we assisted the County in identifying and resolving structural flooding issues resulting from an earthen access road located in adjacent wetlands. Tasks included coordination of wetland permitting associated with the installation of culvert cross drains, as well as coordination of land appraisal associated with acquisition of construction and maintenance easements.

BRIAN DURHAM, GISP | GIS MANAGER

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EDUCATION

BS, Geography, 2007, Appalachian State University
MS, Energy Policy & Climate, 2019, Johns Hopkins University

PROFESSIONAL REGISTRATIONS

Geographic Information Systems Professional (GISP)

PROFESSIONAL AFFILIATIONS

American Society of Adaptation Professionals

American Association of Geographers

CORE COMPETENCIES

- GIS Web-Applications
- Mobile GIS
- ESRI® ArcGIS 10.x
- ESRI® 3D & Spatial Analyst
- ESRI® Collector
- Spatial Data Analysis
- Map Standards Creation and Implementation
- 3-Dimensional Modeling
- Data Acquisition
- Database Design
- Data Organization
- Image Processing
- Map Series Creation
- AutoCAD Civil 3D

Brian Durham has 11 years of professional GIS experience. He works with organizations to determine how data can be utilized to make smarter decisions and improve efficiency. Brian excels in geospatial analysis and management, serving clients in a wide variety of fields in both the public and private sectors.

PROFESSIONAL AWARDS

American Council of Engineering Companies of South Carolina Engineering Excellence Award - Isle of Palms Water & Sewer Commission GIS & Framework

PROJECT EXPERIENCE

Old Village Watershed Study – Phase 1, Town of Mt. Pleasant, SC, GIS Manager for a detailed study and improvement recommendations for the Old Village watershed. Responsible for designing a data collection workflow that would allow surveyed data to integrate seamless with existing Town of Mt. Pleasant GIS data. The project involved the collection and study of data including reports of flooding, service requests, FEMA flood claims, and construction permits. A capacity analysis was performed for the existing stormwater infrastructure, which was then assigned a level-of-service for existing and future runoff conditions. The basins/drainage systems were scored and prioritized to identify the most critical basins in need of improvements.

Charleston County Disaster Response, Charleston County, SC, Project involved studying approximately 300 roads needing repair after the October 2015 South Carolina flooding. All roads elevations were analyzed to locate sections below standard and determine scope of repairs. Reports were created for each road including station locations, Flood Hazard Zones, and construction strip exhibits. Data was added to geothinQ, a GIS web application which allowed users access to all geographic aspects of each project and georeferenced photographs from site visits.

Isle of Palms Water and Sewer Commission (IOPWSC), Isle of Palms, SC, GIS Analyst for developing a GIS database and mobile application that serves as a centralized water/wastewater utility information system for the IOPWSC. The mobile application allows field personal to view data in a live web application, collect field data, view and complete service & work orders in the field, and post data to a SDE database. Front office personnel, operators, and managers are given the ability to work and communicate together seamlessly and in real time.

Berkeley County Water and Sanitation Department GIS, Berkeley County, SC GIS Manager for processing a backlog of dozens of water & sewer project as-builts for the County's Water and Sanitation Department. This backlog was leading bottlenecks in work and service order management. T&H met with the Department to understand their existing data schema and develop a process to convert CAD as-builts to GIS data. This data was delivered to the County for seamless integration with the County's existing utility data inventory, eliminating the backlog.

Stormwater Inventory, City of Augusta, GA, Designed stormwater geodatabase and mobile GIS for field data collection. As the collected field data was post-processed, the updated inventory was immediately viewable for interested parties in a real-time web-based GIS.

3-Dimensional Visualization/Land Use Planning, Johnnie Dodds Boulevard, Mount Pleasant, SC, GIS Analyst for creating 3-dimensional model of Johnnie Dodds Boulevard with hypothetical buildings to determine the visual impact of allowing an increase in building height along the corridor and to facilitate land use planning initiatives.

Murrells Inlet Water Quality Study, Murrells Inlet, SC, Assisted participating parties (Georgetown County, Horry County, Surfside Beach, Coastal Carolina University and MI 2020) with analysis of drainage areas and determining contributing areas for each water quality monitoring station being sampled by MI 2020. Work performed using techniques developed for analyzing GIS data with ArcGIS 9.3 Spatial Analyst Extension.

THOMAS & HUTTON

JENNIFER HAYES, PE, LEED AP, CPM | STRUCTURAL ENGINEER

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EDUCATION

BS, Civil Engineering, 2000, Virginia Tech

PROFESSIONAL REGISTRATIONS

Professional Engineer in SC, NC, FL
LEED Accredited Professional
Certified Project Manager

CORE COMPETENCIES

- Project Management
- Structural Engineering
- Construction Management & Oversight
- Failure and Deficiency Analysis

Jen has 18 years of experience, including analysis, design, and construction management of federal, commercial, healthcare, municipal, educational, industrial, and residential structures. Her experience with existing structures includes failure and deficiency analysis, as well as historic structure analysis. Jen is a LEED Accredited Professional with detailed knowledge of sustainable design approaches, as well as energy conservation measures. She is also a Certified Project Manager.

PROJECT EXPERIENCE

Shem Creek Public Park, Mount Pleasant, SC, Thomas & Hutton performed design and construction oversight of phase 1 of this project in 2010 including at pile supported wooden boardwalk, public restroom facilities, fixed and floating dock systems and covered shade structures. Phase 2 was completed in June 2016 and included the planning, permitting, design and construction services for a new ADA accessible 1,200-linear foot concrete pile supported boardwalk along the edge of Shem Creek with a bridge, floating docks and pierheads. Phase 2 included extensive interaction and coordination with the restaurants and owners of the properties adjacent to the proposed boardwalk, as well as regulatory agencies. Phase 3 of the project to include a pedestrian crossing of the creek and development of a park, is currently underway.

Oyster Point Trip Wall, Mount Pleasant, SC, Structural Engineer for the design and construction services for a 3,000-foot long aluminum sheet pile trip wall. The purpose of the trip wall is to trip the waves during flood events, in order to protect the inland structures from damages. Design includes soil considerations, flood and hydraulic calculations, scour considerations, and agency interaction with FEMA to produce LOMAR and CLOMAR.

Forest Trails Wastewater Treatment Plant Replacement, Isle of Palms Water & Sewer Authority, SC, Structural Engineer for the design and detailing of the concrete process structures and concrete/masonry building to support the replacement of the wastewater treatment plant. The process structures include an elevated concrete platform for the primary screen equipment and a divided concrete treatment basin with secondary screen support. The blower and operations building is a 2-story flood-proofed structure and is a combination of concrete and masonry. There is a monorail system supported by the building roof system for removal of the membranes. All main structures are pile supported.

Cainhoy Pump Station, Charleston, SC, Structural Engineer for the design and construction services for a new 2400-gpm pump station. Cast in place concrete structures included a 35-foot deep wet well and a 20-foot deep dry well. Also included was a partially enclosed steel building.

Waterfront and Marine Structures, Charleston, SC, Structural Engineer for various analyses/assessments, designs, and construction oversight for waterfront and marine structures in Charleston and surrounding areas. Structures include bulkheads/seawalls, revetments, and other erosion control systems, docks, pier heads, floating dock systems, and wharves. Ongoing.

Carolina Forest Boulevard, Myrtle Beach, SC, Structural engineer for the design of new two-lane concrete bridge with pedestrian walkway. Bridge is supported by concrete piles, cast in place concrete pile caps, cast in place concrete slab for deck.

Omni Industrial Park Culvert, Berkeley County, SC, Structural Engineer for the design and detailing of the bottomless culvert system to span wetland and creek below new roadway (AASHTO loading). A scour analysis was performed on the waterway, the results of which were used to design the walls and foundation. Various foundation systems were designed for consideration, including a pile-supported stem wall, concrete spread footings, and concrete footing system with soil improvements.

St. John's Yacht Harbor, City of Charleston Bridge, Charleston County, SC, Structural Engineer for various structural services for remedial action for severely deficient concrete bridge supported by timber piles. Performed a condition assessment and analysis with recommendations for immediate action. Completed a report detailing five different repair and replacement options, including preliminary design, cost estimates, schedule estimates, pros and cons for each option. Worked with contractors and permitting agencies.

**Previous experience with prior employer(s)*

THOMAS & HUTTON

BRYAN TAYLOR SHIVER, P.E.

DEPARTMENT MANAGER, GEOTECHNICAL SERVICES

OFFICE LOCATION: CHARLESTON, SC

PROFESSIONAL EXPERIENCE

Mr. Shiver is the Geotechnical Services Department Manager and a Senior Project Engineer in Terracon's Charleston, SC office. Over his 12 year career, Mr. Shiver has gained experience on various types of geotechnical assessments including water/wastewater investigations, residential, commercial, industrial, and transportation projects. Mr. Shiver has also been involved in environmental site assessments as well as construction oversight and quality control on many of his projects.

PROJECT EXPERIENCE

Water and Wastewater Projects

Managed several water and wastewater facility projects while becoming familiar with their unique foundation support requirements. These include below grade construction, buoyancy, and groundwater control. Additionally, investigated pump station and pipeline projects gaining expertise in their design and construction along with long term corrosion effects.

Notable projects:

- Cainhoy Plantation Pump Station, Charleston, SC
- Central Berkeley WWTP Pump Station, Moncks Corner, SC
- West Ashley Pump Station, Charleston, SC
- Dorchester Pump Station #67, Summerville, SC
- Ravenel Pump Stations 3 and 4, Ravenel , SC
- Santee Cooper Water Treatment Facility, Moncks Corner, SC
- Cherry Point Water Reclamation Facility, Jasper County, SC
- Lower Berkeley Wastewater Treatment Facility, Goose Creek, SC
- Upper Berkeley Wastewater Treatment Facility, Goose Creek, SC
- Charleston County Water and Sewer Pipeline Improvements, Charleston County, SC
- Mount Pleasant Water Systems Saddle Valve Corrosion Study, Mt Pleasant, SC

Education

M.S., Civil Engineering, Auburn University, 2007

B.S., Civil Engineering, Auburn University, 2002

Registrations

Professional Engineer: South Carolina: #27816

Awards

ASCE South Carolina Section Young Civil Engineer of the Year 2010-2011

Affiliations

American Society of Civil Engineers

Charleston Civil Engineers Club

Earthquake Engineering Research Institute

National Society of Professional Engineers

Pile Driving Contractors Association

Work History

2010-Present
Geotechnical Department Manager
Terracon, North Charleston, SC

2009-2010
Senior Staff Engineer
WPC, A Terracon Company
North Charleston, SC

2005 - 2009
Staff Geotechnical Professional
WPC, Inc., North Charleston, SC

Research

DCP-CPT-DMT correlations in the Charleston, SC area

Liquefaction Remediation using Micro Particles

Embankment Settlements over Soft Soils Consolidation of High Plasticity Organic Clays (Pluff Mud)

Geotechnical Earthquake Engineering

Pile Soil Interaction

Terracon

Will Salters, M.B.A., CFM
SENIOR SCIENTIST

PROFESSIONAL EXPERIENCE
Mr. Salters is a Senior Scientist with 16 years of professional experience with specific expertise in environmental planning, coastal policy, floodplain management, hazard mitigation planning, emergency management and regulatory permitting. Driven by opportunities to connect technical science with state and local policy, Mr. Salters has dedicated his career to promoting and protecting fragile coastal environments and has emerged as one of the most trusted, respected and well-connected leaders in his field throughout South Carolina and the southeast region.

PROJECT EXPERIENCE
South Carolina's Coastal Planner, CFM – Charleston, South Carolina
Program manager for South Carolina Department of Health and Environmental Control's (SCDHEC) Office of Ocean and Coastal Resource Management (OCRM). Fostered relationships, built capacity and provided direct technical assistance to state and municipal governments focusing on beachfront and estuarine shoreline management, floodplain management, coastal hazards, mitigation planning, resiliency planning and water quality improvement. Advanced the policy goals of South Carolina's Coastal Zone Management Program and developed and implemented 5-year programmatic strategies including enhancing FEMA's Community Ratings' System (CRS) in local beachfront communities in South Carolina. Mr. Salters is a proven leader of interdisciplinary teams demonstrating a unique ability to build partnerships, communicate, collaborate and work effectively with public and private stakeholders.

Previous Chair and South Carolina Liaison, Governor's South Atlantic Alliance's Disaster Resilient Communities Issue Area Technical Team- South Carolina/Southeast Region
Appointed by Governor Haley as South Carolina's Liaison on the Governor's South Atlantic Alliance's Disaster Resilient Communities Issue Area Technical Team. Charged with enhancing the understanding of ocean and weather dynamics and improving prediction, observation and forecasting capabilities for both episodic and chronic impacts from weather and climate change. Conducted regional and state-specific vulnerability assessments. Developed and implemented adaptation and mitigation strategies for climate change impacts. Improved post-disaster redevelopment planning for coastal communities.

Williamsburg Regional Hospital FEMA NEPA Environmental Assessment- South Carolina
Project Lead and Author for the preparation of an Environmental Assessment (EA) prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and FEMA regulations for NEPA compliance (FEMA Management Directive 108-1). The purpose of the EA is secure federal funding for the development of the new hospital. FEMA must fully consider the environmental consequences of actions proposed for federal funding. The purpose of the EA is to meet FEMA's responsibilities under NEPA and to determine whether to prepare a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed project.

PERMITTING AND REGULATORY EXPERIENCE
Mr. Salters has a diverse professional experience specializing in environmental consulting, OCRM regulatory compliance and review and National Environmental Policy Act (NEPA) site investigations, technical writing and site assessment. As a project manager, Mr. Salters has led numerous wetland delineations and permitting of critical and non-critical wetlands, regulatory interaction report preparation and interagency liaising.

EDUCATION
Master of Business Administration, Environmental Policy and Management, Florida Atlantic University, 2004

Bachelor of Science, Environmental Economics and Resource Management, University of Georgia, 2002

APPOINTMENTS
Founding Chair, Coastal South Carolina's Community Ratings System (CRS) Users Group

Advisory Committee, Charleston County's Hazard Mitigation Plan

Previous Chair and SC Liaison, Governor's South Atlantic Alliance's Disaster Resilient Communities Issue Area Technical Team

REGISTRATIONS
Certified Floodplain Manager
Association of State Floodplain Managers

PUBLICATIONS
Blue Ribbon Committee on Shoreline Management's Final Report: Recommendations for improved beachfront management in South Carolina, 2013

Adapting to Shoreline Change: A Foundation for Improved Management and Panning in South Carolina, 2010

South Florida Environmental Report, 2006-2008

WORK HISTORY
Terracon Consultants, Inc., Senior Scientist, 2018 to Present

South Carolina Department of Health and Environmental Control's OCRM, Coastal Planner, 2008-2018

South Florida Water Management District, Environmental Analyst/Environmental Analyst II/ Project Manager, 2002-2008

Andy Ruocco, M.S., PWS, LEED AP BD+C

ENVIRONMENTAL DEPARTMENT MANAGER

PROFESSIONAL EXPERIENCE

Mr. Ruocco is an Environmental Department Manager with 17 years of professional experience. His education and environmental and regulatory compliance experience have resulted in the development of specialized multi-disciplinary skills for use on wetland disturbance, urban and water development, transportation and industrial development, and corridor assessment/ restoration projects. His areas of expertise include project management involving Section 404/401 Clean Water Act permitting, Mitigation Analysis/Design, Development of complex Practicable Alternatives Analyses to support permitting for various large-scale industrial projects, transportation projects, utility rights-of-way, and commercial developments. Related areas of expertise include Threatened and Endangered Species Surveys, Habitat Assessments, NEPA Documentation, Environmental Site Assessments, Subsurface Site Investigations, Environmental Permitting and Regulatory Compliance, and Soil & Groundwater Remediation. Mr. Ruocco serves as an Authorized Project Reviewer (APR) for Natural Resource services and Phase I Environmental Site Assessments conducted as part of Terracon's quality control process.

PROJECT EXPERIENCE

Camp Hall Commerce Park – Berkeley County, South Carolina

Project manager for 404/401 CWA permit application, development of Permittee-responsible Mitigation Plan (PRM), Compensatory Mitigation for Losses of, Aquatic Resources; Final Rule, and preparation of environmental documentation. Calculated various mitigation scenarios for each alternative and lead the permitting documentation, which included preparation of a Practicable Alternative. The project involved coordination with regulatory agencies including USACE, SCDHEC, SHPO, EPA, SCDNR, USFWS, NOAA–NMFS and local government and community representatives, and environmental stakeholders. Other services conducted included a cultural resource survey, various wetland delineations, and protected species surveys.

Williamsburg Regional Hospital FEMA NEPA Environmental Assessment- South Carolina

Manager for the preparation of an EA prepared in accordance with NEPA, CEQ regulations, and FEMA regulations. The purpose of the EA is to secure federal funding for the development of the new hospital, meet FEMA's responsibilities under NEPA, and to determine whether to prepare a FONSI or NOI to prepare an EIS for the proposed project.

Grainger Generating Station Wetland Mitigation Bank Planning – South Carolina

Project manager for the planning and establishment of a mitigation bank to support a local energy provider and related economic development projects. Planning and preparation for the mitigation bank included mitigation calculations to determine potential mitigation credits available for sale, coordination with the Interagency Review Team (IRT), construction plans, hydrologic investigations, wetland and WoUS delineations, monitoring, conservation easement evaluation, long-term stewardship evaluation and coordination, and preparation of a mitigation banking prospectus.

South Carolina Inland Port Dillon – Dillon County, South Caroloina

Project manager working directly for the South Carolina Ports Authority (SCPA) providing Individual 404/401 CWA wetland permitting and development of a PRM to offset the wetlands and WoUS impacts associated with the development of the South Carolina Inland Port Dillon. The permitting support included preparation of permit drawings to meet USACE submittal standards and calculation of mitigation credits requirements using the USACE Charleston District's Compensatory Mitigation Guidelines. Developed a PRM plan that consisted of preservation and hydrologic enhancement of an approximately 75-acre property located within the floodplain of the Little Pee Dee River to offset the impacts associated with the SCIPD project. The project involved coordination with regulatory agencies including USACE, SC SCDHEC, and SCDNR.

EDUCATION

Master of Science, Environmental Science, College of Charleston, 2007

Bachelor of Science, Biological Sciences, University of South Carolina, College of Science and Mathematics, 2000

REGISTRATIONS

Professional Wetland Scientist
Society of Wetland Scientists

LEED Accredited Professional

Licensed Asbestos Building Inspector / SC

Licensed Well Driller / SC

Certified Erosion Prevention Sediment Control Inspector

CERTIFICATIONS

40 Hour HAZWOPER Certification

10 Hour OSHA Construction Certification

30 Hour OSHA Construction Certification

NEPA and Transportation Decision Making Process provided by National Highway Institute, 2013

NEPA Cumulative Effects Analysis and Documentation provided by the Shipley Group, 2012

WORK HISTORY

Terracon Consultants, Inc., Staff Scientist / Project Manager / Environmental Manager, 2005 to Present

South Carolina Department of Health and Environmental Control, Environmental Manager I, 2001-2005

EDWARD J. FERNANDEZ, CFM

Senior Management Consultant / Urban Planner

An urban planner with a focus on helping communities withstand, respond, and adapt to the impacts of natural hazards. Supports clients to fund initiatives to improve their natural hazard resilience.

EDUCATION

MSP Urban & Regional Planning, Florida State University 2011
BS Political Science, Florida State University 2007
BS Social Sciences, Florida State University 2007
Certificate in Urban Design, Florida State University 2011

YEARS OF EXPERIENCE

Total – 9
With ARCADIS – 8

PROFESSIONAL REGISTRATIONS

Certified Floodplain Manager – FL
Certified Project Manager - Arcadis

PROFESSIONAL ASSOCIATIONS

Association of State Floodplain Managers
American Planning Association
Natural Hazards Mitigation Association
State of Florida, State Hazard Mitigation Advisory Team

PUBLICATIONS AND PRESENTATIONS

Hazard Mitigation For Utilities: Forming Partnerships For Leveraging Resources And Funding Opportunities WSC – St. Louis, MO; September 2012
Implementing Hazard Mitigation for Water and Wastewater Utilities – FEMA EMI - FEMA 2018 Hazard Mitigation Stakeholders Workshop

PROFESSIONAL TRAINING

FEMA L212, Unified Hazard Mitigation Assistance – Developing Quality Application Elements
FEMA L213, United Hazard Mitigation Assistance – Application Review and Evaluation
FEMA L-276 and G-278, Benefit-Cost Analysis (Advanced)
National Incident Management System (NIMS) 100b, 200b, and 700(a)
FEMA Hazus Loss Estimation

Edward J. Fernandez specializes in disaster planning, floodplain management, funding, and grants management. Mr. Fernandez provides ongoing support to several state, local, and non-profit organizations with grant application development and management. Mr. Fernandez has extensive experience developing Hazard Mitigation Assistance (HMGP/PDM/FMA) applications and 406 Hazard Mitigation Proposals, with a specialization in benefit-cost analysis. He has also developed methods for post-disaster loss avoidance assessment, in order to analyze return on investment for flood and wind hazard mitigation projects.

Project Experience

Main Road Drainage Improvement – Charleston County, SC
Project lead for the development of a Hazard Mitigation Grant Program (HMGP) application under DR-4241 for a roadway elevation project for Main Road in Charleston County. Worked with the project team to submit complete and a competitive grant application to the South Carolina Emergency Management Division (SCEMD) which was successful in obtaining funding from FEMA.

Wastewater Infrastructure Relocation and Floodproofing – Isle of Palms Water and Sewer Commission
Project lead for the development of a HMGP application under DR-4241 for the relocation, floodproofing, and consolidation of service of the Wild Dunes and Forest Trails WWTP. Worked with the project team to submit complete and a competitive grant application to the South Carolina Emergency Management Division (SCEMD) which was successful in obtaining in funding from FEMA.

Multi-Basin Stormwater Drainage Improvement Project – Sullivan's Island, SC
Project lead for the development of a HMGP application under DR-4241 for stormwater improvements for Station 18/Atlantic Ave Basins and Marshall Boulevard/Brownell Avenue Basins. Worked with the project team to submit complete and a competitive grant application to the South Carolina Emergency Management Division (SCEMD) which was successful in obtaining funding from FEMA

National Disaster Resilience Competition - City of Norfolk, Virginia

$120M Winning National Disaster Resilience Competition Application. Supported the City of Norfolk in developing environmental, social, and economic development solutions that support adaptation to sea level rise and prevent repetitive loss in low to moderate income areas of the community. Conducted a Benefit Cost Analysis to quantify social, environmental, economic, and resiliency benefits to justify public expenditure.

WELCOME TO THE
Isle of Palms

SUB-CONSULTANTS

Thomas & Hutton continues to foster great working relationships with teaming partners throughout the Southeast. Our sub-consultants for this project are below. We have worked extensively in the past with both sub-consultants on similar types of projects.

Since 1965, Terracon has evolved into a successful multi-discipline firm specializing in environmental, facilities, geotechnical, and materials. Terracon has experience with wetland permitting issues and geotechnical evaluations of geologic and groundwater conditions relevant to the design and construction of drainage improvement alternatives. The firm has a reputation for providing a timely response, coupled with clear and concise consultation, which reduces project delays.

Terracon's Charleston office has a team of geotechnical engineers who are intimately familiar with the unique soil conditions on the South Carolina coast. These soil conditions generally contain soft alluvial clays, loose sands, and high groundwater. These conditions are further complicated with high seismicity. Excessive settlements, liquefaction, weak subgrade, and site preparation difficulties are common in this region. Failure to accurately address these issues during the design phase may lead to extensive construction delays and significant costs. With a local geotechnical presence, Terracon has excellent understanding of the properties of these soils because of their many years of experience working in this challenging environment. Terracon has performed wetlands delineation and permitting on various properties. Working together, Terracon and Thomas & Hutton were able to produce a permit application for an individual permit that was authorized by the USACE and the State of South Carolina within four months following submittal of the permit application (typically a one-year process). The heavy industrial site project involved substantial coordination with regulatory agencies including USACE, SCDHEC, and SCDNR.

Terracon will be responsible for geotechnical engineering services, wetlands/critical areas science services, and permitting assistance/grant funding advising services.

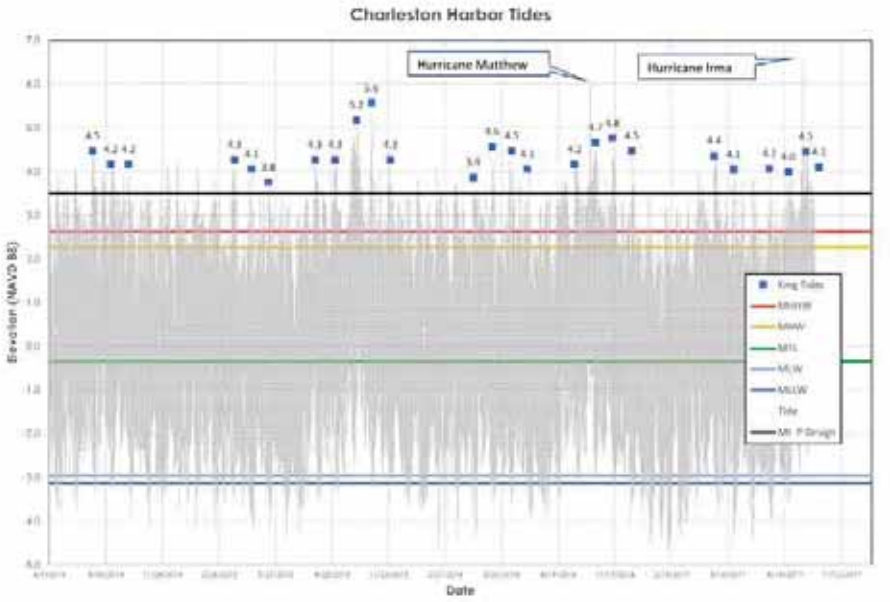
Arcadis is a global natural and built asset design and consultancy firm that provides services in infrastructure, water, environment and buildings. They deliver services throughout the entire value chain – from strategic advice, project management, planning, design and implementation, to maintenance and total lifecycle operation. Their reputation is built on a deep understanding of client needs, combined with their knowledge and experience. With over 27,000 people, Arcadis has built an international network that enables us to serve their local clients on a global basis. Some of the strongest services that Arcadis provides is pursuit of funding, grant management, and audit support. Their funding team being presented to the City of Isle of Palms evaluates, prepares and submits project applications for grants and low interest loans. They have demonstrated success in obtaining over $4 billion in funding over the past five years for their clients. Arcadis is committed to help cities to navigate towards a more resilient future through supporting the transition from their resilience strategy to funding and implementation.

Arcadis will be responsible for grant funding advising services.

WELCOME TO THE
Isle of
Palms

PROJECT UNDERSTANDING

The City of Isle of Palms (the City), like many South Carolina coastal municipalities, is experiencing increased occurrences of flooding due to heavy rainfall events, extreme high tides, sea level rise, high-water table conditions, and more intense coastal storms. These conditions, combined with an inadequate drainage system, have created flooding conditions throughout the City. In addition, new development and redevelopment throughout the island community can result in higher amounts of impervious surfaces (rooftops, driveways, parking areas, etc.) resulting in increased stormwater runoff volume – which only makes the flooding conditions worse. All these contributing factors will continue to worsen over time and cause additional flooding if not addressed.



In addition to these physical and environmental issues, the City is faced with identifying viable funding for delayed maintenance and improvements to the drainage system. The existing drainage system outside of Wild Dunes resort is principally owned and "maintained" by the South Carolina Department of Transportation (SCDOT). The SCDOT has traditionally provided minimal maintenance of the system, but has been reluctant to make improvements. Most past improvements have been completed under contracts administered by Charleston County as funds were available. These projects, though helpful, generally only address a specific location or condition and do not address the larger neighborhood or island-wide issues. Other potential funding sources (particularly many state and federal grant programs) require potential applicants to provide a detailed study of flooding conditions and detailed designs of projects in order to be competitive for receiving grant funding.

To begin addressing flooding in three of the City's drainage basins, the City is soliciting proposals from qualified consulting firms to study and design improvements to the outfalls of the basins. The three basins/outfalls include 30th Avenue, Forest Trails, and 41st Avenue

Please see the attached **Project Area Map** and **Outfall Map** included at the end of this section for the limits of the project.

We understand that the City is seeking the services of a qualified professional engineering firm to design and oversee improvements to the three identified outfalls to include surveying, designing, permitting through all applicable agencies, developing bidding package, and overseeing construction. We further understand that the City's goals for this project are to:

- Identify the appropriate area where the back of the island should be sealed from the intrusion of tidal waters from backing into the system
- Design and permit drainage outfall systems that will seal the tidal water out, while allowing stormwater to exit
- Design and size appropriately to provide for future drainage improvements within the basins associated with each of the three outfalls
- Design to anticipate a reasonable expectation of sea level rise, an increase in impervious surfacing on the island, and soil saturation before storms
- Design to a level that would have kept flood waters associated with Hurricane Joaquin from damaging houses

Thomas & Hutton is well suited to conduct the requested services and provide the City with the necessary consulting to complete the projects. With some minor sub-consultant support (in which we have worked with successfully on similar projects), we believe our team is best qualified to assist the City in achieving their goals for this project. We understand that there will need to be multiple tasks completed for this project, including data collection, basin studies, alternatives evaluation, improvement recommendations, engineering design, plan production, permitting assistance, cost estimating, grant funding assistance, project phase planning, project scheduling, and possibly additional services, including bid phase and construction phase services. Our local Thomas & Hutton team members and highly qualified sub-consultants can address all these tasks efficiently and cost-effectively.

Drainage infrastructure within the study area generally includes some closed storm drain systems (generally of small diameter, i.e. 12- to 18-inch diameter pipes), roadside swales and driveway pipes, and ditches. The study area for this project includes those areas draining to the three outfalls. All of the outfalls are tidally influenced from the Intracoastal Waterway (ICWW). Thomas & Hutton has mapped the existing drainage systems (based on available data and topography) and developed preliminary basin maps (see the **Project Area Map** at the end of this section).

PROJECT APPROACH

The City's Phase 3 Drainage Outfall Design and Permitting project will consist of the necessary services needed to accomplish the City's goals for the project. Our proposed project approach is structured around the scope of services outlined in the Request for Proposals and has been extensively tailored based on our past experience and professional judgment. We understand that this study is a collaboration with the City (and other stakeholders) and we can modify our approach quickly, as necessary, to meet the needs and requirements of all involved. Our team can adapt quickly to unexpected conditions and keep the study on track to meet its goals and schedule.

Our proposed approach includes the following tasks:

- Existing Data Collection and Analysis (City Scope of Work Item 1)
- Survey (City Scope of Work Item 2)
- Study, Alternatives Analysis, and Recommended Outfall Improvements (City Scope of Work Items 3 and 4)
- Engineering Design and Plans Preparation (City Scope of Work Item 5)
- Permitting (City Scope of Work Item 6)
- Opinion of Probable Construction Cost (City Scope of Work Item 7)
- Funding Assistance (City Scope of Work Item 8)
- Project Phasing Plan (City Scope of Work Item 9)
- Project Schedule Development (City Scope of Work Item 10)
- Project Administration and Meetings (City Scope of Work Item 11)
- Bid Phase Services (City Scope Alternate #1)
- Construction Phase Services (City Scope Alternate #1)

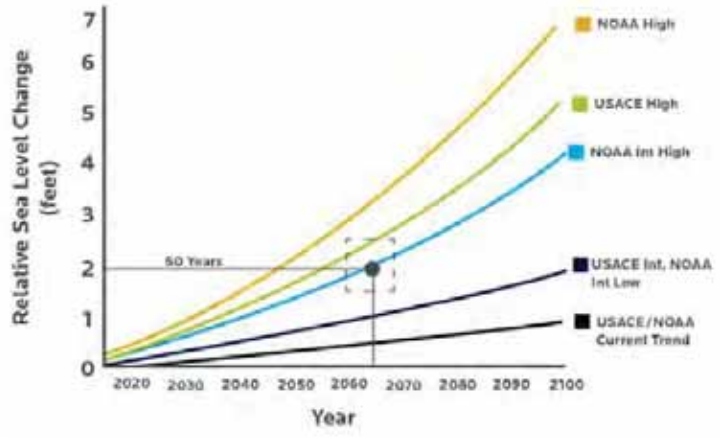
To allow the City to assess our proposed approach and qualifications, we have depicted major tasks and sub-tasks, provided an explanation or description of some of the proposed tasks, as well as additional information as to the exact procedures, techniques, and software that we propose to use. We are confident in our ability to provide the City with quality analyses, findings, and deliverables in a timely and efficient manner.

Existing Data Collection and Analysis (City Scope of Work Item 1)
Thomas & Hutton will maximize the use of available data through a comprehensive review and compilation of existing records and information sources, including, but not limited to, City-provided data, documents and photos of flooded areas, drainage service requests and citizen complaints history, Geographic Information System (GIS) mapping data, existing stormwater system inventory (already acquired from Charleston County), previously conducted hydrologic and

hydraulic (H&H) studies, available aerial photographs, plans/computations for constructed projects, literature, FEMA claims records, and others.

Thomas & Hutton will collect additional data, including useful GIS data for the study area, but will most often rely on our extensive and current in-house library of GIS data, as most of it is currently housed in our customized geothinQ tool. This includes, but is not limited to, FEMA flood data, soils, topography (digital elevation model and contours), aerial photography, roads, utilities, building footprints, wetlands, past hurricane imagery, sea level rise projections, and maximum storm surge potential.

We do know that LiDAR topographic data was recently (2017) collected for Charleston County by SCDNR. This data has not been publicly released yet, but we believe the data could be useful in the study of drainage conditions for the three outfalls. We will attempt to collect this data from Charleston County or SCDNR. In addition, the water and sewer utilities in and around the project area may be impacted by the outfall improvement projects (or future projects in the contributing basins). The IOP Water and Sewer Commission (IOPWSC) does have a GIS mapping data for its infrastructure that can be used as part of this project.



Planning parameters for 50-year outlook, based on sea level change projections by U.S. Army Corps of Engineers and NOAA (Charleston, SC).

Survey and Wetlands/Critical Area Delineations (City Scope of Work Item 2)
Thomas & Hutton will provide the necessary field surveys for the proposed project improvements. All survey work will be supervised by a South Carolina Professional Land Surveyor (PLS). Thomas & Hutton will conduct field, topographic, and boundary surveys of the selected improvements corridor(s). The field survey will include the information necessary for the final design of the project including:

- Pipes – inverts, size and type of drainage pipes, and driveway culverts
- Ditches – top and bottom of slope plus centerline inverts
- Above-ground features – fixed features within the project area, including power poles, guy wires, hydrants, monument sign(s), mailboxes, fences, trees, etc.
- Underground utilities (SUE Quality Level B)
- Roads – survey edge of pavement and centerline. If curb exists within project limits, include back of curb elevation and type.

Thomas & Hutton will perform a topographical survey of the project that is suitable to produce one-foot contours. The boundary survey will include courthouse research on properties likely impacted by the project and field surveys of all existing property evidence and monuments along project frontage.

Thomas & Hutton's wetland scientist sub-consultant, Terracon, will delineate the waters of the United States within the project area in general accordance with the regulatory requirements of 33 CFR Part 328 *Definition of Waters of the U.S.*, the *Corps of Engineers Wetland Delineation Manual*; January 1987. The delineations will be flagged in the field and a field sketch approximating the limits of the delineation will be prepared for future surveying. There are saltwater critical areas contained on or adjacent to proposed improvements and will need to go through SCDHEC-OCRM review also.

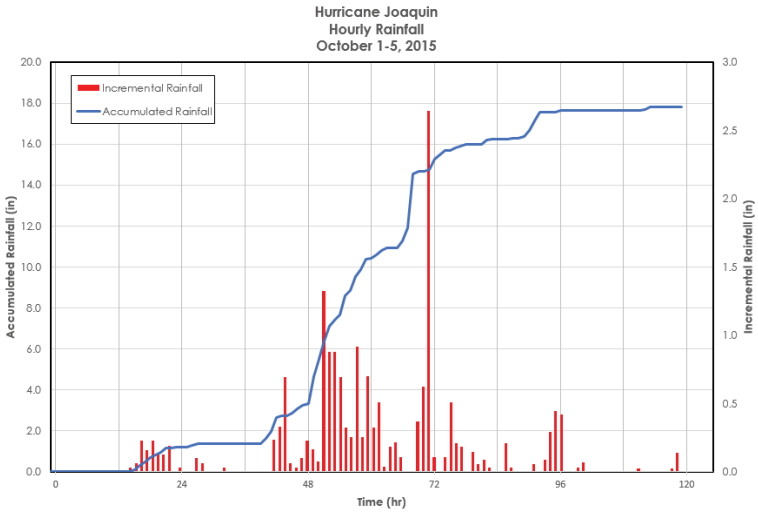
Terracon will prepare and submit a USACE Jurisdictional Determination Request and SCDHEC-OCRM critical area determination and will coordinate with the agencies in order to obtain written verification of the limits of jurisdiction. If a field inspection of the delineation is requested, the sub-consultant will accompany agency personnel to the subject property to support the delineation. The wetland and critical areas delineated and verified by the appropriate agency will be surveyed and included in the overall project survey.

Thomas & Hutton will coordinate with the City by providing the TMS and property information for affected or adjacent properties. Thomas & Hutton will also coordinate with the City to communicate with property owners. This may take the form of project letters informing the owner that surveyors maybe accessing their property. Once project letters have been

sent to the community by the City, survey activities will commence. Survey personnel will carry a copy of the letter at all times.

Study, Alternatives Analysis, and Recommended Outfall Improvements (City Scope of Work Items 3 and 4)
Thomas & Hutton will conduct a limited drainage study of the three drainage outfall basins – 30th Avenue, Forest Trails, and 43rd Avenue. The study will not be an in-depth study of the basins and will not identify all the internal drainage infrastructure improvements necessary for the systems to function to the level of service (LOS) listed in the City's RFP. The study will, however, anticipate that all the internal drainage infrastructure in the basins will be improved in the future (to the City's LOS goal) and that proposed outfalls improvements will be sufficient to accept the future runoff and meet the City LOS goal at the outfall and throughout the basins.

A site reconnaissance will be conducted to confirm existing infrastructure (drainage inlets, manholes, pipes, etc.), basins and sub-basin delineations, and gather other field data. The basin, sub-basins and drainage mapping will be adjusted as needed based on the findings of the site reconnaissance.



It is anticipated that limited H&H modeling will be conducted for each basin as part of this study. This modeling will include the assessment of various design events (i.e. 10-, 100-, and 500-year) and recorded rainfall events (Hurricane Joaquin). The study will also assess various future sea level rise scenarios and the potential impact on the function of the future drainage system.

The study will be conducted to anticipate an increase in impervious areas within the basins due to redevelopment. Thomas & Hutton has recently conducted an assessment of impervious area increases due to residential redevelopment for the Town of Mount Pleasant associated with the Old Village Drainage Improvements project. A similar methodology will be used for Isle of Palms.

The study will be conducted to anticipate a high level of soil saturation prior to rainfall events (thus more stormwater runoff can be expected). Also, various methods of tide backflow protection (i.e. in-line check valve, flap gates, muted tide gates, etc.) will be investigated as part of the study.

During the study, Thomas & Hutton will investigate various alternatives for the design of the three basins outfalls. These alternatives will be a combination of closed and open drainage systems with a tide control system. Given the constraints of the project sites and using our engineering judgment, several alternative outfall layouts will be developed for presentation to the City. The anticipated functions and resulting LOS in the basins of each alternative design will be documented and discussed with the City. Conceptual opinions of probable construction costs will also be developed for the alternatives.

Given the complexities, anticipated future costs, and specialized additional services needed to design stormwater pumping systems, stormwater pumping will not be considered as an alternative nor as the subject of our proposed design services. We believe the level of stormwater management and flood control needed to meet the City's goal LOS could not be cost-effectively implemented by stormwater pumping. If during this study phase and in consultation with the City, stormwater pumping is determined as the only viable option, additional services will be required to implement and design the option.

Working with the City in reviewing the outfall design alternatives, Thomas & Hutton will narrow the outfall design to the recommended improvement at each outfall.

Engineering Design and Plans Preparation (City Scope of Work Item 5)
Preliminary Design: Thomas & Hutton will be ready to begin the preliminary design of the project immediately after the recommended improvements are approved by the City. The preliminary design will be equivalent to a 30-percent design of the proposed improvements. We will develop the necessary plans including the following: cover, notes, plan and profiles, sections (limited design information), property strip map, etc.

All project improvements will be quantified and a preliminary opinion of probable construction cost will be developed. At this initial phase of the project, Thomas & Hutton will review the preliminary design and costs with the City and adjust the

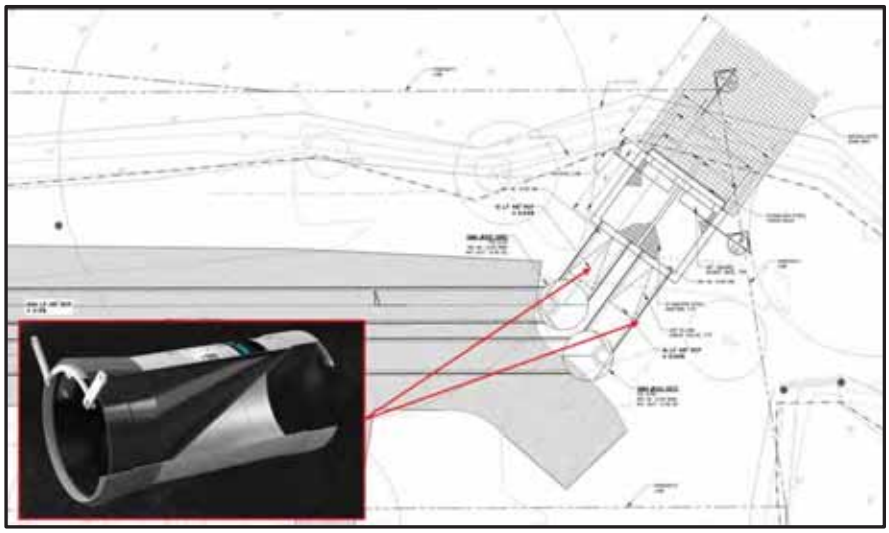
project as needed. Thomas & Hutton, in coordination with the City (and other stakeholders), will conduct a field design review of the preliminary plans. This will identify potential construction or other issues that can address early to avoid costly redesign and field adjustments in the future.

Geotechnical Evaluation: Based on the preliminary engineering design, Terracon, our geotechnical sub-consultant, will perform subsurface soil explorations at selected locations at the three projects sites to ascertain soil characteristics. The exact number and type of testing may be determined by the type of improvements being designed. The following section describes the anticipated geotechnical investigations and testing, but may be subject to change as the preliminary design is developed.

Field and subsurface exlplorations will be performed which will consist of two Cone Penetration Tests (CPT) at each of the 30th Avenue and Forest Trails outfalls and three CPTs at the 41st Avenue outfall, for a total of seven CPTs. In addition, seven Hand Auger Borings (HAB) will be performed adjacent to each CPT. Testing will also include in situ soundings and observations of ground water. Field data will be processed by the geotechnical engineer to create the final in situ sounding and hand auger boring logs.

The geotechnical engineer will develop a geotechnical site characterization, perform the engineering calculations necessary to evaluate foundation alternatives, and develop appropriate geotechnical engineering design criteria. When services are complete, a final geotechnical engineering report will be provided. The final report will include test logs, soil stratification and a description of subsurface conditions, groundwater observations, estimated settlement, recommended foundation and design parameters, seismic classification and summary of hazards, and subgrade preparation/earthwork recommendations.

Final Design: Upon completion and acceptance of the preliminary design by the City and completion of the geotechnical investigations, Thomas & Hutton will continue into final design of the proposed improvements.



The construction plans will be advanced and additional information generated. A project phasing plan will be developed (see *Project Phasing Plan* section below) and appropriate design coordinated between the phases. Additional plan sheets will also be developed, including details, stormwater pollution prevention plan (SWPPP), utility relocation, traffic control, etc.

Generally, SCDOT standard specifications will be used, including the use of SCDOT pay item list and quantities while preparing cost estimates. The design will be based upon current SCDOT design manuals. Construction plan review milestone will be made at 60-percent and 100-percent.

Permitting (City Scope of Work Item 6)
Thomas & Hutton will assist the City in obtaining necessary permits, certifications, and approvals required by agencies having jurisdiction over the drainage improvement project. Permit packages will be prepared for, and submittals made to, the required agencies for review and issuance of permits. It is anticipated that the following permits will be required:

- City of IOP MS4 Approval (administered by Charleston County)
- SCDHEC-OCRM – Coastal Zone Consistency Certification
- SCDHEC BOW – NPDES NOI Construction General Permit
- SCDOT Encroachment Permit
- USACE/OCRM Wetland/Critical Area Impact Permit
- Miscellaneous Encroachment Permits/Approvals

Thomas & Hutton will coordinate with these agencies for the review and approval of the proposed drainage improvements. We will actively track the review of the permit applications and provide responses to comments and address requests for additional information until the permits are issued.

Thomas & Hutton, and our wetland/critical area sub-consultant (Terracon) will strive to limit the impacts to wetlands and critical areas and work as an advocate for the City to limit the need for mitigation (including negotiations with the USACE and OCRM). Dependent on the potential impacts to wetland and critical areas, wetland or critical area mitigation may be necessary. This scope of services includes coordination of purchasing mitigation credits (if available), but does not include provisions for on-site mitigation. Mitigation credit purchase fees will be provided by the City.

Opinions of Probable Construction Costs (City Scope of Work Item 7)
Thomas & Hutton will provide the City (and other stakeholders) opinions of probable construction costs at various stages of the project. The opinions will be based on the level of detail of design at the time the opinion is generated. The stages include study (conceptual alternatives), preliminary (30-percent) design, pre-final (60-percent) design, and final design (100-percent). It is anticipated that the opinions' accuracy will increase as the design of the proposed improvements progresses. Up to three conceptual opinions of probable construction costs will be generated during the study phase. Unit cost for common construction items will be developed from recent construction projects in the area. More unique items will be researched, and if possible, vendors/construction companies will be consulted for pricing. In general, common SCDOT line items will be used for estimating purposes.

Funding Assistance (City Scope of Work Item 8)
Assistance will be provided to the City to determine and coordinate a funding strategy for the project. This task may include the determination of probable funding sources, including grant sources, participation in meetings and calls on an as-needed basis, and development of basic information in support of grant applications. These services do not include the preparation of grant applications or other detailed supporting documentation. As listed in the City's RFP, these services may be provided as additional service once the funding source has been identified. As the effort associated with this task is unknown, these services will be provided on a time and expense (T&E) basis.

Project Phasing Plan (City Scope of Work Item 9)
Thomas & Hutton will work with the City to develop a project phasing plan for the proposed improvements. The plan will be based on various constraints and input, including prioritizing a small portion of the proposed improvements that can be implemented in the short-term to provide flood relief, current and future funding, seasonal access considerations, and others. The phasing plan will be incorporated in the construction plans (see *Engineering Design and Plans Preparation* section above) as necessary.

Project Schedule Development (City Scope of Work Item 10) Thomas & Hutton will create and update the project's schedule throughout the design and permitting of the project (see *Project Administration and Meetings* section below). The schedule will generally be updated monthly as the project progresses. At various times during the project design and permitting, the timing and duration of construction for the proposed improvements will be evaluated. The project 's construction schedule will be evaluated at the end of the study, after preliminary design (30-percent) and after pre-final (60-percent) and final (100-percent) design. Project phasing (if any) will be incorporated in the project schedule at the pre-final and final design stages.

Project Administration and Meetings (City Scope of Work Item 11) Thomas & Hutton will provide the needed project organization, management, scoping with the project's stakeholders, including the City, SCDOT, IOPWSC, Wild Dunes Golf Course, and other affected property owners. The Thomas & Hutton team will conduct resource agency coordination and project partnering and attend agency and public involvement meetings (if needed).

We will provide budget, schedule, and expenditure updates on a monthly basis (in coordination with the projects invoicing) and meet with the City to review if required. We will attend regularly scheduled project progress meetings with the City, as well as meeting to address unknown/unusual issues. A project kick-off meeting will be held with City staff (and other stakeholders, if appropriate) that will include a review of the project scope, goals, deliverables, and schedule. Also, per the City's RFP, we will make presentations to the City's boards on at least three occasions.

From previous experiences, we understand that early, frequent, and consistent coordination and communication to the project's stakeholders (SCDOT, IOPWSC, affected property owners, etc.) is vital to the success of any project, especially drainage improvement retrofit projects. We have budgeted an appropriate amount of time to assist the City in coordination and conducting this outreach.

Bid Phase Services (City Scope Alternate #1)
Assistance will be provided to the City during the bid process with the following:

- Prepare bid package and invitation to bid
- Coordinate and attend a pre-bid conference
- Issue clarification requests or bid addendums, if necessary
- Attend bid opening
- Receive construction bids
- Prepare a bid abstract
- Evaluate the bids
- Prepare consultant's recommendation for award

It is anticipated that City or Thomas & Hutton "front-end" documents will be used. Technical specifications for standard SCDOT items will not be provided, however, specifications for non-standard items will be provided.

This scope includes the administration of one bid procurement occurrence. If subsequent bid procurement occurrences are requested by the City, bid administration services for these subsequent occurrences will be considered additional services.

Construction Phase Services (City Scope Alternate #2)
Office and field-related services shall be provided during construction. It is anticipated by this scope of service that construction will take place over a continuous 9-month period. The following office-related construction phase services will be provided.

- *General Administration of Construction Contract* - Consult with City and act as City's representative
- *Pre-Construction Conference* - Participate in a Pre-Construction Conference prior to the commencement of work at the site
- *Defective Work* - Recommend to City that Contractor's work be disapproved and rejected while it is in progress if, based on such observations, Consultant believes that such work will not produce a completed project that conforms generally to the Contract Documents
- *Clarifications and Interpretations; Field Orders* - Issue necessary clarifications and interpretations of the Contract Documents as appropriate to the orderly completion of Contractor's work. Such clarifications and interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents. The Consultant may issue field orders authorizing minor variations from the requirements of the Contract Documents.
- *Change Orders and Work Change Directives* - Recommend change orders and work change directives to City, as appropriate, and prepare change orders and work change directives as required.
- *Business/Residential Coordination* - Assist the City in coordinating with the affected businesses and residents along the project
- *Utility and SCDOT* - Assist the City with coordinating with the SCDOT and utilities
- *Shop Drawings and Samples* - Review, approve, or take other appropriate action in respect to shop drawings and samples and other data which Contractor is required to submit

- *Substitutes and "or-equal"* - Evaluate and determine the acceptability of substitute or "or- equal" materials and equipment proposed by Contractor

- *Inspections and Tests* - Require such special inspections or tests of Contractor's work as deemed reasonably necessary and required by the specifications, and receive and review all certificates of inspections, tests, and approvals required

- *Project Schedule* - Review and approve or take other appropriate action in respect to the Contractor's project schedule and project schedule changes

- *Photo and Video Galler* - Maintain photo and/or video documentation of the project and the project's construction progress. A compiled photo/video gallery will be provided to the City at project close-out.

- *Observation Reports* - Maintain a log of observation reports. Provide a weekly summary progress report to the City.

- *Disagreements between City and Contractor* - Render formal written decisions on all claims of the City and Contractor relating to the acceptability of Contractor's work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of Contractor's work

- *Applications for Payment* - Review Applications for Payment and accompanying supportive documentation and determine the amounts that Consultant recommends Contractor be paid

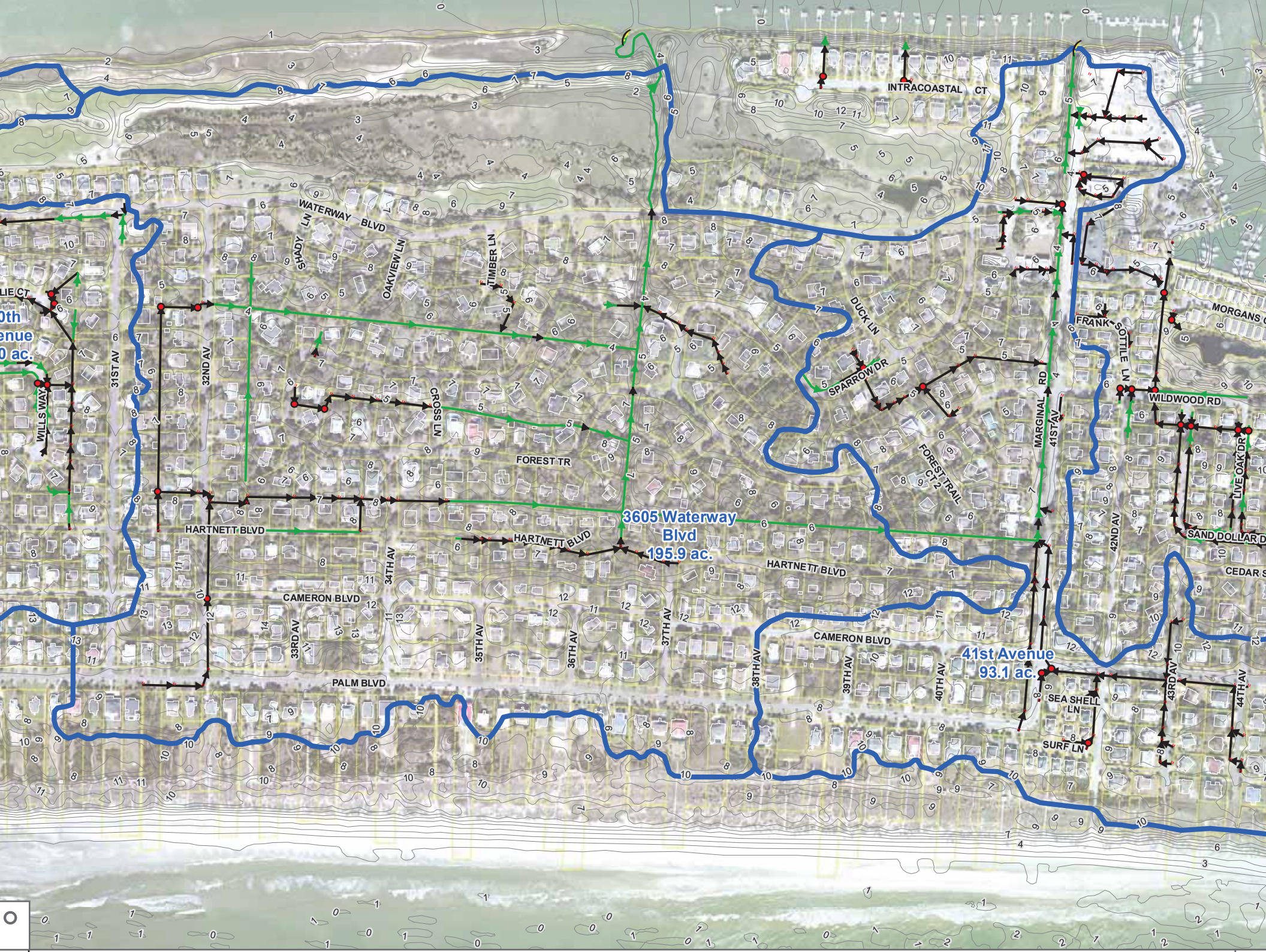
- *Contractor's Completion Documents* - Receive and review maintenance and operating instructions, schedules, and guarantees. Receive bonds, certificates, or other evidence of insurance not previously submitted, certificates of inspection, tests and approvals, Shop Drawings, Samples and other data.

- *Substantial Completion* - Promptly after notice from Contractor that Contractor considers the entire Work ready for its intended use, in company with City and Contractor, conduct an inspection to determine if the Work is Substantially Complete

- *Final Notice of Acceptability of the Work* - Conduct a final inspection to determine if the completed Work of Contractor is acceptable so that Consultant may recommend, in writing, final payment to Contractor

The Consultant shall make visits to the Site at intervals appropriate to the various stages of construction in order to observe the progress and quality of the Work. This scope of services does not include confirmatory testing during construction. If requested by the City, Thomas & Hutton will coordinate with a third-party confirmatory testing firm for the project. The firm shall contract directly with the City.

A final inspection with the Contractor and City personnel will be conducted. A punch list will be prepared and provided to the Contractor to address. Follow up inspections will be conducted as necessary. Assistance will be provided to the City for the preparation of documentation for permit terminations and grant close-out. A 1-year warranty inspection will be conducted and a punch list will be prepared and provided to the Contractor to address. Follow up inspections will be conducted as necessary.



City of Isle of Palms

City of Isle of Palms

FEE PROPOSAL

Thomas & Hutton has carefully studied the City of Isle of Palm's request for proposals, including the project's background, goals, design objectives, etc. We developed an expanded project approach and scope of services that will successfully provide all the necessary services to implement this project. In addition, we coordinated with our highly qualified sub-consultants as to their roles in the project and the services they are to provide. As mentioned in this proposal, we have worked previously with each of our sub-consultants and are confident in their abilities (including developing a scope of service and subsequently meeting their estimated budget requirements).

In developing our scope of services and our fee proposal, we relied on our extensive and recent experience for the resources and level of effort required to accomplish each individual task. To provide a complete scope of services, we made several assumptions (based on our past experiences and our assessment of the project), which are outlined in our project understanding and approach. We have included all anticipated services based on our assumptions and believe that the proposed fee is appropriate and complete for the project as described in the City's RFP and further detailed in our project understanding and approach.

Our proposed fee and fee structure can be found on the following page. The proposed fees are broken down by the tasks (or services) listed in the City's request for qualifications.

City of Isle of Palms - Phase 3 Drainage Outfall Design and Permitting
Proposed Fee Breakdown
September 5, 2018

Description	Type of Fee	Fee
Base Project		
Existing Data Collection and Analysis (City Scope of Work Item 1)	Lump Sum	$12,500
Survey and Wetlands/Critcal Area Delineations (City Scope of Work Item 2)	Lump Sum	$26,900
Study, Alternatives Analysis and Recommended Outfall Improvements (City Scope of Work Items 3 and 4)	Lump Sum	$55,700
Engineering Design and Plans Preparation (City Scope of Work Item 5)	Lump Sum	$83,000
Permitting Phase (City Scope of Work Item 6)	Time & Expense	$66,200
Opinions of Probable Construction Costs (City Scope of Work Item 7)	Lump Sum	$15,300
Funding Assistance (City Scope of Work Item 8)	Time & Expense	$12,900
Project Phasing Plan (City Scope of Work Item 9)	Lump Sum	$7,800
Project Schedule Development (City Scope of Work Item 10)	Lump Sum	$5,700
Project Administration and Meetings (City Scope of Work Item 11)	Lump Sum	$37,300
TOTAL BASE PROJECT FEE		**$323,300**

Alternates		
Bid Phase Services (City Scope Alternate #1)	Time & Expense	$12,100
Construction Phase Services (City Scope Alternate #2)	Time & Expense	$58,000
TOTAL ALTERNATES FEE		$70,100

THOMAS & HUTTON

thomasandhutton.com




PROPOSAL

September 2018

CITY OF ISLE OF PALMS
SOUTH CAROLINA

Request for Proposals 2018-02
Phase 3 Drainage Outfall Design and Permitting

restore | enhance | sustain | maintain

Weston & Sampson℠

transform your environment

westonandsampson.com

3955 Faber Place Drive, Suite 300
N. Charleston, SC 29405
tel: 843.881.9804

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3955 Faber Place Drive, Suite 300, N. Charleston, SC 29405
Tel: 843.881.9804

September 5, 2018

City of Isle of Palms
Attn: Mr. Douglas Kerr
1207 Palm Boulevard
Isle of Palms, SC 29451

Re: **Request for Proposals 2018-02, Phase 3 Drainage Outfall Design and Permitting**

Dear Mr. Kerr and Members of the Selection Committee:

We appreciate the opportunity to provide this qualifications and proposal package to you for the above-referenced project.

Since 1899, Weston & Sampson has been providing clients like the City of Isle of Palms with cost-effective and innovative solutions to their infrastructure challenges. Weston & Sampson is a multi-disciplined engineering and architectural firm, with a total staff size of over 570, and is ranked among the top 500 design firms in the United States (ranked 165 in 2017) and the top 200 Environmental design firms in the United States (ranked 111 in 2017).

We have assembled our proposed team to provide seasoned professionals with significant local knowledge and experience in addition to extensive experience with very similar drainage projects. Under the direction of **Robert L. Horner, PE as Prime Consultant Principal, Mike Petrakis, PE, the Project Manager**, will have primary responsibility for this project. Mr. Petrakis will be the "point person" for the City and will be responsible for all scheduling, permitting, and project control. ***Mike was the Owner's Project Manager for the City of Myrtle Beach Fourth Avenue North Deepwater Ocean Outfall project, making him the ideal candidate to lead this similar project for the Isle of Palms.*** More information on this similar project can be found on Mike's resume in Section 3.

At Weston & Sampson, we are passionate about helping municipal clients determine the highest quality and most cost-effective solutions for challenges they face regarding maintaining a safe and prosperous environment for their citizens. **We share your goal to develop a strategic plan to assist your community to improve the 3 drainage outfalls outlined in this RFQ**, and will make recommendations of additional standards, policies, operational and infrastructure improvements that could be implemented to reduce the risk of flooding and property damage due to flooding. For this significant project, we offer our key resources and capabilities, and a project manager with the knowledge and expertise in similar projects, and value-added services in low impact development (LID), which will result in a successful end product to best meet the needs of the City.

Weston & Sampson offers extensive stormwater services and can provide assistance with a multitude of diverse stormwater-related issues. We have decades of experience assisting communities, agencies, and private entities in meeting their stormwater needs on small- and large-scale projects. This experience ranges from addressing individual residential needs to system-wide drainage master planning to instructional training and informational presentations. We provide traditional engineering services such as evaluation, design, and construction of drainage infrastructure, but are also at the forefront of our industry in offering state-of-the art services such as digital data collection/management, and incorporating green practices/low impact development (LID) into our designs.

We recently worked on a similar, significant drainage study project for the City of Charleston in which we evaluated the Church Creek Drainage Basin in West Ashley and offered recommendations for improvements. More details on this project can be found within our qualifications in Section 2.

For Charleston County, we also recently evaluated the existing drainage conditions associated with current drainage challenges originating in the Signal Point Road area and downstream to the outfall into the Stono River.

With the experience and expertise of more than 570 engineers, scientists, hydrologists, permitting specialists and other professionals, we provide a full range of in-house stormwater capabilities. We pride ourselves on our ability to tailor each project to meet our clients' specific needs as we strive to provide unparalleled innovative and effective solutions.

Our office has been serving the BCD region since 2004, and our employees have been serving the region for over 30 years. **Our goal is to provide unsurpassed customer service such that you are fully satisfied in every way on assigned projects, and that you can rely on us to provide engineering assistance for many years to come.**

We are confident that our practical approach, technical capabilities and experience in drainage analysis and coastal resiliency will result in the identification of significant opportunities for improvements for this project. Your consideration of our credentials is greatly appreciated and we look forward to the opportunity to discuss this project in greater detail. Please contact me at (843) 881-9804 or hornerr@wseinc.com if you need any additional information.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.
Robert L. Horner, PE, Vice President

Ranked #111 among the Top 200 Environmental Design Firms in North America, Weston & Sampson has a core focus on evaluating and designing infrastructure improvements, both large and small.

SECTION 1 – EXECUTIVE SUMMARY

PROJECT UNDERSTANDING & FAMILIARITY

The City of Isle of Palms desires to partner with an experienced, high quality, engineering team that can provide them with engineering and drainage design necessary to protect the island from tidal surge and sea level rise while improving drainage. In addition, the team will also provide guidance in seeking funding assistance programs and grant applications including those offered through the Federal Emergency Management Agency (FEMA) for repairs and upgrades to the drainage system. While heavy rainfall has long been a nuisance in isolated areas on the island, recent extreme storm and tidal events have further exposed the inadequacies of the existing drainage system and the need for additional preparedness for future events. The ultimate needs of the City includes an overall plan and storm water model that can be used to identify current problems, plan future improvements and assist with future funding programming and grant acquisition.

Outfall at 3605 Waterway Blvd.

Having recently completed a very similar project for the City of Charleston, SC, Weston & Sampson is uniquely qualified to assist the City of IOP with this project. On that project, Weston & Sampson was tasked with studying the 15.9 square mile Church Creek watershed area, identifying problem areas, and developing solutions for implementation to alleviate flooding issues for local citizens.

The Weston & Sampson approach for this project includes simple and robust measures designed to prevent tidal surge to design levels while enabling drainage for portions of the basin affected by the three included outfalls. The approach will be to design outfalls that function properly based on current conditions. In addition, outfalls must be designed to accommodate changes in anticipated sea level as forecasted by NOAA. Our long-term approach includes the enlargement of channels to increase storage. Water surface elevations in the enlarged channels could be maintained and controlled by pumping. Pumping would be controlled and used only in preparation of significant storm events including tidal surge. In conjunction with the pumping and storage improvements, passive tidal barriers should be implemented using landscape buffer areas to prevent encroachment during events. Initially, the improved storage and water surface elevation control combined with the new outfalls will provide significant improvements for drainage during severe weather and tidal surges. In the future, as changing conditions warrant, additional higher volume

Outfall at 41st Ave.

pumping capabilities could be added to continue to increase capacity to maintain acceptable water surface elevations within the island. Improvements will be designed and phased in accordance with funding availability.

Our Principal in Charge, Bob Horner, PE, will work closely with the project manager, Mike Petrakis, PE, to ensure the project has the expertise, resources, and execution strategies in place to meet the City's expectations during the project. Bob has successfully managed multiple drainage projects throughout the state including the recent Church Creek drainage study project mentioned above. **The success of the Church Creek drainage study has earned Weston & Sampson the distinction of being recognized by the City of Charleston as being the firm that solved a centuries old flooding problem for the City. By applying a new modelling approach, the Weston & Sampson team was able to identify troubled areas and provide innovative solutions to the Church Creek flooding issues.**

Outfall at 30th Ave.

It is imperative that the partnering team have a thorough understanding of the FEMA grant application process as administered through the South Carolina Emergency Management Division (SCEMD). The drainage study and design work needs to be conducted and written in such a way that it may be used to meet requirements associated with future grant applications.

When we evaluate public works challenges such as flooding and drainage, our determination pushes us to investigate the physical attributes of the system to clearly understand how the system works and to verify results in multiple ways such that once our evaluations are complete, there is the utmost confidence in recommendations to resolve the challenges. Our approach will be direct, robust and simple. We will take a totally unbiased position when evaluating the following:

- History of flood events on Isle of Palms
- Performance of past improvements
- Accuracy and performance of the hydraulic model
- Calibration process used to validate the hydraulic model
- Recently proposed improvements
- Collaboration with local and regional jurisdictions
- Performance of recent improvements
- Recommendations for additional improvements to alleviate future flooding
- Coordination with regulatory authorities

We have performed multiple site visits to ensure that we understand the physical condition of each of the major components of the existing drainage system. We visually inspected many of the critical components to observe actual field conditions. Our initial observations indicate that while many areas of the island appear to have adequate drainage systems in place for normal storm events, much of the island drainage depends on infiltration to dissipate storm water. Localized ponding in low areas is indicative of portions of the systems dependency on infiltration. This is why once the ground becomes

saturated, after multiple normal storm events occur in succession, the island experiences more severe flooding. Saturated soils prevent infiltration and with insufficient local drainage systems in place storm water collects causing localized flooding.

GENERAL DESIGN APPROACH

We intend to combine our existing local and regional knowledge gained from projects in Charleston and Mount Pleasant, SC as well as places like Watertown, CT and Boston, MA with the collection of additional data through field observations, community meetings and conferences with City Staff. The structure of the data collection effort will be closely collaborated during the initial stages of the project with our hydraulics experts who will be able to evaluate performance of drainage features and proposed improvements while benchmarking against comparable stormwater projects. Several recent and successful Weston & Sampson projects all included several similar design parameters including tailwater influenced outfalls, significant land development, changes in weather patterns, storm frequency and intensity.

Kickoff & Community Outreach

To begin the drainage project, we will schedule a kickoff meeting between key members of our team, the City, Charleston County, and SCDOT. In-depth discussions early in the life of a project are key to promoting successful communication. This meeting will also give all stakeholders the opportunity to ensure their needs and expectations are clearly understood prior to any work being completed.

Data Collection

Our familiarity with the region and the basin will help make this phase very effective. Existing drainage inventory maps will be reviewed and compared to existing conditions. Elevations, conditions and sizes of key structures will be field verified. We will review in detail with the Team Members, all past studies and the recommended improvements that resulted. In addition, there will be a review of current design standards, water quality, and MS4 compliance requirements.

Existing Conditions

Using the data obtained during data collection, we propose to create a SWIMM model of the existing drainage conditions on the island. We recommend a SWIMM model due to the complex nature of riverine hydraulics in conjunction with Ocean tides and currents and storm events. SWIMM models provide the flexibility and tools needed to model different tides and riverine reactions to various storm events. SWIMM models also offer the added bonus of compatibility with multiple software platforms capable of running and manipulating them.

We will identify external impacts to the model such as flooded channels, wetland and marsh areas, tidal impacts associated with tailwater conditions, and realistic expected volumes of debris that can impact hydraulic performance in the stomwater conveyance system. Existing land use plans will be reviewed and the buildout conditions will be established in order to determine future stormwater flows. Planning periods such as 2 yr, 5 yr, 10 yr, 15 yr, 20 yr, buildout will be determined to assist with capital planning for any recommended improvements common to all planning horizons evaluated as part of this study.

Full Study and Improvement Recommendations

Once the SWIMM model has been created for the existing conditions, it can be analyzed to determine the areas on the island that are experiencing flooding problems and shed light on why those problems exist. The model can be manipulated for future storm and development conditions. Data can also be taken from NOAA studies to incorporate estimates on sea level rise and their effect on flooding. Weston & Sampson will use the model to develop strategies to improve the existing drainage conditions on the island as well as to prepare conceptual plans to mitigate severe storm events impacts when they occur. It is important to note that as the entire island is within the floodplain, feasibility of designs to eliminate flooding will be evaluated. Designs can be implemented that will help mitigate flood damage and reduce the time needed for flood waters to dissipate. These solutions and strategies will be investigated, developed, and prioritized by the design team with input from the City. Weston & Sampson will produce several projects and phases of design options including projects that may be implemented immediately to improve drainage or alleviate flooding.

Resilience / Adaptive Management / Operation

It is likely that on such a widespread system, that some very simple monitoring stations may be recommended that are tied to a simple SCADA system which will provide real time data collection of storm events and water surface elevations to document the performance of the drainage system. This will enable a much more accurate and continuous calibration of the hydraulic model while developing trends in performance that could be used to help direct future construction, improvements and maintenance efforts in an efficient manner. There are many suppliers of such systems now, many of which are relatively simple and economically plausible. An internet or cellular based system would serve this application well. Data can be linked to a GIS System that is part of an overall asset management program. These systems can be simple and very effective for storing and organizing information associated with drainage systems.

Once the Baseline Improvement Recommendations have been determined, the Team will establish a resilience program for the island. This program will incorporate existing design standards where appropriate, as well as new standards where deemed beneficial, with respect to stormwater quality and quantity. Climatological factors will be incorporated and innovative approaches will be evaluated in order to mitigate increased flood risk exposure due to storm or tidal event impacts. Our Team will develop an accurate understanding of how all of the drainage features interact with tidal events. In the past, there have been high tide scenarios which inundated some drainage assets. Our evaluation will review these events and our alternatives analysis will include innovative approaches to preserve stormwater storage capacity during similar events in the future.

Our Goal will be to develop a robust plan for the three outfalls specifically as well as for other recommendations associated with projects and operational improvements that will serve to strengthen and fortify the existing system while planning a path for the future to significantly improve drainage while reducing flood risk. This path will be supported by public participation, education and local engineering experience.

SECTION 1 – EXECUTIVE SUMMARY

WHY WESTON & SAMPSON

- ✓ We have recent, local, relevant experience with projects of similar scope and size.
- ✓ Strong project management team with decades of similar engineering experience
- ✓ *LOCAL* office with *LOCAL* team members committed to providing the Isle of Palms with engineering and drainage design necessary to protect the island from tidal surge and sea level rise, while improving drainage.
- ✓ Most recently Weston & Sampson helped the City of Charleston solve a 200-year old drainage problem by studying the 15.9 square mile Church Creek watershed area, identifying problem areas, and developing solutions for implementation to alleviate flooding issues for local citizens.
- ✓ Project Manager, who under previous employement with the City of Myrtle Beach Public Works, **managed a similar outfall project on Fourth Avenue North**, which included the installation of two 84” pipes underground to a point approximately 1,100 feet into the ocean.
- ✓ Our experience evaluating and designing water, sewer, storm water and related site utilities dates back to 1889 when the firm was founded.
- ✓ More than 570 multidiscipline staff to call upon in-house.
- ✓ Decades of experience assisting communities, agencies and private entities in meeting their Stormwater needs on small- and large-scale projects.
- ✓ Experience with environmental sensitive areas.

SECTION 2 – FIRM'S WORK HISTORY

Since 1899, Weston & Sampson has been providing municipalities, public agencies, and private sector clients with cost-effective and innovative solutions to their infrastructure, utility, and environmental engineering challenges throughout the eastern United States. Incorporated in 1899, Weston & Sampson maintains several offices throughout the eastern United States, and employs over 570 professionals. Our Engineers have been serving the Charleston area for over 30 years, and we have the applicable state engineering licenses.

Our local office, where services for this project will be performed, is located in Charleston (SE Regional Headquarters). Address and phone number for our local office is as follows:

3955 Faber Place Drive, Suite 300
North Charleston, SC 29405
Tel: (843) 881-9804

Stormwater Infrastructure

Weston & Sampson has assisted municipal, agency, and private sector clients with evaluation, planning, design, permitting, and construction of stormwater, wastewater, and water infrastructure for more than a century. Our firm's extensive experience results in proven designs that are not only innovative and effective, but also easily bid, constructed, and maintained. In addition to the design of traditional stormwater infrastructure – such as culverts, pipelines, manholes, and outfalls – our experience includes the evaluation and design of innovative and cost-effective point- and non-point stormwater runoff control and treatment systems, such as retention basins, rain gardens, and particle separators.

Our engineers have completed dozens of in-depth hydrologic studies for a variety of project types. Some of these studies have been performed on watersheds up to 25 square miles and included wetland impact mitigation and stream channel stabilization plans. Most all infrastructure projects today require knowledge of Federal, State and local inland wetland and storm water management regulations. **These assignments require that our staff perform hydrologic and hydraulic analyses of existing watersheds, identification of critical areas of flooding, design of new and remedial facilities to address hydraulic deficiencies while reducing flooding and the associated impacts to adjacent properties.**

Most recently, Weston & Sampson was selected by the City of Charleston for the Church Creek Drainage Basin Evaluation. The scope of work included completing a review of former evaluations, upgrading the hydraulic model and providing recommendations for improvements to prevent flooding in the future as growth continues. In addition, we developed storm water management strategies to mitigate adverse stormwater impacts as development continues and **successfully led several well-attended public outreach meetings and improved public confidence for the City of Charleston.**

As a result of this project, the City of Charleston has publicly recognized Weston & Sampson as having solved a 200-year old drainage problem.

Specialized Coastal Design and Technical Competence

We recognize that developing solutions to Isle of Palms coastal flooding and resiliency challenges requires an understanding of current infrastructure and operational challenges, coastal dynamics under current and future climate change conditions, innovative problem-solving, and the ability to plan, design, and construct projects that are effective in both the short- and long-term. Our fully integrated team will

provide the City with expertise across all of the areas, including nationally recognized coastal engineering expertise.

Stormwater Financing

Our stormwater/ wastewater professionals are experienced in helping clients evaluate and procure funding from various sources. Weston & Sampson's experience includes developing detailed financing scenario plans for numerous projects using methods that require legislative approval where necessary to assure equitable cost distribution. To your project, we will bring our understanding of stormwater issues and the extreme challenges that communities face in getting projects approved for funding, together with financing concepts that can often result in long-term environmental benefits.

SWMM-Based Hydrologic / Hydraulic Modeling & Analysis

Weston & Sampson has utilized computerized software for stormwater modeling as a tool for the last 28 years. Our earliest experience included a major project for the Boston Water and Sewer Commission in 1985. This project included a full evaluation of the entire Downtown Boston sewer system in all its complexity. The Downtown Boston sewer system was 70% combined sewers and 30% separated sewers. With the development of personal computers, more efficient software evolved and Weston & Sampson took advantage of their capabilities immediately. To complete this project, we utilized PCSWMM, the personal computer version of the original Environmental Protection Agency (EPA) Stormwater Modeling Software or (SWMM).

Over the past 25 years, the software industry has exploded with many options available in hydraulic modeling software. Weston & Sampson has extensive experience in utilizing the following SWMM-Based modeling programs for hydrologic and hydraulic modeling:

- EPA 5.0 Stormwater Modeling (SWMM) public domain version
- EPA Stormwater Modeling (PCSWMM) CHI version
- XPSWMM 2013 (XP Software version)

Additional Software Modeling Experience on small and large-scale projects includes:

- R 20 & TR 55
- HEC-GeoRAS
- Hydrocad
- Hydra
- SewerCad
- Hydraflow
- HEC-HMS

Survey/GIS/GPS/Mapping

Weston & Sampson offers a full range of survey and GIS services, including topographic and planimetric surveys, easement research and preparation, scanning and data conversion, hardware and software acquisition, applications development, web-based GIS, training and technical support. Our experience

includes developing in-depth GIS applications, building parcel databases and creating unique GIS solutions. As an ESRI-authorized business partner, Weston & Sampson uses the latest GIS software, applications, extensions, and conversion techniques. Our staff of experienced technicians is also proficient at Global Positioning Systems (GPS), Relational Database Management Systems (RDBMS), ESRI desktop and server products, MapInfo, AutoCAD Map, Data Conversion, and client/server applications.

Utility Evaluation & Design

Our experience evaluating and designing water, sewer, storm water and related site utilities dates back to 1889 when the firm was founded. We have worked on literally hundreds of thousands of feet of utilities as well as designed municipal and private treatment plants. Our experience also includes capacity evaluations, routing alternatives, and rights-of-way negotiations. Weston & Sampson also provides design-build and operation and maintenance (O&M) services. Our staff of hands-on experts consists of licensed professional engineers, certified operators, plumbers, licensed electricians, and technicians who have specialized experience in water and wastewater distribution, collection, pumping, and treatment.

REFERENCES			
Client/Owner Name & Address		**Contact Name, Email & Phone**	**Description of Work Completed**
1)	City of Charleston 75 Calhoun Street Charleston, SC	Laura Cabiness CabinessL@charleston-sc.gov (843) 724-3754	Church Creek Drainage Basin Evaluation and Recommendations
2)	Charleston County 4045 Bridge View Drive N. Charleston, SC	Brett Champion BChampion@charlestoncounty.org (843) 202-7639	Signal Point Drainage Evaluation
3)	Berkeley County 212 Oakley Plantation Drive Moncks Corner, SC	Tom Lewis Thomas.Lewis@berkeleycountysc.gov (843) 719-4127	Transportation IDC Contract – Murray Drive/Yeamans Hall Road Intersection Improvements

We have included detailed project sheets on the following pages to showcase our Team's similar, recent experience.

COMPREHENSIVE STORMWATER SERVICES

For more information, contact:

Robert A. Goober, PE
Weston & Sampson
(800) SAMPSON | gooberr@wseinc.com

- **Analysis and modeling**
- **Illicit connection detection and removal**
- **Drainage, culvert, and channel improvements**
- **Best Management Practices (BMPs) and treatment systems**
- **Bylaws and stormwater utilities**
- **State and National Pollutant Discharge Elimination System (SPDES/NPDES) stormwater program permit compliance**
- **Low Impact Development (LID)**

Weston & Sampson offers extensive stormwater services and can provide assistance with a multitude of diverse stormwater-related issues. We have decades of experience assisting communities, agencies, and private entities in meeting their stormwater needs on small- and large-scale projects. This experience ranges from addressing individual residential needs to system-wide drainage needs. We provide traditional engineering services such as evaluation, design, and construction of drainage infrastructure, but are also at the forefront of our industry in offering state-of-the art services such as digital data collection/ management and incorporating green practices/low impact development into our designs. With the experience and expertise of more than 450 engineers, scientists, hydrologists, permitting specialists and other professionals, we provide a full range of in-house stormwater capabilities. A list of the types of services we offer is provided below; however, this list is not exhaustive, as we pride ourselves on our ability to tailor each project to meet our clients' specific needs as we strive to provide unparalleled innovative and effective solutions.

EVALUATION, DESIGN & CONSTRUCTION

- Pipeline, Culvert, and Channel Analysis
- Hydraulic Modeling
- Drainage Pump Station Installation/ Replacement/Rehabilitation Design
- Permitting & Public Bidding
- Construction Administration/ Resident Representation

WATER RESOURCE MANAGEMENT

- Water Resources Planning
- Hydrologic Modeling
- Recharge & Water Management Act
- Flood Assessment & Control
- Nutrient Loading Reduction Analysis

ASSET IDENTIFICATION & MAPPING

- Field Location/Verification
- Digital Data Collection
- Survey
- Global Positioning System (GPS)
- Geographic Information Systems (GIS)

STORMWATER MANAGEMENT

- Stormwater Master Planning
- Structural Best Management Practices
- Treatment Systems
- Rain Gardens
- Retention/Detention Basins
- Stormwater Recovery & Reuse
- Low Impact Development (LID)
- Green Practices
- Porous Pavement
- Operation & Maintenance Plans

OTHER STORMWATER SERVICES

- Funding Assistance (budgeting, grants, loans, etc.)
- Federal/State Enforcement Assistance
- Hazard Mitigation & Emergency Response Planning

CHURCH CREEK DRAINAGE BASIN FLOOD REDUCTION STUDY

city of charleston, south carolina

The City of Charleston selected Weston & Sampson to perform the Church Creek Drainage Basin and Flood Reduction Study. The Church Creek Drainage Basin includes over 10,000 acres of residential and commercial developments. The area has experienced flooding in the past with an increasing in severity and frequency over the last three years. Weston & Sampson evaluated past study recommendations, many of which have been implemented, upgraded the hydraulic model to ICPR4, directed over 14 outreach meetings, and developed seven initiatives that would fix the flooding problems if implemented. The recommendations included tidal surge protection at key locations, stormwater diversions, channel maintenance, protection of the flood plain, a regional stormwater pumping facility and policy recommendations associated with the stormwater design manual that govern drainage design. The City is currently implementing the policy recommendations that were developed as a part of the study along with one of the six remaining projects. Implementation of the remaining projects is anticipated as funding sources are identified.

As a result of this project, the City of Charleston has publicly recognized Weston & Sampson as having solved a 200-year old drainage problem.

client contact

Laura Cabiness, PE
Director of Public Service
City of Charleston
843-724-3754
cabinessl@charleston-sc.gov

SIGNAL POINT ROAD DRAINAGE BASIN EVALUATION

charleston county

Weston & Sampson evaluated the existing drainage conditions with the Signal Point Road Drainage Basin associated with current drainage challenges originating in the Signal Point Road area and downstream to the outfall into the Stono River.

The scope included reviewing all available surveying, mapping and drainage facility inventory data for the basin; performing additional surveying to identify key elements and for condition verification; identifying drainage basin boundary; walking the channel and inspecting existing culverts, obstructions, vegetation and section dimensions; developing and running stormwater model for trunks sytem; developing channel improvement recommendations; coordinating conceptual improvements with SCDOT and OCRM; and providing a summary report to the County to document our effort and provide recommendations along with preliminary cost estimates for drainage improvements within the basin.

client contact

Charleston County Public Works
Mr. Brett Champion
BChampion@charlestoncounty.org
(843) 202-7639

DRAINAGE STUDY AND TIDAL IMPACT MITIGATION

charleston national hoa

Working with the Town of Mount Pleasant, Charleston National Country Club and The Charleston National Owners' Association, we performed an assessment of the overall drainage system which consists of a system of interconnected ponds and piped culverts. The drainage basin is over 1000 acres and is impacted by off-site development. The outfalls are affected by tidal influences which impacted water quality and storage capacity. High tides and recent significant flooding events in October 2015 as well as Hurricane Matthew in 2016 inundated portions of the drainage system flooding. In addition, freshwater supplies used by the golf course for irrigation were contaminated by saltwater. Weston & Sampson was engaged to develop ma pping of the entire basin drainage system and to assess impacts to the drainage system from erosion and siltation. We were also asked to evaluate alternatives to prevent future saltwater contamination of the Stormwater pond system which also serves as a fresh water reservoir. Our study resulted in various recommendations including modifications to drainage structures that would preserve Stormwater storage capacity while preventing saltwater intrusion. A very innovative drainage structure was designed by W&S Engineers that utilized buoyancy controlled gates to allow Stormwater to flow during storm events while always keeping saltwater from encroaching into the reservoir contaminating freshwater supplies and depleting Stormwater storage capacity. Due to the innovative approach and design of this successful project, it was selected for presentation at the 2017 South Carolina Environmental Conference in Myrtle Beach.

client contact

Timothy Kane
Charleston National HOA
843-203-9994

FELDER CREEK DRAINAGE BASIN

malphrus development

Weston & Sampson (formerly HEG Engineering) was retained by Malphrus Development to provide engineering services for the Felder Creek Drainage Basin in Berkeley County, South Carolina.

The purpose of this project was to plan improvements for continued development within the Berkeley County/Felder Creek/Jedburg Road area. Study parameters included water quality, available storage, planned storage, floodway impacts, and US Army Corps of Engineers permitting.

Weston & Sampson professionals performed the original topographic surveys as well as identified the drainage basins affected by the overall project. In addition, we also evaluated the off-site impacts to drainage and incorporated those into a drainage model to determine the cumulative effects of various rainfall events, such as 5 year, 10 year and 25 year storms on existing and proposed drainage improvements in the area.

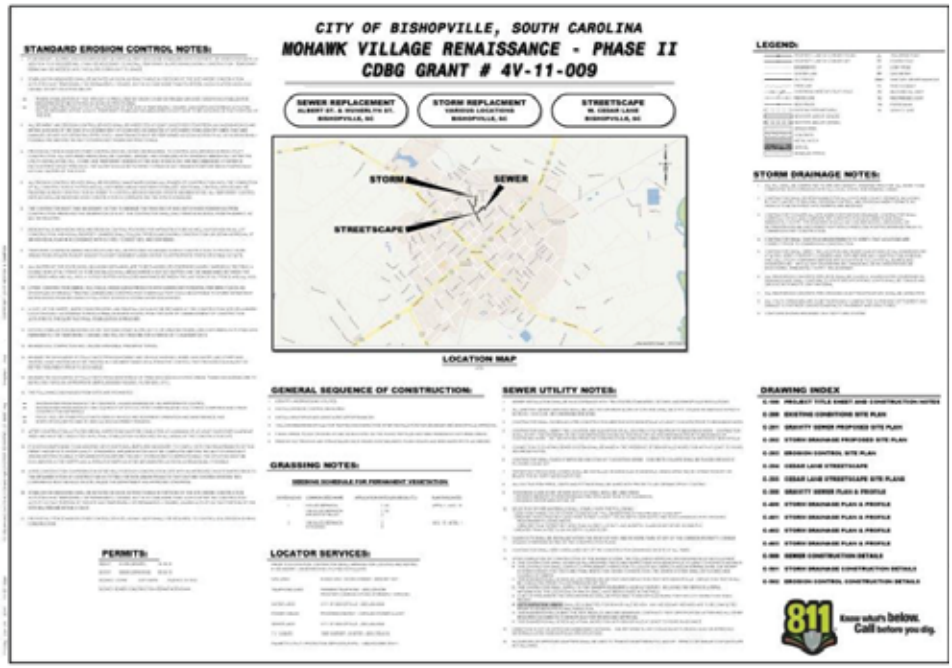
Recommendations were reviewed and approved by SCDHEC, OCRM, Berkeley County Public Works, the US Army Corps of Engineers and SCDOT. Improvements were constructed and are currently in service. The project was completed on-time and under budget.

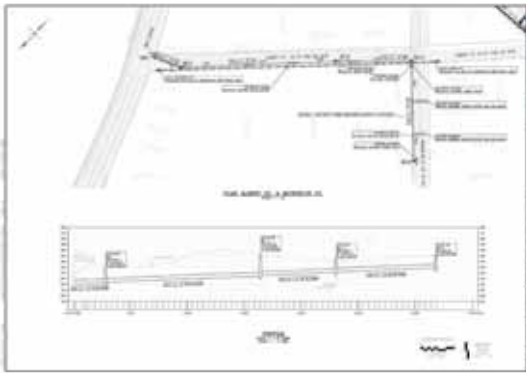
client contact

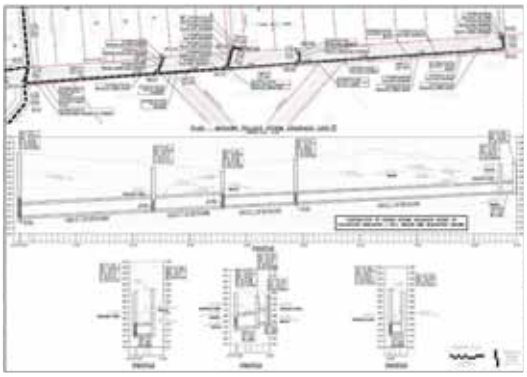
Van Malphrus
Malphrus Development
321 Partridge Creek Rd.
Summerville, South Carolina 29483
843-688-6197

MOHAWK VILLAGE RENAISSANCE, PHASE II

city of bishopville, south carolina







Weston & Sampson was selected through a competitive bid process to provide the design for gravity line, drainage and streetscape improvements for the Mohawk neighborhood in Bishopville.

The project is funded through the Community Development Block Grant (CDBG) program, so close coordination with the Santee-Lynches Regional Council of Governments is key to ensuring all grant requirements are met.

Services include the design of 450 LF of 8-in. PVC along Albert Street and 100 LF along Munnerlyn Street. Drainage improvements throughout the neighborhood will be designed, as the elevation levels vary greatly throughout the neighborhood. Services also include streetscape improvements along Cedar Street to include street lighting, pedestrian signs, plantings, and four crosswalks at the major intersections along Cedar Street.

Construction was completed in early 2014.

client contact

Ronnie Williams
City of Bishopville
135 E. Church Street
Bishopville, SC 29010
803-484-5948

CRESCENT LAKE AREA ROADWAY & DRAINAGE IMPROVEMENTS

town of enfield, connecticut

Weston & Sampson was selected to provide the Town of Enfield with consulting engineering services for full depth roadway reconstruction to numerous roads within the Crescent Lake Area. This project is being conducted under an on-call transportation contract between Weston & Sampson and the Town.

This particular project includes two miles of roadway including the lake community surrounding Crescent Lake and an adjacent sub-division. Upgrades to the roadway include full depth roadway reconstruction, drainage and intersection improvements, and ADA upgrades at pedestrian crossings.

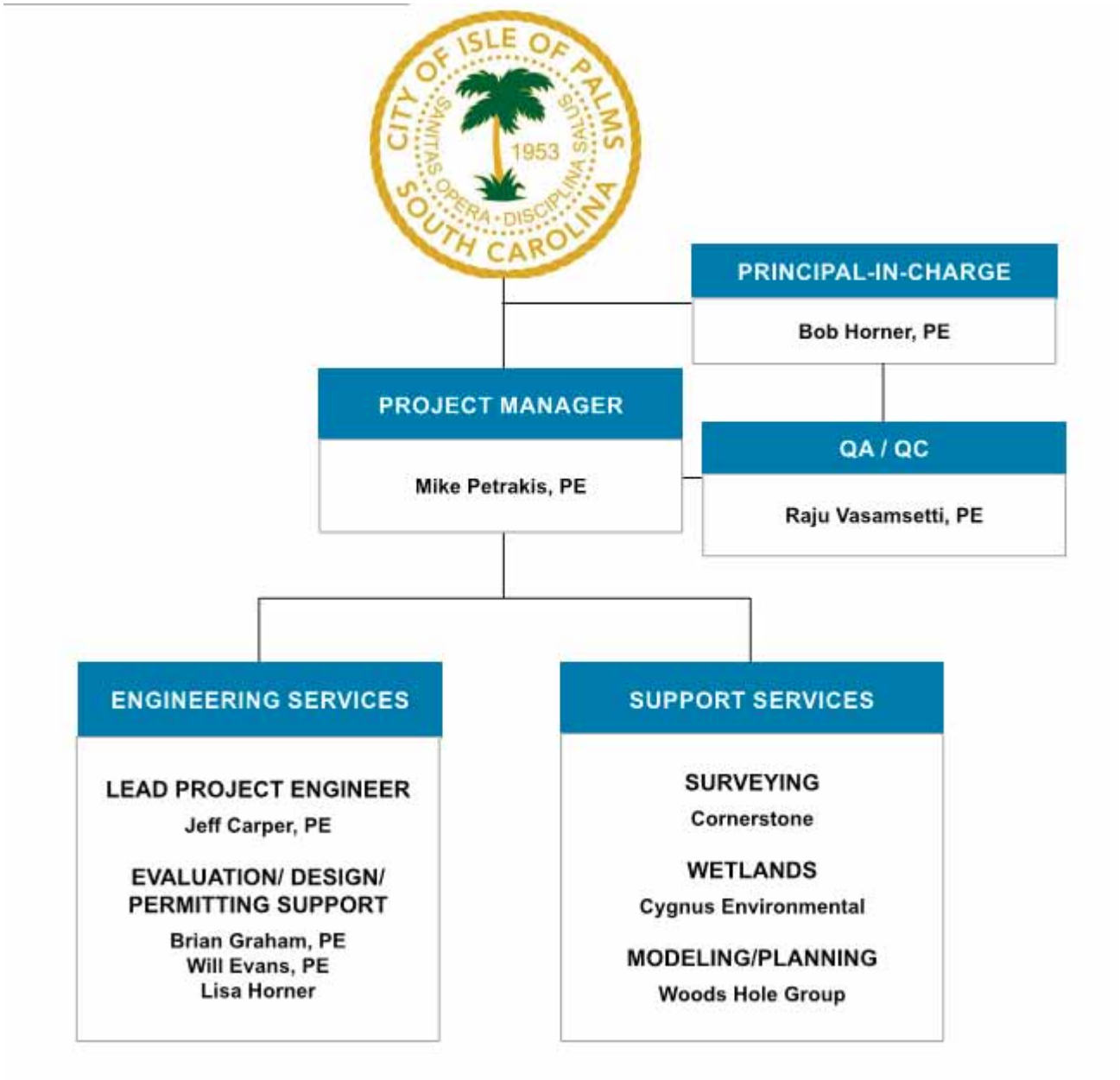
The project also involves an in-depth evaluation of approximately 8,000 linear feet of existing storm drainage pipes in ten different storm drainage pipe networks using hydraulic modeling software. The site experiences frequent flooding with unraveling pavement and irregular cracking of roadways from nuisance flooding. The proposed design includes upgrading the existing storm water systems while proposing several new storm drainage systems consisting of approximately 5,500 linear feet of piping, stormwater management with Low Impact Development (LID), and stormwater quality measures. The design includes town and state permit approvals to comply with environmental regulations. This project is under construction with an anticipated completion of summer of 2016.

client contact

John Cabibbo
Town Engineer
860-253-6366
jCabibbo@enfield.org

SECTION 3 – PROJECT TEAM

Weston & Sampson has assembled a project team of professionals that has the qualifications and experience necessary to successfully complete the project within the scope as needed by the City. Our team members include local Professional Engineers with decades of relevant experience and direct knowledge of local infrastructure.



SECTION 3 – PROJECT TEAM

Qualifications of Project Manager and Management Team

Bob Horner, PE*, serving as *principal-in-charge*,** has over 30 years of experience in all aspects of civil engineering and has managed and reviewed like projects for a number of municipal clients. Bob has an in-depth understanding of infrastructure, hydraulics and drainage and utilities. He has extensive experience with large public works projects including not only technician design aspects but in public relations, easement acquisitions, community impact, mitigation and public acceptance. Bob's project experience includes stormwater & flooding evaluation and control, hydraulics, project design, management, road design, bridge design, rail road design, water transmission and distribution, wastewater collection and pumping, treatment facility expansion, rehabilitation, facility master planning, traffic engineering, project management and construction administration and inspection. Bob has successfully managed multiple drainage projects throughout the state including the recent ***Church Creek Drainage Study project for the City of Charleston. The success of the Church Creek drainage study has earned Weston & Sampson the distinction of being recognized by the City of Charleston as being the firm that solved a centuries old flooding problem for the City.

Mike Petrakis, PE, serving as ***project manager***, brings over 27 years of project management experience on large capital projects to this project team. He will serve as the point person for the City of Isle of Palms, and manage all day-to-day aspects of this important outfall project. He was previously the CIP Project Manager and Project Engineer for the City of Myrtle Beach Public Works, where he **managed a similar outfall project on Fourth Avenue North**, which included the installation of two 84" pipes underground to a point approximately 1,100 feet into the ocean. Mike has spent his career providing design, project management, and project representative services for a number of like projects.

Jeff Carper, PE, will be our ***lead project engineer for this project.*** Jeff has over 24 years of experience in civil design and modeling. Skills include hydrologic and hydraulic modeling; large scale modeling; hydrologic studies; stormwater management treatment systems analysis & design; application of latest best management practices (BMPs); design of drainage collection/conveyance systems, pipes/culverts, swales, exfiltration trenches, detention/retention ponds, inlet/outlet control structures; end-of-pipe innovative devices; stormwater master plans; pollutant loading assessments; multi-agency permitting; municipal separate storm sewer systems (MS4s); erosion and sedimentation control plans; and stormwater pollution prevention plans (SWPPPs). Jeff has prepared stormwater master plans for several of the premier neighborhoods in the Charleston area: Coosaw Creek, Hope Plantation, Dunes West, and Beresford Hall. Additionally, he provided stormwater design for two of the largest high schools in the area, West Ashley High School and Wando High School, and for a few industrial parks.

We have included resumes for all of our proposed team member on the following pages.

ROBERT HORNER, PE

BACKGROUND

August 2013 - Present
Vice President | Regional Manager
Weston & Sampson

May 2010 - August 2013
Senior Associate | Program Manager
Weston & Sampson

July 2004 - May 2010
Principal
HEG, LLC

October 1997 - August 2004
Director of Design & Construction
Charleston Commissioners of Public Works

September 1989 - October 1997
Engineering Manager
Charleston Commissioners of Public Works

June 1986 - September 1989
Associate Engineer
Charleston Commissioners of Public Works

June 1985 - June 1986
Associate Engineer
Nivens Engineering, Inc.

EDUCATION

1985
Bacehlor of Science
Civil Engineering
The Citadel, Charleston, SC

1982
Bachelor of Science
Biology
The Citadel, Charleston, SC

PROFESSIONAL REGISTRATION

Professional Engineer:

South Carolina No.13416
North Carolina No.032786
Georgia No.034969
Ohio No.75111

Certified Erosion Prevention & Sediment Control Inspector, 0568

Bob has more than 30 years of engineering design and leadership experience. He has an in-depth understanding of the public works industry having worked as an Engineer, Engineering Manager and Director of Design & Construction for the Charleston Commissioners of Public Works collectively for 18 years. Bob has extensive experience with the conceptual development and detailed designs for large public works projects, including public relations, easement acquisitions, community impact mitigation and public acceptance. His project experience includes facility master planning and expansion, stormwater management, water transmission and distribution, wastewater collection and pumping, all aspects of water/wastewater rehabilitation, roads, bridges and drainage.

A civil engineering graduate of The Citadel, Bob is talented in the development and coordination of practical and economical solutions for complex engineering problems. His approach to all projects includes team-building and determination to see projects beyond completion and well into the operational phase.

Bob has successfully managed multiple drainage projects throughout the state including the recent Church Creek Drainage Study project for the City of Charleston. The success of the Church Creek drainage study has earned Weston & Sampson the distinction of being recognized by the City of Charleston as being the firm that solved a centuries old flooding problem for the City.

SPECIFIC PROJECT EXPERIENCE

City of Charleston Church Creek Drainage Basin Evaluation & Improvements

Charleston County Signal Point Road Drainage Basin Evaluation, Charleston, South Carolina

Charleston National Drainage Improvements, Mt. Pleasant, South Carolina.

Northwoods Mall Drainage Basin-Goose Creek Reservoir Drainage Improvements, Charleston, South Carolina

Felder Creek Drainage Basin, Berkeley County, South Carolina

SCDOT Enoree River Bridge Replacement, Union, South Carolina

Dillon County Infrastructure Improvements to Support Harbor Freight Tools Expansion and Inland Port, Dillon, South Carolina

Berkeley County Public Works Transportation IDC, Yeamans Hall Road Intersection Improvements, Hanahan, South Carolina

Summerville West 1st North Street Sidewalk and Drainage Improvements

City of Hanahan Sidewalk and Drainage Improvements

MICHAEL PETRAKIS, PE

BACKGROUND

2018-Present
Project Manager
Weston & Sampson

1995-2018
City Engineer | CIP Project Manager | Grant & Contract Coordinator
City of Myrtle Beach Public Works Department

1992-1995
Resident Engineer
Hazen and Sawyer, P.C.

1992
Instructor | Department Chair
Civil Engineering Technology
Horry Georgetown Technical College

1989-1992
General Manager
Ramada Inn

1981-1989
Plant Engineer | Construction Manager
Nassau County Department of Public Works

1980-1981
Civil Engineer
Andron Construction

1977-1980
Civil/Environmental Engineer
Hazen and Sawyer, P.C.

1976-1977
Civil/Environmental Engineer
Albert Switzer and Associates, Inc.

EDUCATION

1976
Bachelor of Science
Civil Engineering
Tulane University

PROFESSIONAL REGISTRATION

Professional Engineer:

South Carolina No. 17363

Michael is a project manager with over 27 years of project management experience on large capital projects.

SPECIFIC PROJECT EXPERIENCE

SCSPA Main Office Building, Mt Pleasant, SC. The South Carolina State Ports Authority has undertaken the design and construction of its new headquarters building at the Wando Welch Terminal. The new Main Office Building will be delivered via the Design-Build methodology and includes the development of the building site including all grading, drainage, utilities, roadways and appurtenances, as well as a new Class "A" 80,000+ square foot, four story steel structure with glass curtain/brick wall structure. Weston & Sampson was enlisted to serve as the Owner's Engineer and provide Site Supervision Services to manage the Authority's project throughout the Design-Build process. The work includes Project Management, Construction Phase and Project Closeout tasks.

BCWS PS 002 Replacement, Hydraulic Modeling & Force Main Replacement, Berkeley County, SC. Construction Inspections for PS002 replacement, which is a critical asset to BCWS; it's the second largest pump station in the BCWS wastewater system, delivering approximately 35% of the influent flow to the Lower Berkeley Wastewater Treatment Plant (LBWWTP). The station currently has three (3) large submersible pumps, (3) Flygt NP-3356 at 150 HP each. PS002 has a design capacity of 12,000 gallons per minute with two pumps in operation with the force main interconnection between PS001 and PS002 closed. Scope of work will include quantifying current and future wastewater flows to PS002, hydraulic modeling and force main capacity evaluation for PS001 and PS002, PS002 site plan and upgrade plans, recommended FM replacement size and construction plans and specs.

BCWS PS004 Force Main Relocation, Berkeley County, SC. Construction Inspector for the PS004 Force Main Relocation project in Hanahan, South Carolina. Scope includes the construction of approximately 5,500 LF of new 10" PVC pipe using a combination of trenchless and trenched methods, including jack & bore, horizontal direction drill, and open-cut placement. The current force main is in failing condition due to hydrogen sulfide corrosion.

Fourth Avenue North Deepwater Ocean Outfall Project, City of Myrtle Beach, SC. Project Manager for the Fourth Ave. Ocean Outfall that included the installation of two pipes, 84 inches in diameter, underground from Ocean Boulevard at Fourth Avenue North to a point approximately 1,100 feet into the ocean.

CIP Project Manager and Project Engineer, City of Myrtle Beach Public Works, SC. Consulted with operations, engineering and finance to develop City of Myrtle Beach five-year CIP plans for water and sewer projects, averaging $5 million annually. Coordinated multiple projects during design and construction; worked with consultants, contractors and utility companies and regulatory agencies to resolve problems and initiate solutions; assisted with field decisions and change orders; monitored schedules and budgets.

JEFFREY CARPER, PE

BACKGROUND

2018-Present
Senior Project Manager
Weston & Sampson

2015-2018
Project Manager
Weston & Sampson

2013-2014
Senior Civil Designer
Weston & Sampson

2010-2013
Engineer IV / Sr. Project Manager
HGBD, Inc.

2007-2010
Engineer III, Project Manager
HGBD, Inc.

2004-2007
Engineer II
HGBD, Inc.

2001-2004
Engineer I
HGBD, Inc.

1994-2001
Technician
HGBD, Inc.

EDUCATION

2008
GEOPAK V7 to V8 Migration
GEOPAK Road 1
GEOPAK Site 1
Bentley Institute

1996
Stormwater Detention Basin Design
Basic Stormwater Drainage Design
Clemson University

1992
Civil Engineering
The Citadel

PROFESSIONAL REGISTRATION

Professional Engineer:

North Carolina No. 041991

Jeff serves as project manager for all drainage assignments, and has over 20 years of experience in civil design and modeling. He provides civil design services for all land development projects in the Charleston office from land planning, road and infrastructure design, hydrologic and hydraulic modeling. Skills include hydrologic and hydraulic modeling; large scale modeling; hydrologic studies; stormwater management treatment systems analysis & design; application of latest best management practices (BMPs); design of drainage collection/ conveyance systems, pipes/culverts, swales, exfiltration trenches, detention/retention ponds, inlet/outlet control structures; end-of-pipe innovative devices; stormwater master plans; pollutant loading assessments; multi-agency permitting including National Pollutant Discharge Elimination System (NPDES) permits; South Carolina Department of Health and Environmental Control (SCDHEC) permits; municipal separate storm sewer systems (MS4s); erosion and sedimentation control plans; and stormwater pollution prevention plans (SWPPPs).

SPECIFIC PROJECT EXPERIENCE

Charleston County Signal Point Drainage Evaluation

City of Charleston Church Creek Drainage Basin Study and Recommendations, West Ashley, SC

BCWS FY ‘17 Pump Stations, Berkeley County, SC

Sewer System Flow Monitoring, Ridgeland, SC

SCDOT On-Call Utility Coordination, all over SC

SCDOT Small Purchase Program, all over SC

SCANA Design/Permitting for numerous gas main replacements and extensions, all over SC

Dillon County Roads, water and Sewer Improvements, Dillon, SC

Berkeley County IDC for Transportation, Berkeley, SC

Sparrow & Kennedy John Deere Tractor Site Planning for New Store

Greene Street Corridor, SC

US Hwy 278 Widening, Beaufort, SC

River Oaks Drive Roadway and Drainage Improvements, Horry County, SC

Wando High School Storm Drainage Design and Analysis, Mt Pleasant, SC

West Ashley High School Storm Drainage Designand Analysis, Charleston, SC

North Beach Storm Water Outfall Improvements, Horry County, SC

MPW On Call Water Distribution, Mt Pleasant, SC

All Safe Storage Site and Drainage Design

RAJU VASAMSETTI, PE

BACKGROUND

2015-Present
Project Manager
Weston & Sampson

2008-2015
Senior Civil Engineer
WMC Consulting Engineers

2003-2008
Water Resources Engineer
Milone & McBroom, Inc.

EDUCATION

2003
Master of Science | Civil & Environmental Engineering
South Dakota School of Mines & Technology

1999
Bachelor of Engineering
Civil Engineering
Osmania University

PROFESSIONAL REGISTRATIONS & CERTIFICATIONS

Professional Engineer:
Connecticut No. 25720

OSHA 10-Hour Construction Training

PROFESSIONAL SOCIETIES

Connecticut Association of Flood Managers (CAFM)

HONORS

ConnDOT Approved Hydraulic Engineer

PRESENTATIONS & PUBLICATIONS

2003
"Characterizing Physical and Hydraulic Habitat Using Arc GIS and Hydraulic Modeling Techniques"

2003
"Hydraulic Modeling to Characterize Brown Trout Habitat in Rapid Creek"

Raju, a project manager at Weston & Sampson, specializes in hydrologic/hydraulic analysis, design, and permitting for stormwater management, highway, bridge/ culvert replacement, flood control, and stream restoration projects. His experience ranges from preliminary project planning through final design to permitting and construction contract administration. An expert in helping clients achieve resiliency from inland/ coastal flooding and shoreline destruction, Raju focuses his efforts on understanding and improving inland/ coastal drainage and infrastructure for municipalities.

Raju is proficient in the application of hydrologic/ hydraulic and stormwater modeling computer programs such as HEC-1, HEC-2, HEC-GeoRAS 10.0, HEC-HMS 4.0, HEC-RAS 4.1, HY-8, Hydraflow-Express, Hydraflow-Hydrographs, Hydraflow-StormSewers, HydroCAD, ICPR 4 (2D), SMS, TR-20, TR-55, and ArcGIS 10.0 for scour analysis and various coordinate geometry programs.

SPECIFIC PROJECT EXPERIENCE

Church Creek Drainage Basin, Charleston, South Carolina. The Church Creek drainage basin drains a total of area of nearly 5,000 acres located along the western side of the Ashley River. Historically the area was composed mainly of old phosphate mines and marsh areas and today is approximately 80% developed with mainly residential and some commercial development. The scope of work includes completing a review of the stormwater analysis that has taken place in the Church Creek drainage basin over the years and to make recommendations of additional development standards, policies and physical infrastructure improvements that could be implemented to reduce the risk of flooding and property damage due to flooding in the basin.

Reedy River Hydraulic Analysis, Greenville, South Carolina. Water resources engineer for hydraulic analysis of a 6-mile stretch of Reedy River in Greenville, which has approximately 20 major roadway crossings. Used HEC-GeoRAS to perform existing hydraulic analysis to evaluate flooding concerns and delineate flooding limits to assist FEMA map revisions. Identified feasible alternatives including several combinations of bridge replacements and channelization.

Roadway and Drainage Improvements, Enfield, Connecticut. Project manager involved with drainage design for the design, modeling, and permitting for replacement of 11,000 feet of roadway including major drainage improvements, erosion control, and water quality measures around Crescent Lake area. Used Hydraflow Storm Sewers to perform drainage analysis, which included providing new storm drainage systems and improving the existing infrastructure.

Flood Control and Stream Restoration Projects, Various Locations, Connecticut. Water resources engineer for flood control and stream restoration projects involving several miles of stream hydraulic modeling, unsteady-state hydraulic modeling, stream restoration, stormwater management, and floodplain mapping for Harbor Brook flood control study in Meriden, Connecticut; Coppermine Brook flood control study in Bristol, Connecticut; Keeler Brook flood control and drainage

WILL EVANS, PE

BACKGROUND

2018-Present
Engineer II
Weston & Sampson

2016-2018
Engineer I
Weston & Sampson

2011-2016
Geophysics Specialist II
GEL Engineering

EDUCATION

2010
Bachelor of Science
Civil Engineering
Clemson University

PROFESSIONAL REGISTRATION

Professional Engineer:
South Carolina No.33553

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

Will, a graduate of Clemson University's Civil Engineering program, is an engineer with experience in utility coordination, subsurface utility engineering investigations, and water, wastewater, stormwater and road design. He has conducted numerous SUE investigations using various geophysical methods including radio-frequency electromagnetics, ground penetrating radar, and computer-assisted radar tomography.

SPECIFIC PROJECT EXPERIENCE

SCANA, All over South Carolina. Design and permitting for a number of extensions and replacement of gas mains. The development of templates and standards used by the client have enabled a quick project turn around.

SCDOT On Call Utility Coordination, all over SC. Weston & Sampson was recently selected to provide utility coordination services for selected projects for the SCDOT, on an on call basis.

SCDOT Small Purchase Program, all over SC. Weston & Sampson was recently selected to provide engineering services in the following areas for the SCDOT Small Purchase program, as the need arises: Hydrology/Hydraulics, Environmental Services, Landscape Architecture/Design, Maintenance of Traffic Design, Pavement Marking/Signage Design, Road Design, Structural Design and Value Engineering.

Berkeley County Public Works Indefinite Delivery Contract. Project Engineer for this IDIQ to provide surveying, design, geotechnical, permitting and construction administration and inspection services for various road, drainage and infrastructure related projects. Our staff is currently working on intersection improvements located in the City of Hanahan on Yeamans Hall Road which includes turn lane improvements, traffic signal improvements, sidewalks drainage and pedestrian safety and accessibility improvements.

Dillon County Harbor Freight Tools Expansion Ph 2, I-95 Gateway Industrial Park, Dillon, SC. Phase 2 of the project includes expanding the Industrial Park Road for 4,350 LF of 45-foot, 3-lane roadway, and adding wastewater and water services for the new expansion of the park.

AllSafe Storage Road Drainage and Site Design, Charleston, SC. Full site design for two AllSafe Storage Sites, Dorchester Road and Orangeburg Road.

SUE Seymore Johnson Air Force Base, Goldsboro, NC. Project Engineer for a subsurface utility investigation to map the approximat horizontal location of detectable underground utilities within the designated project limits (approximately 4 acres near the SJAFB's air traffic control tower). Marked the approximate horizontal locations of all detected utilities on the ground using marking paint. Infrastructure mapped included water, telephone, cable television, fiber optics, natural gas, and electric. Detected multiple unknown and abandoned utility lines during the field effort. Provided project results to CEMS to assist the United States Army Corps of Engineers with infrastructure design services at the base.

BRIAN GRAHAM, PE

BACKGROUND

2018-Present
Project Engineer
Weston & Sampson

2017-2018
Engineer II
Weston & Sampson

2014-2017
Project Engineer
Water Mission

2013-2014
Engineering Intern
Clemson Engineers for Developing Countries

EDUCATION

2013
Bachelor of Science
Civil Engineering
Clemson University

PROFESSIONAL REGISTRATION

Professional Engineer:
South Carolina No. 35760

Brian is a project engineer with nearly five years of experience designing and building small scale water systems. His main experience includes designing water systems in rural areas of developing countries, including: pump selection, treatment process selection, water distribution modeling, and solar-array/generator sizing. He also has experience designing, permitting, bidding, and performing construction administration for water distribution projects here in South Carolina.

SPECIFIC PROJECT EXPERIENCE

BCWS FY '17 Pump Station Rehabilitations

BCWS PS004 Force Main Replacement

BCWS PS002 Replacement/Hydraulic Modeling

BCWS Railroad Avenue Force Main Replacement

City of Columbia, SC Smith Branch Basin SSES

CWS Hollywood Ravenel Water Main Phase 3

Georgetown, SC Kaminski and Hewyard Water Main

Lee County, FL New Post Road Water Main Replacement

MPW On-Call Water Distribution Projects

ReWa Powdersville PS#2 Elimintation

Ridgeland, SC SSES

SCANA On-Call Gas Main Extensions

SC State Ports Authority Main Office Building Construction Administration

Education

M.C.E., Civil Engineering-1996
University of Delaware
B.S., Civil Engineering- 1994
Calvin College

Licenses and Registrations

- P.E., Professional Engineer, Massachusetts License #45849

Professional Affiliations

Member, Association of Coastal Engineers (ACE)

Member, Coasts, Oceans, Ports, and Rivers Institute (COPRI)

Associate Member, American Society of Civil Engineers (ASCE)

Work Experience

2001-Present	Coastal Engineer/Team Leader, Woods Hole Group
1997-2001	Coastal Engineer, Woods Hole Group
1994-1996	University of Delaware (Teaching and Research Asst.)
1992-1994	McNamee, Porter and Seeley, Inc.

Kirk F. Bosma, M.C.E., B.S., P.E.
Team Leader/Senior Coastal Engineer

Expertise

Kirk F. Bosma, PE, is a Senior Coastal Engineer and Team Leader of the Coastal Sciences, Engineering & Planning team at Woods Hole Group. He manages projects and develops engineering solutions related to coastal structure design, beach nourishment, beach management, inlet stabilization, water quality, environmental permitting, impacts of offshore dredging, marsh restoration, and climate change planning. He holds expertise in habitat restoration, shoreline protection, and climate change planning projects for a diverse client base and specializes in applying numerical models to optimize engineering designs and reduce overall project life cycle costs. Mr. Bosma has developed and applied the latest data and numerical methods toward capturing current and future flooding risk for climate change vulnerability assessments, incorporating storm surge risk coupled with increased precipitation and sea level rise. He has developed gray, green, and hybrid coastal engineering adaptations for fostering urban and rural resiliency in a cost-effective approach and has been the project manager for both large coastal and marsh restoration projects.

Select Project Experience

MassDOT – FHWA Pilot Project for Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options of the Central Artery, Massachusetts Department of Transportation – Project Manager/Coastal Engineer and Modeler

Was a key project member on a technically advanced, leading-edge pilot project for the Federal Highway Administration evaluating the vulnerability to sea level rise and extreme weather events for the Central Artery in Boston, MA. The project combines a vulnerability assessment by conducting a new systems-level assessment and evaluated adaptation options to reduce risk to specific assets. The project also is geared towards integrating climate change vulnerability into MassDOT and FHWA overall practices. A highly resolved, numerical processes model was developed to assess the combined impact of sea level rise, storm events (tropical and extra-tropical), winds, tides, and waves. Results from the model were used to assess risk for various assets throughout the City of Boston, and subsequently investigate adaption options to reduce the identified vulnerabilities and to establish an emergency response plan for tunnel protection and/or shutdown.

Coastal Climate Change Adaption and Engineering Alternatives East Boston, Massachusetts, The Boston Harbor Association – Project Manager/Coastal Engineer

Developed a range of engineering adaptation alternatives in response to potential sea level rise scenarios. The alternatives ranged from management approaches (e.g., evacuation, flood-proofing, etc.), to soft-engineering options (e.g., beach nourishment, creation of wetlands, etc.). For each location, conceptual designs and associated cost estimates were developed and compared to the potential cost incurred by flooding and storm damages to the location without protective measures over a given time horizon.

NAME: ROBERT DAVID BRANTON, PLS & PE

TITLE: President (Principal in Charge)

EDUCATION: Bachelor of Science, Civil Engineering
The Citadel, 1983

REGISTRATION:

Professional Land Surveyor

South Carolina	#11053
North Carolina	#L3636
Georgia	#2675

Professional Engineer, Civil

South Carolina	#11053
North Carolina	#18852
Georgia	#20506

EXPERIENCE: 35 Years (Years with Firm: 28)

PROFESSIONAL EXPERIENCE:

Mr. Branton has 35 years of surveying and engineering experience in large-scale utility, site design, industrial and construction projects. Mr. Branton has performed First, Second and Third Order control surveys by means of GPS equipment. He has been involved in many surveying and engineering projects where he successfully coordinated the efforts of the various disciplines needed to produce a final product. Mr. Branton has served as Project Manager and Construction Engineer for many different types of State and federally funded projects, including both grants and loans from the State Revolving Fund, Community Block Grants, Farmers Home Administration, and commercial institutions. In addition to his engineering experience, he has successfully performed boundary, topographic, ALTA/ACSM, and subdivision surveys. He has served as an expert witness in engineering and surveying lawsuits. **Mr. Branton has MASC safety training, OSHA 30 Hour Construction Safety & Health certification, Red Cross First Aid & AED training, and is U.S. TWIC qualified.**

Mr. Branton has served as the Secretary/Treasurer, Vice President and two complete term terms as the President-Elect, President, Immediate Past-President, of the South Carolina Society of Professional Land Surveyors. He has served on the Board of Directors for the SC Council of Engineering & Surveying Societies as Secretary, Vice President, and President. He was recognized by the Surveying Society as the 1997 SC Surveyor of the Year. He is a founding charter Board Member of the American Indian Chamber of Commerce of SC. Mr. Branton is the Chairman of the Board of Awana Clubs International Board of Directors and headquartered in Chicago Illinois.

PROJECT RESPONSIBILITIES:

Mr. Branton is the Principal in Charge as the President and Founder of Cornerstone Surveying & Engineering, Inc. He also serves as quality control supervisor and operations officer for all surveying and engineering related activities. Mr. Branton's responsibility is to promote the client/consultant team interface in order to produce the highest quality product at reasonable costs.

NAME: KEITH ALAN WILSON, PLS

TITLE: Vice President/Senior Project Manager

EDUCATION: Bachelor of Science degree in Forest Management, Clemson University, 1981

REGISTRATION: Professional Land Surveyor

South Carolina	#12252
North Carolina	#L-3308
Georgia	#2347
Florida	#4689

EXPERIENCE: 36 Years (Years with Firm: 23)

PROFESSIONAL EXPERIENCE:

Mr. Wilson has 36 years of experience in all facets of Land Surveying, inclusive of field work, research, computations, drafting, project management, and administration and procurement of projects. He has experience in construction staking, boundary surveys, topographic mapping, control levels, real time kinematics (RTK), VRS, and static GPS surveying and computations, wetland and critical line delineation, and existing conditions surveys, in addition to horizontal and vertical control for aerial mapping projects. Mr. Wilson has been the project manager on several successful large-scale mapping and subdivision projects, and he has surveyed and mapped 55-plus communication tower sites, involving most of the aforementioned surveying disciplines. Mr. Wilson also has served as Project Manager for several SCDOT related road widening projects (Trolley Road, S-18-199, and Ladson Road, S-18-230), an interstate cross-section survey (18 mile section of I-26 under litigation in 1999), and the Ravenel Bridge over the Cooper River, railroad crossing projects, and for a multitude of SCE&G/SCANA projects. **Mr. Wilson has MASC safety training, OSHA 30 Hour Construction Safety & Health certification, Red Cross First Aid & AED training, and is U.S. TWIC qualified**.

Mr. Wilson has previously been involved in a partnership with local attorneys as an instructor and author in surveying and boundary law. He has earned several awards in both the annual South Carolina and the National Surveying Plat Competitions, and was honored to serve as a state judge for the 1998 South Carolina Surveying Plat contest.

PROJECT RESPONSIBILITIES:

Mr. Wilson is the Senior Surveying Project Manager for Cornerstone Surveying & Engineering, Inc., and is responsible for overseeing as well as performing Conventional Land and GPS Surveys. His duties are to properly plan, implement, and direct the field and office operations in these areas. Upon successful completion of a project, Mr. Wilson provides 'quality control' review and approval of the project, and certifies the end product with his professional license.

NAME:	AARON W. KNIGHT, PLS
TITLE:	Survey Project Crew Chief
EDUCATION:	B.S., Civil Engineering, The Citadel, 2007
REGISTRATION:	Professional Land Surveyor South Carolina # 30771 Engineer in Training (EIT)
EXPERIENCE:	12 Years (Years with Firm: 12)

PROFESSIONAL EXPERIENCE:

Mr. Knight has 12 years of surveying and construction management experience in various types of development and utility projects. He has experience with AutoCAD, Land Development Desktop, and Civil 3D CAD programs. Mr. Knight has successfully performed numerous control and monitoring surveys, boundary, topographic, infrastructure, route, existing conditions surveys, static and VRS GPS surveys, and hydrograph surveys. He successfully managed a large city-wide GIS with 50,000 attributives. **Mr. Knight has MASC safety training, OSHA 30 Hour Construction Safety & Health certification, Red Cross First Aid & AED training, and is U.S. TWIC qualified.**

Mr. Knights background in land surveying, GIS data collection, and construction Quality Control Surveys allows him to be a competent and valuable liaison between the field surveyor and the designer and/or contractor of a project.

PROJECT RESPONSIBILITIES:

Mr. Knight is responsible for survey crew management, planning and leading the field surveying work required by a given project, and performing calculations and CAD drafting upon returning to the office. Under the direction of the Senior Project Manager, he will prepare plats, maps, applications, and other documents as required and within the constraints of his expertise and license as a Land Surveyor.

NAME: JEAN STEPHENSON BRANTON

POSITION WITH FIRM: Executive Vice President
Project Researcher

EDUCATION: Associate in Business, Paralegal Major, Summa Cum Laude
Trident Technical College, 1988

Associate In Secretarial Science, Legal Secretarial Major
Williamsburg Technical College, 1980

EXPERIENCE: 38 Years (Years with Firm 28)

PROFESSIONAL EXPERIENCE:

Jean S. Branton was trained over a four-year period through assisting a prominent Williamsburg County real estate attorney. In addition to the experience gained through land surveying and drafting courses, she has been a part-time rodman and researcher for several local land surveyors. Mrs. Branton co-founded CSE in 1990 and has over 37 years of experience in title and property research.

As Vice President of Cornerstone Surveying & Engineering, Inc., Mrs. Branton is committed to continuing education. She and her staff frequently attend real estate continuing education courses and maintain active memberships in the South Carolina Society of Professional Land Surveyors on a state and local level, Professional Legal Assistants, Inc., and the Tri-County Paralegal Association. Mrs. Branton was selected and has actively served for several years a member of the Legal Assistant/Paralegal Advisory Board of Trident Technical College. She has assisted the College in preparation of the syllabus of several courses in title abstracting, has been a guest speaker on a number of occasions, and has assisted the College in obtaining its accreditation with the American Bar Association. Mrs. Branton is a guest seminar speaker for the South Carolina Society of Professional Land Surveyors. She has represented the Coastal Chapter of the South Carolina Society of Professional Land Surveyors on the Charleston County RMC committee, in its research of archiving plats and document imaging processes. She was a Charter Member of the Dorchester County Document Imaging Users' Group, Record Documents Committee. Mrs. Branton is a strong advocate of excellence in the work place and product. This is evidenced throughout her work.

PROFESSIONAL EXPERIENCE:

Mrs. Branton serves as the researcher for all surveying and engineering projects. It is her duty to gather the appropriate public and private documents needed by the staff to fulfill their duties.

Eric J. McClanahan, PWS

President/Principal – Cygnus Environmental, LLC

Education

Masters Program, 1996-2001, Marine Biology, College of Charleston, Charleston, SC

Bachelor of Science, 1996, Environmental and Forest Biology, State University of New York, Syracuse, NY

Registrations/Certifications

Mr. McClanahan is the principal scientist for Cygnus Environmental, LLC. He provides all environmental consulting services for the firm, including. Mr. McClanahan has 18 years of experience performing wetland and stream identification and delineation, functional assessments of wetlands, evaluations for wetlands mitigation, and jurisdictional determinations. He also has experience with United States Army Corps of Engineers criteria, as well as federal and state permitting requirements and regulations.

Routine operations include the conduct of wetland delineations, protected species surveys, Phase One Site assessments, permit coordination, report writing and government agency liaison activities.

Environmental Consulting as needed by private landowners, developers, engineers, surveyors and others to comply with state and federal regulations related to CERCLA, Clean Water Act,, Endangered Species Act and other related regulations.

Natural Resources Consulting - Mr. McClanahan's experience includes 18 years of wetlands consulting, , NEPA scoping and reports, Environmental Impact Statements scoping, coordination and report writing, Categorical Exclusions package preparation, Section 10/404 Permit pre-application meetings, preparation and agency/client coordination, Soil and Sediment Sampling field data collections, lab analysis coordination and reporting, Wetlands Delineations and agency review and Threatened and Endangered Species studies – coordination with USFWS.

Wetlands Consulting, Phase I and II Environmental Site Assessments, NEPA, Environmental Impact Statements, Categorical Exclusions, Section 10/404 Permitting, Environmental Impact Statements, Soil and Sediment Sampling, and Wetlands Delineation and Threatened and Endangered Species studies.

Sample Project Experience

- Florence National Cemetery, Florence, SC; Wetlands Delineation and Threatened and Endangered Species studies, NEPA Environmental Assessment.
- Brown-Swiss Solar Farm, Chuckey, TN; Wetlands Delineation, Threatened and Endangered Species studies, and NEPA Environmental Assessment on 110 acre site.
- McFadden IP (400 Acres), Cades, SC; Wetlands Delineation and Threatened and Endangered Species studies, Phase One ESA
- East Edisto 21-Mile Gas Main; Wetlands Delineation, USACE Determination/section 404 consultation and Nationwide Permit Preparation

SECTION 4 – SUBCONSULTANTS

SUBCONSULTANTS		
Name	**Location**	**Description of Services**
Cornerstone Surveying & Engineering, Inc.	Charleston, SC	Surveying
Cygnus Environmental, LLC	Charleston, SC	Wetlands
Woods Hole Group	Massachusetts	Modeling/Planning Specialists

We have included resumes for these team members in Section 3.

Weston & Sampson
3955 Faber Place Drive, Suite 300
N. Charleston, South Carolina 29405
tel: 843-881-9804

Phase 3 Drainage Outfall Design and Permitting

City of Isle of Palms, SC

Tasks as per Scope of Work outlined in RFP on pages 3 - 4

No.	Cost
1	$15,000
2	$35,000
3	$15,000
4	$5,000
5	$60,000
6	$18,000
7	$5,000
8	$5,000
9	$5,000
10	$5,000
11	$5,000
Total Scope Items 1-11	$173,000

Alternative 1	$5,000 per project procurement effort
Alternative 2	Assume 43 weeks at 10 hours/week at $130/hour = $55,900