CITY OF Hollywood FLORIDA

Storm Water Master Plan Modeling and Design Implementation Continuing Services Contract

Project No. 20-11053

June 2020

QUALIFICATIONS

CDM Smith

TAB
1

Title Page

Tab I: Title Page

Request for Proposal Subject

Storm Water Master Plan Modeling and Design Implementation Continuing Services Contract | Project No. 20-11053

Name of Firm

CDM Smith Inc.

Address

621 NW 53rd Street, Suite 265, Boca Raton, FL 33487

Telephone Number

561.571.3800

Contact Person

Suzanne E. Mechler, PE, BCEE; Associate

Date

June 4, 2020

TAB
2

Table of Contents

Tab 2: Table of Contents

TAB
3

Letter of Transmittal

Tab 3: Letter of Transmittal

Firm's Understanding of the Work

The City of Hollywood (City) is a recognized leader in environmental sustainability and is committed to increasing resiliency of the community and through infrastructure projects. This commitment is demonstrated by the City's engagement in Climate Mayors, the Southeast Florida Regional Climate Change Compact, and Resilient Redesign. The City is world renowned for a classic American downtown, international marketplace, and a coastal destination and, as a result, is aggressively taking the challenges head on to plan for future growth.

Challenges include diverse social economics, mixed land uses, and designated historic properties. However, one of the largest challenges is climate change and sea level rise which has resulted in tidal flooding due to low land elevations subject to surge and king tides. The sea level is rising, and the City is experiencing it through sunny day flooding events. In addition, sea level rise also pushes salt water into our aquifer, an underground area of water storage, and can potentially increase flooding inland with higher aquifer levels.

The path towards resilience and community flood protection requires a holistic approach. The City's approach to a 10-year immediate plan is necessary as failing to act compromises current and future investments. Current flood conditions and eminent investments necessitate coordinated action. With the changes CDM Smith will propose, the City can get a return on resilience including reduction of personal flood losses, deliver quality of life and community, preserve property values, and improve flood insurance affordability.

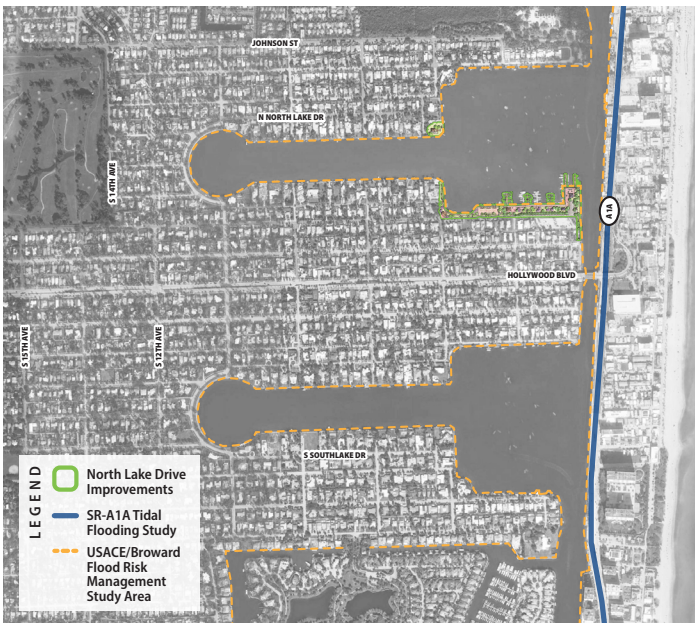
Project Approach

CDM Smith works in close collaboration with our clients while applying our technical excellence and utilizing an approach that is centered on a proven, verifiable, and established record of past experience in South Florida and similar coastal communities, including Broward County Aviation Department (BCAD) Fort-Lauderdale-Hollywood International Airport and Vision 2020, Fort Lauderdale, Miami-Dade County, Miami Beach, Miami, North Miami, Jacksonville, Miami-Dade Aviation Department airports, Daytona Beach, and more than 40 other coastal stormwater programs in Florida.

We will build upon your foundation of information by carefully taking into account past studies and models, data, permit conditions, and recently completed and ongoing projects and initiatives. We understand your objective of developing a new and comprehensive SWMP that establishes a policy framework, integrates resiliency, conducts vulnerability analysis, and provides a prioritized improvement program that ensures the integrity of the City's future is protected for generations to come. The following paragraphs highlight our responses to your RFP-listed scope items.

1 Review Existing Reports and Studies: We have reviewed the 2011 SWMP Update and will build upon this information, previous modeling, identified problems and projects, and recommended design features and strategies in this SWMP update. However, there have been many changes since 2011. This project will require coordination and knowledge of many related, previous and ongoing projects/ plans. As part of this effort, CDM Smith will work with City staff to review and evaluate these documents and their applicability for the SWMP:

- Marine Waterway Master Plan, 2014
- Supplemental Storm Surge, Sea Level Rise, and Transportation Disruption Network (2016, FDOT District 4)
- Long-Term Resiliency of Transportation System (2016, Broward MPO)
- Sustainability Action Plan (2017, City of Hollywood)
- Flood Risk Management Study for Tidally Influenced Coastal Areas (USACE/ Broward County, 2018)
- Vision Hollywood 2020 and Neighborhood Master Plans (2020, City of Hollywood)
- Citywide Vulnerability Assessment and Adaption Plan (underway, City of Hollywood)
- SR-A1A Tidal Flooding Study (underway, FDOT)
- South Atlantic Coastal Study (underway, USACOE)



Low-lying areas that lack a seawall or elevated berm such as South Lake Drive and North Lake Drive continue to be vulnerable. Street-level flooding along A1A continues when king tides overwhelm the existing Florida Department of Transportation drainage system. Areas between the Hollywood Lakes area and South 15th Avenue have consistently experienced major flooding every time it rains. CDM Smith will work closely with the City, FDOT, and Broward County on ongoing plans, including the North Lake Improvements identified in the Marine Waterway Master Plan and the SR-A1A Tidal Flooding Study, to develop solutions that mitigate the impact in these priority areas.

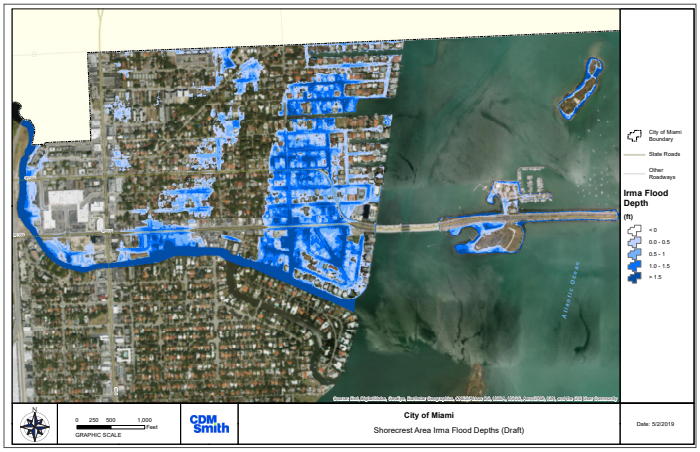
2 Coordinate with Floodplain Management: CDM Smith has innovated floodplain management and restoration standards and criteria since 1986, including "no net loss" of 100-year floodplain storage with compensatory storage to offset site grading filling to maintain overall storage. The CDM Smith brings the entire breadth of our experience to the City – including a proven track record of increasing Community Rating System (CRS) ratings through strategic planning, mapping, and modeling - and proactively helping the City react to the many potential challenges of FEMA floodplain mapping. CDM Smith will also coordinate the various performance measures from other adjacent entities and/or stakeholders including the County, SFWMD, Hallandale Beach, Dania Beach, and the various drainage districts.

3 Validate, Collect, and Manage Stormwater GIS Database: CDM Smith will work with your geographic information system (GIS) and survey staff to validate the City's existing stormwater infrastructure database. We are well versed in the development, verification, modification, and application of all necessary GIS data including best elevation or topographic data available for the design of the City's stormwater drainage system. We will use the latest high resolution LiDAR data from FDOT in raw (LAS) format as well as coordinate with both FDOT and the County to leverage the results of the LiDAR data collection pilot study.

As requested, we will perform data collection of stormwater infrastructure attributes needed to complete population of an existing GIS database and assist the City with the incorporation of the information in the new Cityworks asset management software. We have well-defined digital survey field and data entry tools and drones to facilitate identification and characterization of the system for physical attributes, maintenance condition, and performance.

4 Model Hydrologic/Hydraulic of Stormwater System: CDM Smith is a leader in the development and application of accurate, dynamic hydraulic/hydrologic stormwater models, such as the public domain SWMM model which we co-authored and have supported since 1969. We will develop these for the entire City with the latest high-resolution topographic LiDAR data provided by FDOT and Broward County and recent stormwater projects, including as-builts and survey as needed.

The appropriate model levels of detail will be established in consultation with the City to understand the nature of the problems (tides, storage, conveyance, maintenance condition, et al) and to develop cost-effective solutions that can be implemented modularly in phases based on priority. This will provide a comprehensive basin by basin analysis of the existing and proposed stormwater systems, and how they react to different boundary conditions for adjacent community and tidal effects and surges, including future projected climatological conditions such as sea level rise and changing design storm precipitation. We also can use the models to evaluate actual vs clean maintenance conditions to determine cost-effectiveness for operation and maintenance (O&M) activities, staffing, and equipment. In addition, CDM Smith will model critical facilities for the 500-yr, 24hr storm event along with the 5-yr, 24hr, and the 10, 25, and 100-yr, 72hr storm events as per SFWMD. This will allow the City to identify tiers for flooding and prioritization.



As shown shown above for the City of Miami, the CDM Smith team is well versed in both SWMM and ICPR. We recognize that ICPR was utilized for the previous modeling efforts and is currently being utilized as part of the SR-A1A Tidal Flooding Study. SWMM is utilized throughout the world, was developed for many adjacent and local communities, and has the advantage of a free open source public software. CDM Smith will work with the City to evaluate the best model option moving forward.

5 Incorporate Sea Level Rise (SLR) and Storm Surge (SS) Scenarios: We have been considering higher tides and surge since 1986 and using higher tidal boundary conditions than FEMA (1-year tidal stillwater elevation) in developing recommendations. **We have performed surge analyses for communities including Miami and Miami Beach to define seawall and bulkhead elevations to prevent tidal flooding, size new pump stations, and identify the need for installation of check valves to existing and future storm water drainage infrastructure.**

As part of this analysis, CDM Smith considers evaluation of the increased head loss from back flow preventers which ironically can increase flooding for smaller storm events if not properly designed for. CDM Smith is aware that the City is moving forward with implementation of the County seawall standardization for all new tidal flood barriers and substantial improvements to shorelines and shoreline structures. The minimum seawall and top-of-bank elevation is required to be 5 feet by 2050 (4 feet until 2035). Even with the seawall height improvements, rainfall flooding plus surge will require increased active infrastructure. Our evaluations will incorporate the latest 2019 regionally unified SLR projections for South Florida. In addition, we will review and apply, as necessary, current and revised rainfall with low and high tides to determine flooding potential based on rainfall.

6 Perform Level of Service (LOS) Analysis as System Indicator: CDM Smith will work with the City to confirm new development LOS and to define retrofit LOS which account for diminishing returns in floodprone areas. With the preliminary FEMA flood maps, issued in December 2019, many residents will see a change in flood insurance requirements. Currently, the City has received a National Flood Insurance Program (NFIP) Community Rating System (CRS) Classification of 8. This classification allows City NFIP policy holders to receive a 10 percent discount on their premiums. Part of the decision making will include whether the City is interested in doing more to obtain additional discount on flood insurance premiums for all homes and businesses within the City's corporate boundaries.

CDM Smith will evaluate all the current information and work closely with the City to develop LOS expectations. The management of safe, shallow, and short duration street flow can allow for cost-effective implementation while maintaining safe vehicle passage and protection of buildings and infrastructure. Utilizing the model, we will develop Flood Summary Tables listing flood elevations by node across the City compared to indicator elevations for roads and buildings to clearly define LOS.

7 Establish design criteria: CDM Smith will define onsite controls for clearing, site grading and onsite storage, and aquifer recharge to reduce volumes and flows; minimum elevations for buildings, structures, pavement, and evacuation routes; floodplain and wetland storage protection; outfall and backflow prevention recommendations; and water quality treatment requirements. CDM Smith will also update and develop design and construction standards to account for SLR/SS. The CDM Smith team will work with the City's various departments to develop resilient design concepts that capitalize on redevelopment, enhance natural infrastructure, integrate water management, and connect to roadway/transit, and pedestrian traffic.

8 Recommend system improvements: CDM Smith will perform alternatives evaluations that comprehensively address all aspects of the hydrologic cycle to provide efficient collection, conveyance, storage, treatment, infiltration, recharge, stormwater harvesting, and safe discharge of stormwater. We will apply a best management practices (BMP) Treatment Train approach, utilized and accepted by SFWMD and FDEP, which provides cost savings and multiple benefits by building on your NPDES MS4 program and providing stormwater storage and treatment from generation to the outfall. In some SWMPs, between 30 to 70% of basin runoff can be recharged or harvested to offset saltwater intrusion and reduce discharge of excess freshwater volumes and pollutant loads to sensitive receiving waters.

CDM Smith will work to identify alternatives to restore natural systems functions, where possible, to address extreme precipitation events and other sources of flooding. The vision that has been created includes green landscapes, increased storm protection, and integrated water storage. We are a strong, diverse team that has expertise in developing these integrated, co-benefit opportunities for water quality and quantity. Some of the options that we will consider include:

- Green infrastructure can be an important element for volume and pollutant load control. This can include underground stormwater storage for reuse projects, opportunities to use rain gardens, bioswales, and other stormwater harvesting.
- Low-impact development with permeable asphalt and concrete parking lots, roads, alleys, and sidewalks, as well as parks and other community amenities.
- Water storage for retention may include repurposing of infrastructure, consideration of existing land uses and vacant lots, and identification of pedestrian traffic options.

9 Include criteria of the Sustainability Action Plan: The City has committed to identifying sustainable, resilience, and adaptation opportunities over the last couple of years. CDM Smith will work to identify sustainable, adaptable, and resilient options that will work now and in the future with modular upgrades. In addition, we will coordinate all recommendations with the reports including the following:

- Increase the use of green infrastructure city wide to manage stormwater and tidal flooding. Open space and parks provide necessary ecosystem benefits and also improves health both physical and mental.
- Include pollution prevention messaging in communication from the City and provide information about storm drains and dumping in new resident information packets. Target education regarding water pollution to vulnerable stakeholders.
- Meet the desired goals of every resident within ½ mile of a park by implementing the goals of the Parks Master Plan to purchase land for parks. Incorporate stormwater storage into the design and work with the immediate neighborhood on the design of the park.

10 Permit Solutions: CDM Smith brings extensive knowledge and thorough understanding of regulations, the people, and the procedures involved in obtaining permits. We will identify solutions that are permittable for flood control, water quality, and wetlands and aquifer protection. This will include Wetland Mitigation permits for stormwater discharge.

11 Prepare a budget level cost estimate and schedule: To implement upgrades to the stormwater management system, we will develop 10-year and long-range budgets of Capital Improvement Projects (CIP) for the stormwater management system. The CIP will be based on a ranking and priority list for capital projects that address stormwater drainage and water quality improvements, as well as City maintained seawalls/bulkheads. This could include, flood damage avoidance in dollars using a tool like the FEMA HAZUS, numbers of houses and citizens affected, social and community impacts, life cycle costs, potential phasing options based on costs and near vs longer term needs, water quality and environmental benefits, and future needs for climate change effects. This will lead to development of a business case for the proposed improvements by identifying benefits and costs with a positive benefit/cost ratio that manages potential risk and vulnerability now and in the future.

12 Estimate the Stormwater Fee and Determine Best Methodology for Calculation: We propose to conduct a stormwater utility sufficiency study where "what if" fee scenarios are modeled to determine the optimum balance between capital costs, operational costs, and rate affordability. CDM Smith has been a leader in stormwater funding through development of the stormwater utility based on a fair and equitable equivalent residential unit (ERU). We have successfully implemented more than 90 stormwater utility programs since our first in Tallahassee in 1985. We recommend an update to the accuracy and coverage of impervious area by parcel which is used in calculations for stormwater utility assessments.

13 Participate and conduct public meetings: CDM Smith will ensure that the recommendations in the SWMP can be implemented with support across stakeholders. We provide a range of public information and community relations support. **For the City of Miami, a series of workshops were held across the City and with other special committees to present the SWMP program goals, issues, constraints, opportunities, and potential solutions while identifying ways that every citizen can be part of the solution. The presentations will be coordinated with the City and remain inline with other City priorities.**

14 Investigate funding options for projects: CDM Smith will assist in development of funding programs including bonding, grants, loans and public/private partnerships, as well as stormwater utility rate studies. Funding will be crucial to implementation. In addition to our successful stormwater utility implementation, we have assisted our clients with more than $3.5B in grants and SRF loans over the past 25 years. Project-related grants that CDM Smith has obtained and apply to the City include FEMA Community Flood Mitigation, FEMA Disaster Preparation, FDEP Resiliency, and Florida Inland Navigation District Grants.

Innovation, implementation, and regional collaboration will be weaved into the recommended alternatives, to enhance or improve the ability for funding. Part of that consideration includes stormwater management utilizing green infrastructure concepts that prove to be cost-effective, resilient, and a water quality solution.

We perform evaluations on the recommendations to ensure that the program components are technically, economically, and functionally consistent and are implemented in a manner that meets the specific deadlines and milestones of the City and the requirements of all agencies, including the Broward County Surface Water Department, Clean Water Act, NPDES Permits, FDEP regulations, SFWMD, and any additional applicable regulatory requirements.

Based on our recent experience, the defined two-year schedule is readily achievable. We understand the City may award subsequent design, permitting, and construction services for a few select neighborhood stormwater CIP projects resulting from the revised stormwater master plan described above. If we are requested to do design work, we offer full stormwater, complete streets, and sewer and water infrastructure design, permitting, and construction capabilities as needed to complete and coordinate other utility work and keep the project within schedule. These services will include complete design, permitting, and construction/inspection services for neighborhood CIPs.

We are excited for this opportunity and positively commit to performing the work under this contract.

Suzanne E. Mechler, PE, BCEE
Associate
621 NW 53rd Street, Suite 265,
Boca Raton, FL 33487
Tel: 561.571.3756
MechlerSE@cdmsmith.com.

The City's Authorized Representative and
CHAMPION

We acknowledge receipt of Addendum 1 and Addendum 2, and have included signed forms in the following pages.

Yours truly,

Suzanne E. Mechler, PE, BCEE; Associate; CDM Smith Inc.

THIS SHEET MUST BE SIGNED

RESPONDENT CHECK LIST

IMPORTANT: Please read carefully, sign in the spaces indicated and return with your Submittal.

Respondent should check off each of the following items as the necessary action is completed:

- ✓ The Letter of Transmittal has been signed.
- ✓ Any information required in Section V - SUBMITTAL REQUIREMENTS of the REQUEST FOR QUALIFICATIONS have been included.
- ✓ Any addenda have been signed and included.
- ✓ The mailing envelope has been addressed to:
  Office of the City Clerk
  City of Hollywood
  P.O. Box 229045
  Hollywood, FL 33022-9045
- ✓ The mailing envelope must be sealed and marked with Submittal Number, Submittal Title and Due date.
- ✓ The Submittal will be mailed or delivered in time to be received no later than the specified due date and time. Otherwise Submittal cannot be considered.

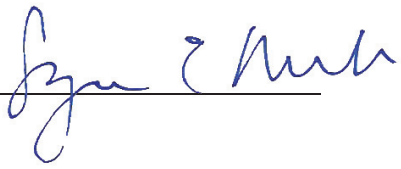
ALL COURIER-DELIVERED STATEMENTS OF QUALIFICATIONS MUST HAVE THE RFQ NUMBER AND TITLE ON THE OUTSIDE OF THE COURIER PACKET

Company Name:

CDM Smith Inc.

Signature and Title:

Suzanne E. Mechler, PE, BCEE; Associate



Date:

June 4, 2020

PROJECT SUBMITTAL

FROM: CDM Smith Inc.
621 NW 53rd Street, Suite 265
Boca Raton, FL 33487

DATE: June 4, 2020

CITY OF HOLLYWOOD
Department of Public Utilities
c/o City Clerk
2600 Hollywood Blvd.
Hollywood, FL 33022-9045

RE: RFQ NO. 20-11053

To Whom It May Concern:

The undersigned, as Respondent, hereby declares that we have examined the Scope of Services and informed ourselves fully in regard to all conditions pertaining to the work to be done for the City of Hollywood's **PROFESSIONAL ENGINEERING CONSULTANT SERVICES AGREEMENT FOR THE CITY OF HOLLYWOOD STORMWATER MASTER PLAN.** The Respondent further declares that the only persons, company or parties interested in this Submittal or the Contract to be entered into as principals are named herein; that this Submittal is made without connection with any other person, company or companies making a Submittal; and it is in all respects fair and in good faith, without collusion or fraud.

The service to be furnished by us is hereby declared and guaranteed to be in conformance with the specifications of the City.

The undersigned agrees that should this Submittal be accepted, to execute the contract and present the same to the City for approval within twenty (20) days after being notified of the awarding of the contract.

The undersigned further agrees that failure to execute and deliver said forms of contract within twenty (20) days, will result in damages to the City.

IN WITNESS WHEREOF, I have hereunto subscribed my name on this 4th day of June, 2020, in the County of Orange, in the state of Florida.

CDM Smith Inc.

Respondent's Firm or Trade Name

Corporation, Sole Proprietorship, Partnership (Circle One)

Phone No.: 561.571.3800

Address 621 NW 53rd Street, Suite 265

City and State Zip Boca Raton, FL 33487

BY:

Typed and Written Signature

Suzanne F. Mechler, PE, BCEE; Associate

Title

CITY OF HOLLYWOOD
DEPARTMENT OF PUBLIC UTILITIES
ENGINEERING AND CONSTRUCTION SERVICES DIVISION

1621 N. 14th Avenue
Hollywood, FL 33019
Phone (954) 921-3930 Fax (954) 921-3591

ADDENDUM NUMBER 1

Date: **May 28, 2020**

FOR: **REQUEST FOR QUALIFICATIONS TO PROVIDE ENGINEERING, SURVEY AND GENERAL CONSULTING SERVICES TO THE CITY OF HOLLYWOOD FOR STORM WATER MASTER PLAN MODELING AND DESIGN IMPLEMENTATION CONTINUING SERVICES CONTRACT**

PROJECT NUMBER: **20-11053**

ALL RESPONDENTS BE ADVISED OF THE FOLLOWING CHANGES TO THE ABOVE REFERENCED PROJECT AS LISTED BELOW:

This addendum is issued as part of the RFQ package for the above described project. The changes incorporated in this addendum shall be considered as a part of the documents and shall supersede, amend, add to, clarify, or subtract from those conditions shown in the original documents dated March 2020. The respondent shall coordinate all modifications herein with all trades and disciplines related to the RFQ package. **The respondent shall acknowledge receipt of this addendum per Item No. 3 of the "Respondent Check List" included in this addendum**. Failure to do so may subject Respondent to disqualification.

Item 1: PROFESSIONAL ENGINEERING CONSULTANT SERVICES AGREEMENT
Refer to Exhibit 1 of this addendum for the "Consultant Services Agreement".

Item 2: RESPONDENT CHECK LIST
Refer to Exhibit 2 of this addendum for "Respondent Check List" to be included in RFQ Response Package.

Item 3: DELIVERY OF RFQ PACKAGE
To assist in mitigating the 2019 Novel Coronavirus (COVID-19) potential exposure and transmission risks, City Clerk is not accepting personal delivery at this time. All RFQ packages need to be mailed to City Clerk of the City of Hollywood, or delivered to Records and Archives located in the Annex building on the west side of City Hall, 2600 Hollywood Boulevard, Hollywood, Florida, 33020. It is recommended that a delivery confirmation email be sent to the Project Manager, Raul Wainer, P.E. (rwainer@hollywoodfl.org) after you drop off the packages but before 2 PM on the submittal date. The Project Submittal (Exhibit 3) letter shall be included.

CITY OF HOLLYWOOD
DEPARTMENT OF PUBLIC UTILITIES
ENGINEERING AND CONSTRUCTION SERVICES DIVISION

1621 N. 14th Avenue
Hollywood, FL 33019
Phone (954) 921-3930 Fax (954) 921-3591

ADDENDUM NUMBER 1

Item 4: WEBEX TELEPHONIC MEETING FOR ORAL PRESENTATION

Oral Presentation will be conducted through WebEx telephone meeting. City will provide WebEx meeting link, dial in number and access code before the Oral Presentation. RFQ Respondent could present their files through sharing computer function during the WebEx meeting.

Item 5: NOTES RELATED TO RELEVANT REQUEST RECEIVED FROM POTENTIAL RESPONDENTS

- Do you anticipate extending the bid due date?

Response: No

What additional details are you willing to provide, if any, beyond what is stated in bid documents concerning how you will identify the winning bid?

Response: None

- Was this bid posted to the nationwide free bid notification website at www.mygovwatch.com?
  Response: None

- Other than your own website, where was this bid posted?
  Response: https://www.demandstar.com

- For Profile of Consultant, Item g., the City requests "estimated hours for each member of the team." Is the City's intent for consultants to include percentages of availability for each team member?
  Response: Percentage is acceptable.

City of Hallandale Beach, Florida may be a joint participant in this RFQ

ALL OTHER TERMS AND CONDITIONS IN THE RFQ PACKAGE SHALL REMAIN THE SAME.

Clece Aurelus, P.E.
Interim Assistant Director
Department of Public Utilities
City of Hollywood

CITY OF HOLLYWOOD
DEPARTMENT OF PUBLIC UTILITIES
ENGINEERING AND CONSTRUCTION SERVICES DIVISION

1621 N. 14th Avenue
Hollywood, FL 33019
Phone (954) 921-3930 Fax (954) 921-3591

ADDENDUM NUMBER 2

Date: **June 1, 2020**

FOR: **REQUEST FOR QUALIFICATIONS TO PROVIDE ENGINEERING, SURVEY AND GENERAL CONSULTING SERVICES TO THE CITY OF HOLLYWOOD FOR STORM WATER MASTER PLAN MODELING AND DESIGN IMPLEMENTATION CONTINUING SERVICES CONTRACT**

PROJECT NUMBER: **20-11053**

ALL RESPONDENTS BE ADVISED OF THE FOLLOWING CHANGES TO THE ABOVE REFERENCED PROJECT AS LISTED BELOW:

This addendum is issued as part of the RFQ package for the above described project. The changes incorporated in this addendum shall be considered as a part of the documents and shall supersede, amend, add to, clarify, or subtract from those conditions shown in the original documents dated March 2020. The respondent shall coordinate all modifications herein with all trades and disciplines related to the RFQ package. **The respondent shall acknowledge receipt of this addendum per Item No. 3 of the "Respondent Check List" included in this addendum**. Failure to do so may subject Respondent to disqualification.

Item 1: <u>SUBMITTAL REQUIREMENTS</u>
Page 9, Title Page: Replace "Request for Proposal" with "Request for Qualifications"
Page 9, Profile of Consultant: [g]. "Remove "and estimated hours for each member of the team".

tem 2: <u>CONE OF SILENCE</u>
Page 16, Delete "NOTE: It is the responsibility of each Proposer to redact all financial information (i.e., social security numbers and bank account numbers) from your RFP prior to submittal, which are exempt from the Florida Statutes Chapter 119, (Public Records Law)." at the bottom of the page.

CITY OF HOLLYWOOD
DEPARTMENT OF PUBLIC UTILITIES
ENGINEERING AND CONSTRUCTION SERVICES DIVISION

1621 N. 14th Avenue
Hollywood, FL 33019
Phone (954) 921-3930 Fax (954) 921-3591

ADDENDUM NUMBER 2

ALL OTHER TERMS AND CONDITIONS IN THE RFQ PACKAGE SHALL REMAIN THE SAME.

Clece Aurelus, P.E.
Interim Assistant Director
Department of Public Utilities
City of Hollywood

TAB
4

Submittal Questionnaire

ENGINEERING SERVICES QUALIFICATION STATEMENT
AND SUBMITTAL QUESTIONNAIRE

PROJECT NAME: **ENGINEERING, SURVEY AND GENERAL CONSULTING SERVICES FOR STORM WATER MASTER PLAN MODELING AND DESIGN IMPLEMENTATION CONTINUING SERVICES CONTRACT**

PROJECT NO.: **20-11053**

1. FIRM NAME & OFFICE LOCATION (Mailing Address and Street Address)

Name: CDM Smith Inc.

Mailing Address:
Street/PO Box: 621 NW 53rd Street, Suite 265
City: Boca Raton **State:** FL **Zip:** 33487

Physical Address (if different from above):
Street: Same as above
City: _____ State: _____ Zip: _____

Phone: (561) 571 - 3800 Ext: _____ Fax: (561) 241 - 7084

Primary E-Mail Address: mechlerse@cdmsmith.com

Web Site Address: cdmsmith.com

Contacts:
1. Name: Suzanne E. Mechler, PE, BCEE Title: Associate
2. Name: _____ Title: _____

2. TYPE OF ORGANIZATION

A. Check One:

- ☑ Corporation (complete Section B and G)
- ☐ Sole Proprietorship (complete Section D)
- ☐ Other (complete Section F and G
- ☐ Partnership (complete Section C and G)
- ☐ Joint Venture (complete Section E and G

B. If a Corporation, State incorporated:

Massachusetts

Date of Incorporation: December 29, 1970

State in which Incorporated: Massachusetts

If an out-of-state corporation that is currently authorized to do business in the State of Florida, give the date of such authorization: April 23, 1974

Name and Titles of Principal Officers	Date Elected
Timothy B. Wall, Chairman and Chief Executive Officer	1/02/2018
Anthony B. Bouchard, President and Chief Operating Officer	1/02/2018
Thierry Desmaris, Executive VP, Finance and Mergers & Acquisitions	01/02/2013
Julia B. Forgas, Executive VP, Marketing & Communications	1/02/2018

C. If a Partnership, State formed:

Date of Partnership: N/A

Type of Partnership (General or Limited):

Names and Addresses of Partners:

D. If Joint Venture, State formed:

Date of Joint Ventureship: N/A

Names and Addresses of Joint Venturers:

E. If a Sole Proprietorship, State created:

Name and Address of Sole Proprietor:

N/A

F. If other than above, please describe:

N/A

G. Related Parent Company, Divisions, and Subsidiaries:
(Attach additional information on other office locations, if appropriate)

CDM Smith is the parent company. CDM Smith's subsidiaries are CDM International Inc.;

CDM Michigan Inc.; CDM Constructors Inc.; and CDM Federal Programs Corporation.

Please attach the following:

a. Corporate Organization Chart
b. Resumes of Principal Staff
c. Corporate Family Tree
d. Company Brochure/Annual Report

Items a - d: included at end of this section.

3. EMPLOYEES AND PERSONNEL Provide a separate listing for personnel at the corporate (national) level, with the state (Florida) level and for the local office.

Permanent Office Staff	Number	Avg. Years With Firm		
		1-5	5-10	10+
Administrative	See end of section			
Project Management				
Engineers				
Design/Drafting				
Computer Services				

Permanent Office Staff	Number	Avg. Years With Firm		
		1-5	5-10	10+
Clerical /Technicians				
Procurement				
Project Control and Estimating				
Construction Management				
Research and Development				

Local Office Location:
621 NW 53rd Street, Suite 265, Boca Raton, FL 33487

Personnel in Organization by Discipline.

Discipline	Engineers		Designers
	Reg	Total	Total
Civil	207	431	224
Sanitary	59	71	12
Structural	84	146	62
Mechanical	21	70	49
HVAC	see above	see above	see above
Process	328	626	298
Electrical	51	141	90
Instrumentation	see above	see above	see above
Industrial	10	20	10

Discipline (*Procurement*)	**Personnel**
Capital Equipment Buyers	0
Subcontract Administrators	75
Bulk Material Buyers	0
Inspection/Expediting	0
Clerical/Technical Support	20

Discipline (*Construction Management*)	**Personnel**
Field Superintendents	72
Home Office Management	80
Planners (Site, City, Community)	0
Architects	32
Other	551

Maximum Man-Hours Available Per Year:	20,600
Current Estimated Man-Hours Per Year:	18,260

*Numbers representative of proposed CDM Smith team members. Additional firm and subconsultant resources available, if necessary.

4. FINANCIAL INFORMATION

A. Attach a copy of current audited income statement and balance sheet.

5. WORK EXPERIENCE:

A. Types of Services Provided (Check Yes or No)

	Yes	No		Yes	No
Feasibility Studies	☑	☐	Stress Analysis*	☐	☑
Drawings					
Preparation of Specifications	☑	☐	Pipeline	☑	☐
Construction Mgmt. Services	☑	☐	Surveying	☐	☑
Process Problem Analysis	☑	☐	Direct Hire Field Construction	☑	☐
Energy Conservation Studies	☑	☐	Detailed Instrumentation & Control	☑	☐
Soil and Foundation Studies	☑	☐	Process Design	☑	☐
Foundation Design	☑	☐	Equipment Design	☑	☐
Structural Design	☑	☐	Detailed Electrical	☑	☐
Testing Capability	☐	☑	Detailed Piping Design	☑	☐
Detailed Mechanical	☑	☐	Construction Management	☑	☐

Procurement ☐ ☑ Inspection/Expediting ☑ ☐

B. Drafting Method Utilized:

*Manual ☐ Computer ☑ If Computer, What Program: Civil 3D (civil), Plant 3D (process mechanical), Revit (structural, architectural, mechanical, electrical, I&C)

C. Please attach summaries for projects, related to the type of work to be awarded as a result of this submittal, completed by your firms including:

1) Location of project and client
2) Description of project
3) Your scope of involvement in project
4) Contract type (e.g. reimbursable/fixed fee/fixed price)
5) Approximate value of contract
6) Duration of work
7) Project Manager Utilized

6. EXPERIENCE WITH THE CITY OF HOLLYWOOD

A. Most Recent City of Hollywood Work Experience: (Date/Location/Description)

Oxygen Generation System Upgrade Design-Build, City of Hollywood, FL, 2008 - 2011.

CDM Smith provided project management for structural foundations, site access road, and stormwater modification at the Southern Regional Wastewater Treatment Plant (SRWWTP). The oxygen generation system is one of the key components of the plant and required upgrades due to capacity and reliability limitations.

B. Current City of Hollywood Engineering services agreement, if any: (Agreement Number/Expiration Date/Location/Description)

None

7. SUBCONTRACTED SERVICES:

List Subcontractor/ Sub-consultant firms expected to be utilized, and their portion of the work below:

Name of Firm	Area of work to be Performed under this agreement
See end of section	

Also, provide resumes of individuals from these firms whom the Subcontractors shall utilize for completion of the construction.

Identify those subcontractors that are Minority/Women's Business Enterprises and repeat required information in "Minority/Woman Business Participation", below for said Subcontractors. (THIS REQUIREMENT FOR M/WBE INFORMATION IS VOLUNTARY)

8. BUSINESS SIZE AND CLASSIFICATION

A. Size (check one)

☐ Small
A domestic concern that normally employs less than 500 persons, or as defined by section 3 of the Small Business Act.

☑ Large
A domestic concern which, including domestic and foreign divisions and affiliates, normally employs 500 or more persons, is independently or publicly owned or controlled and operated and

which may be a division of another domestic or foreign concern.

B. Classification (check where applicable; may be more than one)

☐ Foreign:
A concern which is not incorporated in the United States or an unincorporated concern having its principal place of business outside the United States.

☐ Minority:
A business, at least 50% of which is owned by minority group members, or, in case of publicly owned businesses, at least 51% of the stock of which is owned by minority group members. For the purpose of this definition, minority group members are Black-Americans, Hispanic-Americans, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts.
(THE REQUIREMENT FOR M/WBE INFORMATION IS VOLUNTARY)

☐ Women:
A business that is at least 51% owned and controlled by a woman or women.
(THE REQUIREMENT FOR M/WBE INFORMATION IS VOLUNTARY)

☐ Nonprofit:
A business or organization that has received nonprofit status under IRS Regulation 501C3.

☐ Sheltered:
A sheltered workshop or other equivalent business basically employing the handicapped.

Please indicate in the space below how your firm complies with the definitions selected above.

N/A

9. PROFESSIONAL ENGINEER'S LICENSE:

Respondent must hold a valid State of Florida Professional Engineer's License to be considered a qualified bidder.

State of Florida Professional Engineer's License No.: 20

Date: 05/10/1977

Primary Classification: Engineering Services

10. QUALIFICATION FORM PREPARED BY:

Name (print or type): Suzanne E. Mechler, PE, BCEE

Title: Associate

Signature:

Address: 621 NW 53rd Street, Suite 265, Boca Raton, FL 33487

Telephone Number: 561.571.3800

Tab 4: Submittal Questionnaire Attachments

Corporate Organization Chart

The CDM Smith Organization

CDM Smith

BOARD OF DIRECTORS	EXECUTIVE LEADERSHIP TEAM (ELT)	CORPORATE DEPARTMENTS	CLIENT SERVICES UNITS	SERVICE DELIVERY UNITS

Chairman & CEO
Tim Wall

President & COO
Anthony Bouchard

EVP–Finance
Thierry Desmaris

EVP–Marketing
Julia Forgas

CORPORATE DEPARTMENTS

- Business Technology — **David Neitz**
- Human Resources — **Carlos Echalar**
- Compliance — **M. Beth Colling**
- Office of the General Counsel — **Mario Marcaccio**
- Health & Safety — **James Skrabak**
- Controller — **Christine Simco**
- Corporate Development — **Ravi Khehar**
- Financial Systems & Automation — **Rob Novotny**
- Operational Finance & FP&A — **Dave Motarjeme**
- Procurement & Real Estate — **Maria Brown**
- Marketing & Communications — **Julia Forgas**

CLIENT SERVICES UNITS

- Federal Services Unit — **Gwen Baker**
- Industrial Unit — **Kevin Riley**
- North America Unit — **David Zimmer**
- Project Delivery & Performance — **Graham Campbell**
- Treasury and Internal Audit — **Chris Campbell**

International

- Middle East Group — **Bala Sashikant**
- Latin America & Caribbean Group — **Javier Palencia**
- Vietnam — **Ms. Van Dang**
- Australia — **Stuart Richardson**
- India — **Bala Sashikant**
- Europe Group — **Ralf Bufler**

SERVICE DELIVERY UNITS

- Construction Unit — **Peter Tunnicliffe**
- Technical Services Unit — **Randy Rogers**

Resumes of Principal Staff

We have included brief resumes for Timothy Wall, Anthony Bouchard, Thierry Desmaris, and Julia Forgas below:

Timothy B. Wall

Chairman and Chief Executive Officer

Mr. Wall has more than 25 years of experience working in and leading multiple market focused business units and quickly rose through the ranks to enterprise management. He is presently serving as the firm's President and Chief Operating Officer, directing the operations and strategy execution of the $1.2B global engineering and construction firm. Prior to that, Mr. Wall led the firm's Federal Services Group through a period of rapid sales growth. Mr. Wall holds a bachelor's degree in civil engineering technology from Wentworth Institute of Technology, a master's in environmental engineering from Tufts University, and an MBA from Boston College.

Anthony B. Bouchard

President and Chief Operating Officer

Mr. Bouchard has more than 30 years of experience in the consulting industry. As CDM Smith's North America Unit President, he has been responsible for the overall North America vision and strategy for growth and profitability, across all market sectors of water, transportation, environment, industrial, energy, and facilities. Mr. Bouchard has deep experience in water combined with management of large operating units delivering multiple business lines (water, transportation, environment) across the globe. He has demonstrated significant leadership in smart growth strategies, sales and delivery, risk management, acquisitions, integration, and profitability. Bouchard earned a bachelor's degree in civil engineering from Clarkson University, a master's degree in environmental engineering from Loyola Marymount University, and an MBA from Pepperdine University. He is a registered professional engineer in eight states and a board certified environmental engineer in the American Academy of Environmental Engineers and Scientists. He is a founding member of the Clarkson University School of Engineering Dean's Leadership Council.

Thierry Desmaris

Executive VP, Finance and Mergers & Acquisitions

Mr. Desmaris is responsible for all financial and accounting activities of CDM Smith, a $1.2B global engineering and construction firm. He has more than 30 years of experience in the engineering and construction industry. Prior to joining CDM Smith, he held several positions with a major E&C company, including head of corporate development, head of project development, corporate treasurer, and chief financial officer of a major subsidiary. He has led several large P3 transactions and has deep experience in risk management and M&A. He holds a BA in economics from Columbia University and and MBA in finance and quantitative methods from Syracuse University.

Julia B. Forgas

Executive VP, Marketing & Communications

MS. Forgas is the Chief Marketing Officer and Executive Vice President of Marketing and Communications at CDM Smith. She brings 29 years of marketing, communications, and advertising experience. She holds a BS in advertising from the University of Florida.

Corporate Family Tree

Business Units

Company Brochure/Annual Report

CDM Smith is committed to environmental sustainability, and as such, no longer creates hard copies of annual reports. We have provided a link to our website which provides much of this information: cdmsmith.com

We have included a copy of our current audited income statements and balance sheet.

Employees and Personnel (Attachment)

Permanent Office Staff	Corporate (National)				State (Florida)				Local Primary Office (Boca Raton)			
	Number	Avg. Years With Firm			Number	Avg. Years With Firm			Number	Avg. Years With Firm		
		1-5	5-10	10+		1-5	5-10	10+		1-5	5-10	10+
Administrative	318	129	78	111	20	4	7	9	1	0	0	1
Project Management	424	109	100	215	36	4	5	27	6	0	0	6
Engineers	1398	517	244	637	134	40	28	66	14	4	5	5
Design/Drafting	193	76	34	83	13	5	3	5	1	0	0	1
Computer Services	204	75	46	83	18	6	6	6	0	0	0	0
Clerical/Technicians	253	140	32	81	13	1	8	4	1	0	0	1
Procurement	95	19	14	62	13	0	0	13	0	0	0	0
Project Control and Estimating	124	45	39	40	10	3	5	2	0	0	0	0
Construction Management	231	119	32	80	19	8	5	6	4	0	1	3
Research and Development	0	0	0	0	0	0	0	0	0	0	0	0

Current Audited Income Statement and Balance Sheet

We have provided a copy of our 2019 Financial Report—including balance sheet, and related statements of income, retained earnings, and cash flows for the year ended—at the end of this section.

Summaries of Projects

We have included a summary of projects below and on the following pages.

Stormwater Management Program

Miami-Dade Aviation Department, Miami, FL

CDM Smith has provided various services at the Miami-Dade Aviation Department's (MDAD) Miami International Airport (MIA), Miami-Opa Locka Executive Airport (OPF), and Miami Executive Airport (TMB), as well as other minor MDAD-operated airports. Our services have included modeling, drainage design, best management practices, water quality assessment, facilities planning, remedial actions, and permitting and regulatory assistance.

Total Compensation for Services: $2.5M (to Date)
Project Duration: 05/1989 to Ongoing
Client Name: Miami-Dade Aviation Department
Contact: Guillermo R. Garcia
Telephone Number: 305.869.4111
E-mail: grgarcia@miami-airport.com

CDM Smith Project Manager: Jon Goldman

Stormwater Master Plan

Miami, FL

CDM Smith is currently developing a new and comprehensive SWMP to replace the City's outdated 2012 SWMP, with the goals of establishing a policy framework so that the integrity of the City's future is protected and enhanced over time.

Total Compensation for Services: $3.8M
Project Duration: 04/2018 to Ongoing
Client Name: City of Miami
Contact: Keith A. Ng, CFM
Telephone Number: 305.416.1298
E-mail: keithng@miamigov.com

CDM Smith Project Manager: Jon Goldman

Hydraulic Analysis for Downtown Stormwater System

Boynton Beach, FL

As part of an overall infrastructure and ancillary services and consulting and engineering service for the Boynton Beach General Consulting Services contracts, our primary responsibility included professional services related to stormwater master planning, SCADA, lift station design and construction services, and water supply planning and permitting.

Total Compensation for Services: $100K
Project Duration: 08/2018 to 12/2018
Client Name: City of Boynton Beach
Contact: Christopher Roschek, Engineering Division Manager
Telephone Number: 561.742.6413
E-mail: roschekc@bbfl.us

CDM Smith Project Manager: Yanice Mercado

SWMP and Update

Lake Worth, FL

CDM Smith developed a citywide SWMP to evaluate the study area and the City's primary stormwater management system along with associated outfalls to receiving waters.

Total Compensation for Services: $525K
Project Duration: 10/2011 to 12/2012; 7/2016 to 10/2016
Client Name: City of Lake Worth
Contact: Felipe Lofaso, Assistant Director of Public Service
Telephone Number: 561.586.1720
E-mail: flofaso@lakeworth.org

CDM Smith Project Manager: Brian Mack (Active); Lena Rivera (Former)

Master Stormwater Management Plan Update and FEMA Map Modernization

Jacksonville, FL

CDM Smith conducted SWMM stormwater modeling including model setup, calibration, and alternative evaluations for water quality and quantity improvements.

Total Compensation for Services: $8.6M
Project Duration: 03/2007 to 12/2012
Client Name: City of Jacksonville
Contact: William (Bill) J. Joyce, PE, Chief of Engineering
Telephone Number: 904.255.8763
E-mail: joyce@coj.net

CDM Smith Project Manager: Lisa Sterling

Stormwater Management Master Plan and Update

Miami Beach, FL

Worked with the City of Miami Beach to establish SWMP, identify BMP recommendations, provide public outreach, and identify alternatives for flood control for this project.

Total Compensation for Services: $1.1M
Project Duration: 03/2010 to 6/2012
Client Name: City of Miami Beach
Contact: Richard W. Saltrick, (Former) City Engineer
Telephone Number: 954.540.6560
E-mail: saltrick@hotmail.com

CDM Smith Project Manager: Ignacio Lizama (Active); Jose Guzman (Former)

Nova Canal Flood Control and Integrated Water Resource Program

Volusia County, FL

CDM Smith provided stormwater management planning, conceptual design, and cost-benefit analysis support to identify a cost-effective implementation plan to achieve flood control, water quality improvement, aquifer recharge, and stormwater harvesting for reuse.

Total Compensation for Services: $761K
Project Duration: 06/2009 to 7/2010
Client Name: Eastern Volusia Regional Water Authority
Contact: Judy Grim, PE, Road and Bridge Director (Retired)
Telephone Number: 386.290.3289
E-mail: jsgrim56@gmail.com

CDM Smith Project Manager: Mike Schmidt

Stormwater Master Plan

Virginia Beach, VA

For the City of Virginia Beach, VA, we assisted in program and model development, neighborhood mitigation plans, and other stormwater-related consulting services for this coastal community.

Total Compensation for Services: $5.6M
Project Duration: 11/2014 to Ongoing
Client Name: City of Virginia Beach
Contact: CJ Bodnar, PE, Project Manager
Telephone Number: 757.385.8430
E-mail: cbodnar@vbgov.com

CDM Smith Project Manager: Martin Malone

Stormwater Master Plan (SWMP) Update of System-wide Modeling

Royal Palm Beach, FL

The Village of Royal Palm Beach tasked CDM Smith with the development of an original SWMP in 2000 as well as an update in 2005. In 2013, the Village retained CDM Smith to use the existing model to evaluate two recent developments, which had the potential to impact the Village's primary storages and conveyances.

Total Compensation for Services: $2.4M (to Date)
Project Duration: 03/1999 to Ongoing
Client Name: Village of Royal Palm Beach
Contact: Christopher A. Marsh, PE, LEED AP, Village Engineer
Telephone Number: 561.790.5161
E-mail: cmarsh@royalpalmbeach.com

CDM Smith Project Manager: Brian Mack

Districtwide Surface Water Model Update

Southwest Florida Water Management District, FL

In support of SWFWMD's groundwater model and future water supply projects, CDM Smith was retained to update a total of 12 HSPF models that cover the entire District and portions of SJRWMD.

Total Compensation for Services: $1.3M
Project Duration: 2/2015 to Ongoing
Client Name: SWFWMD
Contact: Hua Zhang, PhD, PG; Project Manager
Telephone Number: 352.796.7211 ext. 4239
E-mail: hua.zhang@swfwmd.state.fl.us

CDM Smith Project Manager: Danielle Honour

Subcontracted Services

Name of Firm	Area of work to be performed under this agreement
Anfield Consulting Inc.	Funding and Grant Management
Biscayne Engineering Co Inc.	Data Collection, Evaluation, and Field Verification
Brizaga, Inc.	Local Resiliency/Community and Public Outreach; Floodplain Management Implementation
Collective Water Resources, LLC (WBE)	Wetlands, Natural Systems, Water Quality, and Environmental; Floodplain Management Implementation
Curtis + Rogers Design Studio, Inc. (WBE)	Wetlands, Natural Systems, Water Quality, and Environmental
FernLeaf Interactive	Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development
Nutting Engineers of Florida, Inc.	Geotechnical
Tetra Tech	Capital Improvements Program; Funding and Grant Management; Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development; Permitting/ Regulatory; Stormwater Design and Construction Standards
Tobon Engineering (MBE)	Capital Improvements Program

We have included resumes for named individuals from our subconsultants in our **Profile of Consultant**.

2019 Financial Report

CDM Smith

Five-Year Financial Summary

CDM Smith Inc. and Subsidiaries and Affiliates

(In thousands)

Results from Operations	**2019**	2018	2017	2016	2015
Client revenues	**$1,156,566**	$1,178,128	$1,169,304	$1,191,544	$1,282,351
Total direct costs of services and other operating expenses	**$1,116,319**	$1,143,318	$1,148,537	$1,171,851	$1,246,570
Income from operations	**$ 40,247**	$ 34,810	$ 20,767	$ 19,693	$ 35,781
Net Income attributable to CDM Smith Inc.	**$ 25,175**	$ 17,850	$ 6,830	$ 11,329	$ 23,527

Financial Position					
Total assets	**$ 551,304**	$ 572,955	$ 577,669	$ 647,381	$ 581,536
Total current assets	**$ 391,478**	$ 423,542	$ 423,397	$ 485,897	$ 437,278
Total current liabilities	**$ 330,890**	$ 361,698	$ 355,957	$ 411,132	$ 335,763
Net working capital	**$ 60,588**	$ 61,844	$ 67,440	$ 74,765	$ 101,515
Fixed assets, net	**$ 56,505**	$ 55,379	$ 61,150	$ 59,646	$ 37,491
Total equity	**$ 174,334**	$ 166,847	$ 172,486	$ 191,630	$ 201,593

Report of Independent Auditors

To the Management and Board of Directors of CDM Smith Inc.

We have audited the accompanying consolidated financial statements of CDM Smith, Inc. and its subsidiaries and affiliates, which comprise the consolidated balance sheets as of December 28, 2019 and December 29, 2018, and the related consolidated statements of comprehensive income, of changes in shareholders' equity and of cash flows for the years then ended.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on the consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the Company's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of CDM Smith, Inc. and its subsidiaries and affiliates as of December 28, 2019 and December 29, 2018, and the results of their operations and their cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Boston, Massachusetts
April 15, 2020

Consolidated Balance Sheets

CDM Smith Inc. and Subsidiaries and Affiliates

December 28, 2019 and December 29, 2018

(In thousands, except per share and per share amounts)

Assets	2019	2018
Current assets:		
Cash, cash equivalents, and restricted cash	**$ 30,632**	$ 25,980
Accounts receivable, net of allowances of $3,204 and $4,737, respectively	**197,105**	222,123
Contract assets	**141,717**	—
Unbilled revenues on contracts	**—**	141,189
Work in process inventory, net of reserves of $0 and $4,451, respectively	**—**	5,400
Prepaid expenses and other current assets	**22,024**	27,005
Total current assets	**391,478**	421,697
Fixed assets, net	**56,505**	55,379
Goodwill and intangibles, net	**51,385**	51,890
Other assets	**51,936**	43,989
Total assets	**$ 551,304**	$ 572,955
Liabilities and Shareholders' Equity		
Current liabilities:		
Short-term debt	**$ 27,787**	$ 36,987
Accounts payable	**98,941**	125,061
Accrued compensation and related liabilities	**75,077**	70,573
Contract liabilities	**86,228**	—
Excess of advance payments over accrued revenues	**—**	82,142
Other current liabilities	**42,857**	46,935
Total current liabilities	**330,890**	361,698
Other liabilities	**46,080**	44,410
Total liabilities	**376,970**	406,108
Commitments and contingencies (Note 12)	**—**	—
Equity:		
Common stock, par value $.01	**23**	25
Additional paid-in capital	**107,858**	104,818
Retained earnings	**74,664**	68,911
Shareholders' notes receivable	**(1,388)**	(1,348)
Accumulated other comprehensive loss	**(5,075)**	(4,183)
Total CDM Smith Inc. shareholders' equity	**176,082**	168,223
Noncontrolling interests	**(1,748)**	(1,376)
Total equity	**174,334**	166,847
Total liabilities and shareholders' equity	**$ 551,304**	$ 572,955

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Comprehensive Income

CDM Smith Inc. and Subsidiaries and Affiliates

Years Ended December 28, 2019 and December 29, 2018

(In thousands, except share and per share amounts)

	2019	2018
Client revenues	**$1,156,566**	$1,178,128
Direct cost of services	**765,419**	778,354
Other operating expenses	**350,900**	364,964
Income from operations	**40,247**	34,810
Interest expense	**(1,903)**	(3,002)
Other expense	**(1,392)**	(54)
Income before income taxes	**36,952**	31,754
Provision for income taxes	**12,149**	14,149
Net income	**24,803**	17,605
Less: Net loss attributable to noncontrolling interests	**372**	245
Net income attributable to CDM Smith Inc.	**$ 25,175**	$ 17,850

Comprehensive Income

Net income	**$ 24,803**	$ 17,605
Other comprehensive income (loss)		
Foreign currency translation adjustments	**(892)**	(2,027)
Gain on net investment hedge, net of tax of $0 and $507, respectively	**—**	1,403
Other comprehensive loss	**(892)**	(624)
Comprehensive income	**23,911**	16,981
Less: Comprehensive loss attributable to noncontrolling interests	**372**	245
Comprehensive income attributable to CDM Smith Inc.	**$ 24,283**	$ 17,226

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Changes in Shareholders' Equity

CDM Smith Inc. and Subsidiaries and Affiliates

Years Ended December 28, 2019 and December 29, 2018

(In thousands, except share and per share amounts)

	Common Shares		Additional Paid-In Capital	Retained Earnings	Shareholders' Notes Receivable	Accumulated Other Comprehensive Income (Loss)	Total CDM Smith Shareholders' Equity	Non-Controlling Interests	Total Equity
	Shares	Amount							
Balance at December 30, 2017	**2,687,431**	**$ 27**	**$105,110**	**$ 73,696**	**$ (1,657)**	**$(3,559)**	**$ 173,617**	**$ (1,131)**	**$ 172,486**
Net income	—	—	—	17,850	—	—	17,850	(245)	17,605
Repurchase of common stock at book value	(356,201)	(4)	(12,174)	(22,635)	—	—	(34,813)	—	(34,813)
Exercise of employee stock rights	52,004	1	5,139	—	—	—	5,140	—	5,140
Issuance of common stock to 401(k) match	69,049	1	6,743	—	—	—	6,744	—	6,744
Net repayment (borrowing) on shareholders'	—	—	—	—	309	—	309	—	309
Gain on net investment hedge, net of tax $507	—	—	—	—	—	1,403	1,403	—	1,403
Cumulative translation adjustment	—	—	—	—	—	(2,027)	(2,027)	—	(2,027)
Balance at December 29, 2018	**2,452,283**	**$ 25**	**$104,818**	**$ 68,911**	**$ (1,348)**	**$(4,183)**	**$ 168,223**	**$ (1,376)**	**$ 166,847**
Net Income	—	—	—	25,175	—	—	25,175	(372)	24,803
Repurchase of common stock at book value	(274,274)	(3)	(8,970)	(19,422)	—	—	(28,395)	—	(28,395)
Exercise of employee stock rights	73,721	1	7,646	—	—	—	7,647	—	7,647
Net repayment (borrowing) on shareholders'	—	—	—	—	(40)	—	(40)	—	(40)
Long-term incentives shares vested	12,081	—	—	—	—	—	—	—	—
Shares repurchased to cover employee tax withholding for long-term incentive plan shares vested	(4,185)	—	(427)	—	—	—	(427)	—	(427)
Stock-based compensation	—	—	4,791	—	—	—	4,791	—	4,791
Cumulative translation adjustment	—	—	—	—	—	(892)	(892)	—	(892)
Balance at December 28, 2019	**2,259,626**	**$ 23**	**$107,858**	**$ 74,664**	**$ (1,388)**	**$(5,075)**	**$ 176,082**	**$ (1,748)**	**$ 174,334**

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Cash Flows

CDM Smith Inc. and Subsidiaries and Affiliates

For the Years Ended December 28, 2019 and December 29, 2018

(In thousands, except share and per share amounts)

	2019	2018
Operating activities:		
Net income	**$ 24,803**	$ 17,605
Amounts that reconcile net income to net cash provided by operating activities:		
Depreciation, amortization and other	**14,708**	15,208
Deferred income taxes	**(1,533)**	(1,288)
Stock-based compensation	**4,041**	750
Non-cash portion of 401(k) match	**—**	6,744
Undistributed earnings on equity method investment	**(3,835)**	(3,687)
Unrealized (gains) losses on deferred compensation plan investments	**(3,615)**	99
Changes in operating assets and liabilities:		
Accounts receivable	**25,018**	(18,835)
Contract assets and liabilities	**8,958**	—
Unbilled revenues on contracts	**—**	8,328
Excess of advance payments over accrued revenues	**—**	(2,608)
Work in process inventory	**—**	(114)
Prepaid expenses and other current assets	**4,981**	16,204
Other assets	**(1,295)**	(469)
Accounts payable	**(26,480)**	(3,607)
Accrued compensation and related liabilities	**4,504**	12,444
Other current and noncurrent liabilities	**(3,006)**	9,347
Net cash provided by operating activities	**47,249**	56,121
Investing activities:		
Capital expenditures	**(14,782)**	(9,282)
Purchase of investment securities	**(930)**	(1,883)
Acquisitions and purchases of intangible assets	**(66)**	(1,950)
Proceeds from sale of investment securities	**3,438**	4,365
Purchase from net investment hedge	**—**	1,910
Net cash used for investing activities	**(12,340)**	(6,840)
Financing activities:		
Proceeds from notes payable to banks	**437,622**	438,079
Repayments of notes payable to banks	**(446,822)**	(452,892)
Proceeds from the issuance of common stock	**7,607**	5,139
Repurchase of common stock	**(28,395)**	(34,580)
Net cash used for financing activities	**(29,988)**	(44,254)
Effect of exchange rates on cash	**(269)**	(431)
Net increase in cash, cash equivalents and restricted cash	**4,652**	4,596
Cash, cash equivalents and restricted cash:		
Beginning of year	**25,980**	21,384
End of year	**$ 30,632**	$ 25,980

The accompanying notes are an integral part of the consolidated financial statements.

Notes to Financial Statements

CDM Smith Inc. and Subsidiaries and Affiliates
December 28, 2019 and December 29, 2018
(In thousands, except share and per share amounts)

1. Description of Business

CDM Smith Inc. and Subsidiaries and Affiliates ("the Company", "we", "our" and "us") is a global privately-owned engineering and construction firm providing full-service consulting, engineering, and construction services to clients primarily in the water, environment, transportation, energy and facilities industries. The Company was founded in 1947, in response to increased client demand for alternative delivery approaches and operates as a design/builder and contract manager specializing in environmental and infrastructure improvement projects both to private and public clients located throughout the world.

Principles of Consolidation: The consolidated financial statements include the accounts for CDM Smith Inc. and its subsidiaries and affiliates after elimination of all significant intercompany accounts and transactions.

Certain contracts are executed jointly through partnerships and joint ventures with unrelated third parties. The Company consolidates certain variable interest entities ("VIEs") in accordance with Accounting Standards Codification ("ASC") 810 "Consolidation." For joint ventures and partnerships that are not consolidated, the Company used the proportionate consolidation method of accounting, whereby the Company recognizes its proportionate share of revenue, cost, and profit in its Consolidated Statements of Comprehensive Income and records its proportionate share of assets and liabilities on a line-by-line basis in its Consolidated Balance Sheets. The net carrying value of the unconsolidated VIEs included in the Consolidated Balance Sheets was a net asset of $15,108 and $4,745 as of December 28, 2019 and December 29, 2018, respectively.

The consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States of America (U.S. GAAP).

Fiscal Year: The Company reports its operating results based upon a 52- or 53-week fiscal year ending on the Saturday nearest December 31. Operating results for the years ended December 28, 2019 and December 29, 2018, were both based on a 52-week fiscal year. The Company consolidates financial results for certain subsidiaries based upon calendar years ending December 31.

2. Summary of Significant Accounting Policies

Use of Estimates in the Preparation of Financial Statements: The preparation of the consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Reclassification: Certain prior period balances have been reclassified to conform to current year presentation.

Recent Accounting Standards: In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2016-02, Leases (Topic 842) and subsequently issued related ASUs, which together require lessees to recognize the following for leases with an original lease term of 12 months or more as of the lease commencement date: (a) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis; and (b) a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. In April 2020, the FASB voted to propose the deferral of the effective date for Topic 842 which, if approved, would extend the effective date from our fiscal year beginning on January 3, 2021 to our fiscal year beginning on January 2, 2022. We will adopt the new guidance using a modified retrospective approach, with the comparative period and the respective disclosures presented using the legacy guidance of Topic 840. We anticipate applying the optional practical expedients upon adoption, which allow us to forego a reassessment of 1) whether any expired or existing contracts are or contain leases; 2) the lease classification for any expired or existing leases; and 3) the initial direct costs for any existing leases. We expect the adoption of this ASU to result in the recognition of right-of-use assets and lease liabilities on our Consolidated Balance Sheets and additional required disclosures. The Company is currently evaluating the impact of this new standard on its consolidated financial statements.

Adoption of New Revenue Recognition Standard: On December 30, 2018, the Company adopted ASC 606, Revenue from Contracts with Customers ("ASC 606"), utilizing the modified retrospective method. Using the modified retrospective method, the Company applied the standard only to contracts that are not completed at the date of initial application. The comparative information has not been restated and continues to be reported under the accounting standards in effect for that period as the Company asserts it remains comparable.

There was an impact relating to the requirement to recognize unapproved change orders as contract modifications and estimated as variable consideration under ASC 606. During previous periods, the Company recognized costs for work performed prior to final contract approval, as well as costs incurred on pending amendments and change orders, as work in process inventory to the extent that it is probable a final contract, amendment, or change order would be executed on its Consolidated Balance Sheets. Upon adoption, the Company includes

amounts from the unapproved change orders in the transaction price to the extent it can be reasonably estimated, and it is not probable a significant revenue reversal would occur. The Company updates the transaction price on a cumulative catch-up basis as the additional services included in the unapproved change order are not distinct and are part of a single performance obligation that is partially satisfied at the time of the modification.

The impact from the adoption of ASC 606 related to the items noted above was not material and was recorded within Consolidated Statement of Comprehensive Income for the year ended December 28, 2019.

In addition, as of December 30, 2018, the Company began to separately present contract assets and liabilities on the Consolidated Balance Sheets. Contract assets include amounts due under contractual retainage provisions that were previously included in accounts receivable as well as costs and estimated earnings in excess of billings that were previously separately presented as unbilled revenues on contracts. Contract liabilities include billings in excess of costs and estimated earnings that were previously separately presented as excess of advance payments over accrued revenues as well as provisions for losses that were previously included in accrued expenses and other current liabilities. The adoption did not have a material impact on the overall cash flows from operating, investing or financing activities.

The amounts by which each Consolidated Balance Sheet line item as of December 28, 2019 and Consolidated Statement of Comprehensive Income line item for the year ended December 28, 2019 was affected by the adoption of ASC 606 relative to the previous revenue guidance are presented in the tables below. The changes are primarily related to reclassifications on the Consolidated Balance Sheet and the impact on the Consolidated Statement of Comprehensive Income from the new requirements under ASC 606 as described above.

Consolidated Balance Sheet	As Reported	Balances Without Adoption	Effect of Change Higher/ (Lower)
Assets			
Accounts receivable, net	$197,105	$218,107	$(21,002)
Contract assets	141,717	—	141,717
Unbilled revenues on contacts	—	120,715	(120,715)
Liabilities and Shareholders' Equity			
Accounts payable	$ 98,941	$114,893	$ (15,952)
Contract liabilities	86,228	—	86,228
Excess of advance payments over accrued revenues	—	66,184	(66,184)
Other current liabilities	42,857	46,949	(4,092)
Retained earnings	$ 74,664	$ 74,664	$ —

Consolidated Balance Sheet of Comprehensive Income	As Reported	Balances Without Adoption	Effect of Change Higher/ (Lower)
Client revenues	$1,156,566	$1,154,761	$1,805
Direct cost of services	$ 765,419	$ 763,614	$1,805

The adoption resulted in offsetting changes in cash flows through net income from operating activities and in operating assets and liabilities.

Revenue Recognition: The Company derives its revenue primarily from providing engineering and construction services. Additionally, the majority of the Company's revenue is derived from contracts that are within the United States and often with local, state and federal government agencies. Project funding can fluctuate and be impacted by changes in the macro economic and political environment, however, cash flows related to client receivables from funded projects are typically collectible in accordance with the contract terms. To determine revenue recognition for arrangements within the scope of ASC 606, the Company performs the following five steps: (1) identify the contract(s) with a customer; (2) identify the performance obligations in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) performance obligations are satisfied. Sales, value add, and other taxes collected on behalf of third parties are excluded from revenue. The Company's revenue arrangements do not contain significant financing components. Customers are typically invoiced on a monthly basis and payment terms are typically net thirty days.

The Company's major contract types include fixed price, cost plus and time and materials. Under fixed price contracts, the Company charges the client a lump-sum amount for performing all of the work under the contract. Lump-sum contracts are typically subject to price adjustments if the scope of the project changes or unforeseen conditions arise. Under cost plus contracts, also termed a cost reimbursement contract, the contractor is paid for all of their allowed expenses to a set limit plus additional payment to allow for profit. While there is not a fixed, negotiated fee, the Company charges clients for its direct and indirect costs based upon a negotiated rate. Under time and materials contracts, the Company negotiates hourly billing rates and charges its clients based on the actual time that it expends on a project. In addition, clients reimburse the Company for its actual out-of-pocket costs of materials and other direct incidental expenditures that it incurs in connection with its performance under the contract. The materials can be marked up or passed through at cost. Profit margins on time and materials contracts fluctuate based on actual labor and overhead costs that it directly charges or allocates to contracts compared to negotiated billing rates. Many of the Company's time and materials contracts are subject to maximum contract values, over which the Company may no longer charge the customer.

Contracts with customers principally contain only one distinct performance obligation, which is the provision of an integrated set of engineering and construction services. However, if more than one distinct service was included in a particular contract, then the Company is required to allocate consideration across the multiple distinct services being sold together. For such arrangements, the transaction price is allocated to each item based on the relative standalone selling prices of the promised services, which is generally estimated utilizing the expected cost plus reasonable margin approach. The Company provides an assurance type warranty on certain services provided which is not sold separately and does not represent a separate performance obligation. Warranties offered on construction projects are typically related to the start-up of a facility and are less than one year in duration, and therefore, the Company accounts for such warranties under ASC 460, Guarantees; the estimated costs of warranty claims are generally accrued as cost of revenue in the period the related revenue is recorded.

The Company's revenue is recognized over time as the services are delivered to the client and the particular project is progressing to completion. The Company utilizes a cost-to-cost approach for measuring the amount of revenue to be recognized. This approach is an acceptable input method under ASC 606 and is calculated by taking the costs incurred to date against the total estimate of costs to complete the project. Project costs consist of direct costs on client contracts, including labor and materials, amounts payable to subcontractors and direct overhead costs. If the estimate of total costs changes, then the Company will recognize a cumulative catch up adjustment to revenue at the time the updates for the project are known. Any costs to obtain the Company's contracts ("pre-bid costs") that are not expected to be recovered from the customer are expensed as incurred and included in other operating expenses on the Consolidated Statements of Comprehensive Income. Although unusual, pre-bid costs that are explicitly chargeable to the customer even if the contract is not obtained are included in accounts receivable on the Consolidated Balance Sheets with a corresponding reduction in the other operating expenses on the Statements of Comprehensive Income.

There are agreements with certain customers which may include clauses for liquidated damages, reimbursement of out of pocket expenses, incentive awards, cost or profit sharing and may be subject to potential claims which affect the transaction price. Services provided to these customers are in accordance with such terms set forth in written agreements, which requires the Company to assess the potential revenue effects of this variable consideration. Given each customer contract is typically unique, the Company will utilize the expected value or most likely amount method depending on the specific facts and circumstances. Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. As such, revenue on sales to customers that include certain of these clauses are recorded net of the estimated variable consideration based on both available industry data as well as the project manager's experience with a particular customer. Any potential claims would constrain the corresponding revenue when the circumstances become known. Work performed under a change order prior to final contract approval is also recognized as variable consideration utilizing the expected value method and included in the transaction price. The Company believes that the judgements and estimates utilized are reasonable based upon current facts and circumstances, however, utilizing different judgments and estimates could result in different amounts. Management continuously monitors factors that may affect the quality of its estimates.

Accounts Receivable: Accounts receivable represents amounts billed to clients that have yet to be collected and are an unconditional right to cash from our clients. These amounts are billed in accordance with the terms of our client contracts and are shown net of an allowance for doubtful accounts. The Company's receivables are principally derived from governmental clients. The Company anticipates that substantially all such billed amounts will be collected over the next twelve months. As a result of the adoption of ASC 606, retainage amounts of $21,002 are classified as contract assets as of December 28, 2019, compared to retainage amounts of $18,790 classified as accounts receivable as of December 29, 2018.

Contract Assets: Contract assets represent amounts where the right to payment is subject to more than merely the passage of time and require additional Company performance. Contract assets are transferred to accounts receivable when the right to payment becomes unconditional.

The Company's contract assets include amounts due under contractual retainage provisions as well as costs and estimated earnings in excess of billings. Retainage amounts are withheld from progress billings to provide assurance to the customers that the Company will perform in accordance with the contract terms and are paid upon final and satisfactory project completion. Retainage due beyond one year are classified as current in accordance with industry convention and are not considered a financing benefit. Costs and estimated earnings in excess of billings also represent amounts earned and reimbursable under contracts, including customer affirmative claim recovery estimates, but have a conditional right for billing and payment such as achievement of milestones or completion of the project. With the exception of customer affirmative claims, generally, such unbilled amounts will become billable according to the contract terms and generally will be billed and collected over the next twelve months. Settlement with the customer of outstanding affirmative claims is dependent on the claims resolution process and could extend beyond one year. Based on the historical experience, the Company generally considers the collection risk related to billable amounts to be low. When events or conditions indicate that it is probable that the amounts outstanding become unbillable, the transaction price and associated contract asset is reduced.

Notes to Financial Statements

CDM Smith Inc. and Subsidiaries and Affiliates
December 28, 2019 and December 29, 2018
(In thousands, except per share and per share amounts)

The components of the opening and closing contract asset balances as of the respective dates are as follows:

	December 28, 2019	December 30, 2018
Unbilled revenues on contracts	$120,715	$141,189
Contract retainage	21,002	18,790
Total contract assets	$141,717	$159,979

	December 28, 2019	December 30, 2018
Billings in excess of costs and estimated earnings, net of retainage	$ 66,184	$ 82,142
Retainage	15,952	15,858
Provision for losses	4,092	3,500
Total contract liabilities	$ 86,228	$101,500

Cash, Cash Equivalents, and Restricted Cash: The Company considers all highly liquid investments purchased with a remaining maturity of three months or less at time of purchase to be cash equivalents. The carrying amount of these cash equivalents is a reasonable estimate of fair value. The Company believes it is not exposed to any significant credit risk on cash and cash equivalents, however, balances with certain financial institutions exceed FDIC limits. The Company monitors their cash position with financial institutions and reclasses book overdraft positions to accounts payable; $0 and $4,391 was reclassified to accounts payable as of December 28, 2019 and December 29, 2018, respectively. We record cash and cash equivalents as restricted when we are unable to freely use such cash and cash equivalents for our general operating purposes. As of December 28, 2019 and December 29, 2018, we had restricted cash of $419 and $429, respectively, on the Consolidated Balance Sheets included in our cash, cash equivalents, and restricted cash.

Fair Value of Financial Instruments: Provisions of FASB ASC 820-10, which defines fair value, establish a uniform framework for measuring fair value where other accounting pronouncements require fair value measurements, and expands disclosure requirements for all financial and non-financial assets and liabilities. Financial assets and liabilities, which include money market instruments and investments related to the Company's Deferred Compensation Plan (Note 7), were measured using Level 1 inputs, which are quoted prices in active markets. The Company did not have any non-financial assets or liabilities that required remeasurement to fair value.

Goodwill and Intangible Assets: Goodwill is not amortized but is reviewed for impairment on an annual basis and whenever events or changes in business circumstances indicate that the carrying value may not be recoverable. Amortizable intangible assets are reviewed for impairment whenever events or changes in business circumstances indicate that the carrying value may not be recoverable. No impairments of goodwill or intangible assets were identified in fiscal years 2019 and 2018.

Intangible assets are amortized using a straight-line amortization method, which is not materially different from the pattern of economic benefit, over the following useful lives: customer relationships 9-13 years; trademarks and licenses 15-16 years; backlog 2 years; and design library 4 years.

In 2018, the Company acquired a license to practice engineering in the state of New York for $1,950. This license has been accounted for as an indefinite lived intangible asset and is recorded in trademarks and licenses in the table below. The carrying value is $1,950 as of December 28, 2019 and December 29, 2018.

Intangible assets recorded within goodwill and intangible assets, net within the Consolidated Balance Sheets consist of the following:

	2019	2018
Customer relationships	$ 8,350	$ 8,350
Trademark and licenses	3,550	3,550
Backlog	11,750	11,750
Design library	900	900
Total	$24,550	$24,550
Accumulated amortization	(16,965)	(16,261)
Intangible assets, net	$ 7,585	$ 8,289

Changes in the carrying value of goodwill for each of the years ended December 28, 2019 and December 29, 2018 are as follows:

	2019	2018
Balance at of beginning of year	$43,601	$44,220
Additions	313	—
Exchange rate change	(114)	(619)
Balance at end of year	$43,800	$43,601

Amortization expense was $704 and $914 in fiscal years 2019 and 2018, respectively. The expected intangible asset amortization is as follows:

2020	$ 704
2021	704
2022	704
2023	701
2024	659
Thereafter	2,163
	$5,635

Income Taxes: For financial reporting purposes, deferred taxes are determined based on the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. A valuation allowance is established for deferred taxes when it is more likely than not that all or a portion of the deferred tax assets will not be realized.

According to authoritative guidance on the accounting for uncertainty in income taxes, the Company may recognize the benefit of an income tax position only if it is more likely than not (greater than 50%) that the tax position will be sustained upon tax examination, based solely on the technical merits of the tax position. The Company will accrue interest and related penalties, if applicable, on uncertain tax positions for which reserves have been established, consistent with jurisdictional tax laws as a component of income tax expense.

Foreign Currency: Adjustments resulting from translating the accounts of non-U.S. subsidiaries with a functional currency different from the U.S. dollar are recorded as accumulated other comprehensive loss, a component of shareholders' equity. Other comprehensive loss is represented entirely by foreign currency translation adjustments and a gain on net investment hedge. Adjustments relating to other foreign currency transactions are recorded within other expense on the Consolidated Statements of Comprehensive Income. Foreign currency transaction losses of $1,392 and $85 for the years ended December 28, 2019 and December 29, 2018, respectively, have been recorded within other expense on the Consolidated Statements of Comprehensive Income.

Changes in currency exchange rates expose us to market risk. We use derivative instruments, including net investment hedges, as part of our overall strategy to manage our exposure to currency exchange risk. As a matter of policy, we only enter into transactions that we believe will be highly effective at offsetting the underlying risk, and we do not use derivatives for trading or speculative purposes. Net investment hedges are recorded at fair value and changes in the fair value of such hedges are recorded in accumulated other comprehensive loss.

Noncontrolling Interests: The Company follows the guidance within ASC 810 relating to the accounting and reporting standards for noncontrolling interests in consolidated subsidiaries as reported in the consolidated financial statements. The provisions of ASC 810 require that the carrying value of noncontrolling interests be classified as equity, and that net income attributable to the noncontrolling interests be included in consolidated net income. Accordingly, noncontrolling interests are presented as a separate component of equity in the Consolidated Balance Sheets. Net loss and comprehensive loss attributable to noncontrolling interests is presented in the Consolidated Statements of Comprehensive Income.

3. Fixed Assets

Equipment and leasehold improvements are stated at cost. Equipment is depreciated over its estimated useful life of three to seven years using the straight-line method. Leasehold improvements are depreciated using the shorter of the lease term or estimated useful life. Capitalized software is stated at cost. Capitalized software is amortized over its estimated useful life of three to seven years using the straight-line method. Repairs and maintenance are expensed as incurred. When assets are retired or otherwise disposed of, the assets and related accumulated depreciation and amortization are eliminated from the accounts, and any resulting gain or loss is recognized. In fiscal years 2019 and 2018, the Company retired $2,341 and $11,306, respectively, of fully depreciated assets that were no longer in service.

Fixed assets, net consists of the following:

	2019	2018
Equipment	$ 53,167	$ 52,508
Leasehold improvements	39,869	34,159
Software	52,408	47,068
	$145,444	$133,735
Accumulated depreciation and amortization	(88,939)	(78,356)
	$ 56,505	$ 55,379

Depreciation and amortization expense of fixed assets amounted to $14,004 and $14,212 in fiscal years 2019 and 2018, respectively. In fiscal years 2019 and 2018, there were $638 and $256, respectively, of capital expenditures in accounts payable.

Capitalized software accumulated amortization at December 28, 2019 and December 29, 2018 totaled $29,409 and $23,867, respectively.

Software amortization included in depreciation and amortization expense of fixed assets amounted to $5,578 and $5,353 in fiscal years 2019 and 2018, respectively.

4. Debt

On December 28, 2016, the Company amended its then existing revolving credit agreement with a new Amended and Restated Credit Facility ("Amended and Restated Credit Facility"). The amount available for borrowing under the Amended and Restated Credit Facility is $150 million, which includes a $75 million sublimit for the issuance of standby letters of credit and a $15 million sublimit for swingline loans. Letters of credit issued under the Amended and Restated Credit Facility reduce the facility's available borrowing capacity. The Company obtains standby letters of credit from various banks in connection with certain domestic and international contracts. The aggregate amount of outstanding letters of credit at December 28, 2019 and December 29, 2018 was $30,683 and $25,319, respectively.

The Amended and Restated Credit Facility requires that the Company comply with certain financial covenants relating to a maximum leverage ratio, fixed charge coverage, and a minimum tangible net worth, which were changed as part of amendments subsequent to December 28, 2016. The Amended and Restated Credit Facility expires on December 28, 2021. The Company has classified amounts outstanding under the Amended and Restated Credit Facility as current on the Consolidated Balance Sheets because the Company's intended use is to finance working capital needs and the Company intends to repay the balances outstanding within one year.

At the Company's option, borrowings under the Amended and Restated Credit Facility may be maintained from time to time as a Base Rate loan and/or a Eurodollar Rate loan (each as defined in the Amended and Restated Credit Facility), each with a different determination of interest rates. The interest rate for Base Rate loans was 4.75% at December 28, 2019 and 5.50% at December 29, 2018. The interest rate for Eurodollar Rate loans was 3.202% at December 28, 2019 and 3.849% at December 29, 2018. At December 28, 2019, the Company had a total of $27,787 of borrowings outstanding under the Amended and Restated Credit Facility, of which $2,787 were at the Base rate and $25,000 were at the Eurodollar rate. At December 29, 2018, the Company had a total of $36,987 of borrowings outstanding under the Amended and Restated Credit Facility, of which $1,987 were at the Base rate and $35,000 were at the Eurodollar rate.

Cash interest payments on the Amended and Restated Credit Facility were $1,673 and $2,429 in fiscal years 2019 and 2018, respectively.

A revolving commitment fee of 35 basis points per annum is payable on the unused balance of the facility. The commitment fee payments were $329 and $192 in fiscal years 2019 and 2018, respectively.

The Company's German affiliate has credit agreements with a number of local banks. The total notional amount of these facilities was $12,174 and $12,488 as of December 28, 2019 and December 29, 2018, respectively. The credit agreements consist of working capital overdraft facilities which are currently not used. The credit agreements carry interest rates ranging from 4.13% to 9.25% at December 28, 2019 and December 29, 2018.

5. Derivatives

On January 26, 2018, the Company entered into a foreign currency forward contract to protect against foreign exchange risk that results from translating our European subsidiary's balance sheet into U.S. Dollars. The derivative used to hedge this exposure was a forward contract to sell €14 million with a strike price of €1 = $1.2693 and a value date of December 28, 2018. This hedge was designated as a net investment hedge at inception. In November 2018, the Company early terminated this net investment hedge and realized a gain of $1,403, net of tax, which is recorded in other comprehensive income in the Consolidated Statements of Comprehensive Income. The Company has no outstanding hedges as of December 28, 2019 and December 29, 2018.

6. Capital Accumulation Plan

The Company has a Capital Accumulation Plan ("CAP") that allows eligible employees to share in profits of the Company as determined by the Board of Directors ("Board"). The Company will not contribute to the profit-sharing plan for 2019 and did not contribute to the profit-sharing plan for 2018.

The CAP also provides for a contribution from the Company that matches a portion of the employees' contribution to a 401(k) plan. The matching of the employees' contributions under the CAP is discretionary and is based on an assessment of financial performance. The Company expects to make a contribution of 50% stock and 50% cash with a total value of approximately $8,982 to the 401(k) portion of the Capital Accumulation Plan for 2019. The Company made contributions in cash of $8,371 for fiscal year 2018. The Company match is made in the form of cash and/or Company common stock and is accrued as a component of accrued compensation and related liabilities.

7. Deferred Compensation Plan

The Company has a non-qualified deferred compensation plan that permits certain key employees to annually elect to defer a portion of their compensation for their retirement. The deferred amount and related investment earnings are placed in an irrevocable trust and included in other assets in the Consolidated Balance Sheets because they will be available to the general creditors of the Company in the event of insolvency. Investments within the trust are primarily

composed of mutual funds made up of publicly traded domestic stocks, international stocks, and bonds. Amounts due to employees are included in other liabilities on the Consolidated Balance Sheets. The plan value at December 28, 2019 and December 29, 2018 totaled $30,131 and $27,524, respectively. Gains and losses on investments within the deferred compensation plan are recorded net against the corresponding operating expenses on the Consolidated Statements of Comprehensive Income. The non-cash gains (losses) totaled $3,615 and $(99), during 2019 and 2018, respectively.

8. Stock Purchase Plan

The Company has a Stock Purchase Plan ("Plan") under which officers, associates, and other key members of the Company are granted rights to purchase Common Stock within 5 years from the date of grant. The Company has three classes of Common Stock: Class A, B, and C shares.

The number of shares authorized for Class A, B, and C, respectively, for all years presented is the following:

Shares Authorized	
Class A	5,000,000
Class B	15,000,000
Class C	5,000,000

The number of shares issued and outstanding for Class A, B, and C, respectively, at December 28, 2019 December 29, 2018 were as follows:

Issued and Outstanding	2019	2018
Class A	1,143,846	1,171,970
Class B	364,819	484,438
Class C	750,961	795,875

Additionally, officers, associates, and other key members of the Company may purchase either Class B or Class C Common Stock as requested and approved by the Board. The Class B and C Common shareholders each elect one director to the Board, while Class A Common shareholders elect the remaining directors. The Class A and B Common Stock have certain preferences in regard to dividends and liquidation. The Company is obligated to redeem any shares sold by shareholders.

The Plan establishes a transfer price ("Transfer Price"") for the purchase and sale of Common Stock, and a 6-month minimum holding period for any stock purchased. The Transfer Price is calculated from the book value of the preceding year end multiplied by an adjustment factor of 1.5 times book value. The purchase and redemption price for all the Common Stock is the transfer price in effect for the fiscal year the transaction occurs.

The following table details the unexercised stock rights and share exercise price:

Unexercised Rights	2019	2018
Class A	357,131	350,743
Class B	—	—
Class C	100,513	84,058
Share exercise price	$ 103.73	$ 97.83

The Company's policy for allocation, purchase, sale and conversion of stock does include restrictions relating to change in title, elimination of title, maximum amount of shares that may be held, and class of shares to be held and the need to sell all shares when an employee temporarily goes on a reduced work schedule. Eligible employees can make shares purchases using three methods: (i) direct share purchases during the annual open enrollment period; (ii) participation in a payroll deduction program; and (iii) participation in the stock note program. Direct share purchases can be made by eligible employees during the Company's annual open enrollment period. This period generally begins during the second quarter and ends during the third quarter. The Plan also provides for the purchase of stock through a payroll deduction program that allows for voluntary deductions to take place over a 6-month period culminating in a stock purchase. Amounts withheld do not bear interest.

Additionally, the Company maintains a stock note program that provides for the purchase of Company stock through a stock note. The stock note program allows shareholders to purchase stock at the then current transfer price, through a note with the Company, at the Wall Street Journal prime rate of interest, and repay the note through a payroll deduction for up to 5 years. The notes are full recourse and are secured by the shares purchased. The note may be repaid at any time without penalty or interest. The amount outstanding at December 28, 2019, and December 29, 2018, was $1,388 and $1,348, respectively, and is recorded within shareholders' equity on the Consolidated Balance Sheets.

9. Long-Term Incentive Plan

Effective January 1, 2018, the Company established its Long-Term Incentive Plan ("LTI Plan") with the intent to attract, retain and motivate key individuals, and to provide these employees with rewards that are based upon the improved financial performance of the Company. Participants in the LTI Plan are awarded Restricted Units as well as Performance Units.

	Restricted Units	Performance Units	Total Units	Weighted-Average Grant Date Fair Value	Weighted-Average Remaining Contractual Terms (in Years)
Nonvested as of December 30, 2017	—	—	—	$ —	
Granted	16,480	24,720	41,200	97.83	
Vested	(4,125)	—	(4,125)	97.83	
Nonvested as of December 29, 2018	12,355	24,720	37,075	97.83	2.00
Granted	16,135	24,215	40,350	103.73	
Vested	(7,956)	—	(7,956)	100.82	
Forfeited	(603)	(1,210)	(1,813)	97.83	
Nonvested as of December 28, 2019	19,931	47,725	67,656	$101.00	1.54

Restricted Units vest annually over a three-year period while Performance Units vest only at the end of the three-year period and are additionally subject to the Company's achievement of certain financial goals. The number of Performance Units granted per the table above represents the number of shares that will vest assuming the Company achieves its financial goals at 100% of plan. The number of actual Performance Units that will vest depends on whether the Company achieves its pre-determined three-year cumulative Earnings Before Bonuses and Taxes ("EBBT") performance goals as determined by the Board and can vest between 50% and 150% of target. The total number of incremental performance units that could ultimately vest if all performance criteria are achieved would be 72,193 units assuming the Company achieves its financial goals at 150% of plan, adjusting for known forfeitures. As of December 28, 2019, the 2018 LTI Plan performance is expected to achieve 150% of target and the 2019 LTI Plan performance is expected to achieve 144% of target. As a six-month holding period is required for all shares of the Company prior to a transfer or a repurchase, all awards granted under the LTI Plan are classified as equity awards on the Consolidated Balance Sheet. Holders of vested LTI Plan shares are subject to normal risks and rewards of equity ownership.

During fiscal years 2019 and 2018, the Company recorded stock-based compensation expense relating to the LTI Plan of $3,758 and $750, respectively. Compensation expense is recognized ratably over the service period based on grant date fair value of the awards. Fair value is equivalent to the Transfer Price established under the Company's Stock Purchase Plan.

10. Income Tax

The Company's provision for income taxes for the years ended December 28, 2019 and December 29, 2018 are as follows:

	2019	2018
Current expense (benefit)		
Federal	$ 7,711	$ 8,725
Foreign	2,776	3,666
State	3,195	3,046
Total current	$ 13,682	$ 15,437
Deferred expense (benefit)		
Federal	$ (1,281)	$ (2,440)
Foreign	(308)	45
State	56	1,107
Total deferred	$ (1,533)	$ (1,288)
Total income tax expense	$ 12,149	$ 14,149

The following tabulation reconciles the federal statutory tax rate to the effective rate for the years:

	2019	2018
Federal statutory tax rate	21.0%	21.0%
State and local income taxes, net of federal tax benefit	6.9%	6.7%
Foreign operations	4.1%	6.1%
Research and development credit	(1.4%)	(1.6%)
Non-deductible meals, entertainment and transportation benefits	2.3%	2.5%
Effect of the 2017 Tax Act	0.0%	9.9%
	32.9%	44.6%

The principal components of the deferred tax assets and liabilities are as follows:

Deferred tax assets:	2019	2018
Accounts receivable	$ 546	$ 921
Accrued expenses and reserves	6,715	7,842
Amortization of intangibles	40	729
Deferred compensation	7,933	7,371
Net operating loss carryover	11,276	9,701
Tax credit carryover	2,288	543
Other	97	462
Total deferred tax assets	$ 28,895	$ 27,569
Valuation allowance	(9,908)	(8,361)
Net deferred tax asset	$ 18,987	$ 19,208
Deferred tax liabilities:		
Prepaid expenses/other	$ 1,517	$ 2,306
Depreciation and amortization	6,642	7,607
Total deferred tax liabilities	8,159	9,913
	$ 10,828	$ 9,295

The net deferred tax assets are recorded within other assets on the Consolidated Balance Sheets. An additional deferred tax impact is recorded as a component of equity in the amount of $507 related to a gain on a net investment hedge entered into by the Company during 2018.

As of December 28, 2019, the Company has gross net operating loss carryforwards totaling $53,069 in various foreign jurisdictions, which begin to expire in 2020. As of December 29, 2018, the Company has gross net operating loss carryforwards of $44,504 in various foreign jurisdictions, which begin to expire in 2019. The Company has maintained a gross valuation allowance of $50,132 and $41,458 on the deferred tax asset related to these foreign net operating loss carryforwards as of December 28, 2019 and December 29, 2018, respectively, since the Company believes that it is more likely than not that the benefit from the foreign net operating loss carryforwards will not be realized. In addition, the Company has domestic state net operating loss carryforwards related to various jurisdictions where separate subsidiary filings are required. As of December 28, 2019, and December 29, 2018, the Company has $8,584 and $10,349, respectively, of domestic state net operating loss carryforwards which begin to expire in 2031. The Company has foreign tax credit carryforwards totaling $2,288 and $543 as of December 28, 2019, and December 29, 2018, respectively, which begin to expire in 2028. The Company believes that it is more likely than not that the domestic state net operating loss carryforwards and the foreign tax credit carry forwards will be realized prior to their expiration.

On December 22, 2017, the Tax Cuts and Jobs Act (the "2017 Tax Act") was signed into law. The 2017 Tax Act reduced the U.S. federal corporate income tax rate from 35% to 21% starting on January 1, 2018 and contained other provisions that impacted the Company. In fiscal 2018, the Company substantially completed its accounting for the income tax effects of certain elements of the 2017 Tax Act.

During 2018, the Company identified a misstatement pertaining to the measurement of the deferred tax liability for depreciation and amortization of approximately $3,155, which should have been recorded in prior periods. Management concluded that the effect of this error is not material to the as reported financial statements for prior periods and recorded the amount as an out of period adjustment in fiscal year 2018.

Income tax payments, net of refunds received, were $14,374 and $6,151 in fiscal years 2019 and 2018, respectively.

The total amount of potential unrecognized tax benefits, including interest as of December 28, 2019 and December 29, 2018 was $1,446 and $1,817, respectively. The Company does not anticipate any material changes in the total amount of potential unrecognized tax benefits to occur over the next twelve months.

The Company conducts business operations through legal entities in the United States as well as multiple foreign jurisdictions. Undistributed earnings of non-U.S. subsidiaries are intended to be reinvested in those operations for an indefinite period of time. With few exceptions, the Company is no longer subject to U.S. (including federal, state, and local) or non-U.S. income tax examinations by authorities for years before fiscal 2015.

11. Other Assets and Other Liabilities

Other assets are composed of the following:

	2019	2018
Deferred compensation	$30,415	$27,524
Deferred income taxes	10,828	9,295
Undistributed earnings on equity method investments and other	8,114	4,999
Other long-term assets	2,579	2,171
Total other assets	$51,936	$43,989

Other liabilities are composed of the following:

	2019	2018
Deferred compensation fund	$30,401	$27,524
Deferred rent	15,607	16,886
Deferred salaries	12	—
Other	60	—
Total other liabilities	$46,080	$44,410

12. Commitments and Contingencies

The Company leases office facilities under various operating leases with various terms through 2029, with original lease terms ranging from one to fifteen years. Many of these leases require that the Company pay taxes, maintenance, insurance and certain other operating expenses applicable to leased properties. Certain leases include renewal options, rent escalation clauses and landlord leasehold improvement incentives. The Company records rent expense on a straight-line basis over the lease term, and accordingly has included a deferred lease liability of $18,009 and $18,936 as of December 28, 2019 and December 29, 2018, respectively, in other current liabilities and other liabilities in the Consolidated Balance Sheets. The Company's total rent expense was $32,292 and $32,350 for fiscal years 2019 and 2018, respectively.

The Company is committed to minimum annual rentals (exclusive of tax and operating escalations tied to market indices) on its operating leases as follows:

2020	$ 27,964
2021	24,447
2022	19,885
2024	15,722
2025	11,964
Thereafter	28,147
	$128,129

Legal Proceedings: The Company is involved in various legal proceedings generally incidental to the conduct of its business. The Company has accrued for losses that were determined to be probable and can be reasonably estimated.

In April 2019, the Company received Civil Investigative Demands from the United States Department of Justice ("DOJ") that was issued pursuant to the False Claims Act, 31 U.S.C. Secs 3729-3733 in the course of a False Claims Investigation to determine whether there is or has been a violation of 31 U.S.C Sec 3729. The investigation concerns allegations that the Company and one of its subsidiaries materially inflated cost estimates for non-competitive task order proposals under a single customer contract, in violation of the Federal Acquisition Regulation and the Truth in Negotiations Act (collectively the "Regulations"). Outside counsel were retained to assess the alleged improper behavior for the contract and the assessment was extended to other contracts. The Company's investigation is ongoing and the Company believes that results to date do not indicate that it has violated the Regulations. As a result of the review of these matters, the Company has implemented, and continues to implement appropriate measures including training programs, enhanced policies, and improvement of controls and processes relative to contracts subject to the Regulations. The Company is cooperating with the DOJ in its investigation and with the customer. In 2019, the Company recorded expenses of $1,577 associated with this matter and also recorded an estimated accrued liability of $4,033 to address the resolution of this matter with the DOJ and the customer, but no such resolution has been agreed to as of the issuance date of these consolidated financial statements. Actual results may differ from this estimate, including the potential impact of interest and penalties.

13. Subsequent Events

In December 2019, a novel strain of coronavirus ("COVID-19") surfaced in Wuhan, China. COVID-19 has subsequently spread domestically and internationally and has become a worldwide pandemic. There is a significant amount of uncertainty that continues to exist. Management is actively monitoring the situation as it develops, as well as, any potential impact that COVID-19 could have on the Company, its customers, and the industry.

The extent of the impact of COVID-19 on our operational and financial performance will depend on certain developments, including the duration and spread of the outbreak, impact on our customers, employees and contractors all of which are uncertain and cannot be predicted. The 2019 consolidated financial statements were prepared based on management's best estimates about facts and circumstances that existed at the balance sheet date. There are inherent risks that the Company may experience including potential project delays, collectability of accounts receivable, asset impairments and other business disruptions that could have a material adverse impact on financial results and operations.

As of the date of issuance of the financial statements, the Company's operations have not been significantly impacted. The Company continues to monitor the situation closely and may implement further measures to provide additional financial flexibility and improve the Company's cash position and liquidity.

The Company has performed an evaluation of subsequent events through April 15, 2020, which is the date the consolidated financial statements were available for issuance. There have been no other material events that have occurred that are not otherwise disclosed.

Board of Directors and Senior Officers

CDM Smith Inc. and Subsidiaries

2019 BOARD OF DIRECTORS

Timothy B. Wall [1]
Chairman of the Board

Jennifer S. Banner [2,3,4]
Former CEO, Schaad Companies

Anthony B. Bouchard [1]
President and Chief Operating Officer

Thierry Desmaris [1]
Executive Vice President

Mario J. Marcaccio
Senior Vice President,
General Counsel

Howard H. Stevenson [2,3,4]
Sarofim-Rock Baker Foundation
Professor (emeritus),
Harvard Business School

Peter W. Tunnicliffe [1,4]
Executive Vice President

Gae Walters [3]
President, Millennium

1. Executive Committee
2. Audit Committee
3. Executive Compensation Committee
4. Finance Committee

2019 CORPORATE SENIOR OFFICERS

Timothy B. Wall
Chairman and
Chief Executive Officer

Anthony B. Bouchard
President and
Chief Operating Officer

Graham Campbell
Senior Vice President,
Director of Project Performance
Management

Marla B. Colling
Senior Vice President,
Chief Compliance Officer

Thierry Desmaris
Executive Vice President,
Chief Financial Officer

Carlos S. Echalar
Senior Vice President,
Chief Human Resources Officer

Julia B. Forgas
Executive Vice President,
Chief Marketing Officer

Mario J. Marcaccio
Senior Vice President,
General Counsel

David M. Neitz
Senior Vice President,
Chief Information Officer

2019 UNIT PRESIDENTS

Gwen E. Baker
Federal Unit

Anthony B. Bouchard
International - Middle East, Latin
America/Caribbean, Asia Pacific

Randy R. Rogers
Technical Services Unit

Thierry Desmaris
International - Europe

Kevin J. Riley
Industrial Unit

Peter W. Tunnicliffe
Construction Unit

David T. Zimmer
North America Unit

TAB
5

Profile of Consultant

Tab 5: Profile of Consultant

A. Organization

CDM Smith is a global privately owned engineering and construction firm providing 73 years of legendary client service and smart solutions in water, environment, transportation, energy, and facilities. Maintaining a presence in Florida for more than 45 years, including a local South Florida office since 1987, we are residents who live, work, and play in the local community with families who directly benefit from the continued success of the City's stormwater management program.

B. Location of Office

All aspects of this contract will be led and managed out of our local Boca Raton office at *621 NW 53rd Street, Suite 265, Boca Raton, FL 33487*. Located a short 30-minute drive from the City's offices, we will facilitate responsive service and create a seamless team with the City. What's more, due to our location, we are intimately familiar with the City's infrastructure, allowing us to hit the ground running upon notice to proceed.

C. Firm Description

As summarized to the right, we bring to the City's project the depth, breadth, and availability of resources to deliver. In fact, the sheer depth of national and local resources offered by our team is an indispensable differentiator worth noting. With nearly 400 professionals in Florida and a global staff network of more than 5,000, the CDM Smith team has in place the horsepower needed to effectively deliver a successful SWMP.

Our complete suite of services spans from state-of-the-art stormwater master plans, program management, management consulting, and architectural and geotechnical engineering, to design-build, construction management, and operations. However, the CDM Smith team brings specialized experience in projects involving the development of comprehensive watershed and stormwater management programs; the use of computer models for urban and rural stormwater management evaluations; the permitting, design, and construction of stormwater management systems; and the assessment of institutional, regulatory, and financial needs for stormwater management.

less than **30 minutes** from our Boca Raton office to the City's offices

CDM Smith boasts a total **Florida staff of nearly 400!** This depth of staff allows us to take on projects of all sizes while maintaining availability of staff

nearly **400** staff

33 years of **Florida** stormwater experience including **100+ SWMPS**

1947 Founded in 1947 with 45 years of business in Florida.

$1.2B Employee-owned firm with positive cash flow as shown by our 2019 annual revenue

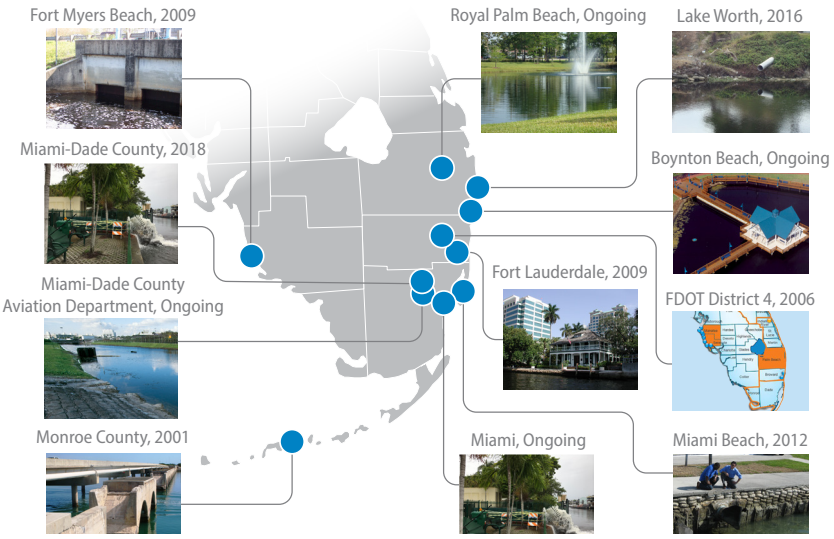
100% A **full-service team** with in-house, multi-disciplinary capabilities that include **EVERY** service area listed in the City 's Scope of Services

D. List and Description of Similar Work Projects

CDM Smith offers relevant and verifiable experience in the crafting of metropolitan and coastal master plans—successful plans that are implementable and can be leveraged towards the development of the City of Hollywood's master plan, applying lessons learned, best practices, and similar hardening concepts. We also offer the City the same highly skilled experienced modelers who developed these plans, along with program management, design, and permitting expertise to specifically address the complex and inter-dependent demands of implementation, schedule, permitting, and cost control. More importantly, we bring verifiable experience from similar Florida coastal communities.

SWMPs that Span the Coast of Florida from the Panhandle to the Keys

In Floride alone, CDM Smith has developed and/or updated more than 100 SWMPs, almost all of which were developed for coastal communities that span the coastline (as shown in the table to the right); in fact, we have unmatched stormwater master planning experience along the southern coast of Florida, having created 9 SWMPs for large coastal communities in the area.



Having developed master plans for communities that surround the City, we have successfully navigated many of the same issues the City is facing and possess an in-depth understanding of the specific improvements needed to accomplish your goals. However, we understand the best measure of our successful completion of similar projects are our client references. On the following pages, we have described ten such similar master plans successfully delivered for similar clients. We invite you to contact these client references who will attest to our excellence.

Coastal Community — CDM Smith's Florida SWMP Experience

- Stormwater Master Plan, Update, and Implementation, Atlantic Beach
- Bayou George Stormwater Master Plan, Bay County
- CR 390 Stormwater Master Plan, Bay County
- St. Andrew Bay Watershed Stormwater Master Plan, Bay County
- Watson Bayou Stormwater Master Plan, Bay County
- **SWMP, Utility, and Hydraulic Analysis, Boynton Beach**
- Fort Lauderdale Airport Stormwater Master Plan, Broward County
- Stormwater Master Plan for Hollywood International Airport, Broward County
- Gateway Triangle Drainage Master Plan, Collier County
- Gordon River Stormwater Master Plan, Collier County
- Immokalee Stormwater Master Plan Implementation, Collier County
- DBIA Stormwater Master Plan, Daytona Beach
- Stormwater Master Plan and Utility Update, Daytona Beach
- Citywide Stormwater Master Plan, Fort Lauderdale
- Stormwater Master Plan, Fort Myers Beach
- Pilot Stormwater Master Plan and Design, Hialeah
- **Master Stormwater Management Plan, Jacksonville**
- **Stormwater Master Plan and Master Plan Update, Lake Worth**

Stormwater Master Plan, Leon County

- **Stormwater Master Plan, Miami**
- **SWMP and Updates, Miami-Dade Aviation Department**
- Stormwater Master Plan Updates, Miami-Dade County
- **Stormwater Management Master Plan and Update, Miami Beach**
- Stormwater Master Plan and Feasibility Study, Naples

Basin Stormwater Management Master Plans, Orange County

- Stormwater Master Plan, Ormond Beach
- Downtown Drainage Basin Stormwater Master Plan, Panama City
- Stormwater Management Master Plan, Panama City Beach
- Preliminary Stormwater Master Plan, Pensacola
- Stormwater Master Plan, Rockledge
- **Stormwater Master Plan, Royal Palm Beach**
- Stormwater Master Plan, Sarasota County

Lake Jesup and Lake Monroe Stormwater Master Plan, Seminole County

- Stormwater Master Plan, St. Augustine
- Stormwater Master Plan, St. Johns County
- Stormwater Management Master Plan, St. Lucie County
- **Rocky Creek SWMP and Modeling Services, SWFWMD**

Stormwater Master Plan Assistance, Tallahassee

- Norma Park Drainage Stormwater Management Master Plan, Tampa
- **Deep Creek SWMP/Nova Canal Flood Control, Volusia County**
- Stormwater Management Master Plan, West Palm Beach

Stormwater Management Program

Miami-Dade Aviation Department, Miami, FL

CDM Smith has provided various services at the Miami-Dade Aviation Department's (MDAD) Miami International Airport (MIA), Miami-Opa Locka Executive Airport (OPF), and Miami Executive Airport (TMB), as well as other minor MDAD-operated airports. Our services have included modeling, drainage design, best management practices, water quality assessment, facilities planning, remedial actions, and permitting and regulatory assistance.

Total Compensation for Services: $2.5M (to Date)
Project Duration: 05/1989 to Ongoing
Client Name: Miami-Dade Aviation Department
Contact: Guillermo R. Garcia
Telephone Number: 305.869.4111
E-mail: grgarcia@miami-airport.com

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

CDM Smith Project Manager: Jon Goldman

Since 1989, CDM Smith has provided support to Miami–Dade Aviation Department (MDAD) in the planning, permitting, and implementation of its stormwater master plan and capital improvement program (CIP) for the redevelopment of Miami International Airport (MIA), Kendall-Tamiami (TMB) airport, and Opa-locka (OPF) executive airport.

For MIA, CDM Smith developed the Stormwater Master Plan (SWMP, 1992) for four of the five outfall systems, including the Terminal Area (Concourse A – J), MIAD Circle, and Northwest Cargo watersheds. The SWMP included comprehensive evaluations of hydrology, hydraulics, water quality, best management practices (BMPs), and facility planning in phases to allow cost-effective implementation of the CIP while aircraft operations continued and increased to serve growing air traffic demands. A variety of planning constraints were identified including the protection of aircraft passenger safety (no fog or bird attractants) and the environment (flood control, water quality protection and improvement, manatee access, and hazardous material cleanups from more than 20 underground sources).

Aircraft passenger safety issues regulated by the Federal Aviation Administration (FAA) had to be balanced with the environmental and flood control permitting requirements of the South Florida Water Management District (SFWMD), Department of Environmental Resources Management (DERM), United States Environmental Protection Agency (USEPA), and Florida Department of Environmental Protection (FDEP). CDM Smith systematically developed the SWMP for the airport's watersheds to meet the environmental permitting requirements and associated level of service (LOS). In some cases, CDM Smith had to balance limiting on-site ponding to maintain safe operations, while providing enough on-site storage to comply with outfall permit requirements. This on-site storage included both water quantity (flood control) and water quality (runoff treatment) components. Storage was considered in both underground pipes and above ground runway-taxiway swales, open channels canals, and surface grading patterns.

Historically, the grassed swales in the infield areas have provided shallow, short-duration retention, which is consistent with both FAA and SFWMD requirements. This retention provides treatment of nearly half of the airport area; however, the remaining half of the airport also needed runoff treatment as part of the redevelopment efforts. Conventional BMPs of retention and detention entail ponding of water to treat and attenuate runoff but this ponding can be a bird and/or fog attractant. Therefore, as an alternative, CDM Smith developed an innovative BMP treatment train approach to meet the competing regulatory requirements. This BMP Treatment Train consisted of retrofit treatment and attenuation of stormwater runoff. The modifications incorporated the requirements of US EPA NPDES, FAA, and SFWMD into one integrated system. The BMP Treatment Train saved the Miami-Dade County $50M in capital costs and allowed a phased implementation as redevelopment occurred.

Stormwater Master Plan

Miami, FL

CDM Smith is currently developing a new and comprehensive SWMP to replace the City's outdated 2012 SWMP, with the goals of establishing a policy framework so that the integrity of the City's future is protected and enhanced over time.

Total Compensation for Services: $3.8M
Project Duration: 04/2018 to Ongoing
Client Name: City of Miami
Contact: Keith A. Ng, CFM
Telephone Number: 305.416.1298
E-mail: keithng@miamigov.com

CDM Smith Project Manager: Jon Goldman

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

The City of Miami encompasses approximately 56 square miles, of which approximately 36 square miles are located in upland areas while the remaining 20 square miles are found within coastal basins and Biscayne Bay. The service area is naturally divided by elevation and topography into eight major watersheds which have been analyzed to various degrees in past stormwater analyses, the most recent of which was completed in 2012. This Stormwater Master Plan (SWMP) has proven to be outdated due to changes in land use, sea level rise, and the current regulatory environment. As such, CDM Smith was retained towards the development of a new and comprehensive SWMP to establish a policy framework so that the integrity of the City's future is protected and enhanced over time.

Our team is currently undertaking planning and development for the newly updated and comprehensive SWMP based on a modern Geographic Information System (GIS) database. This began with an initial data collection and evaluation, which included review of the adopted 2012 SWMP and other available and applicable data sources, including the current LOS, GIS, tidal boundary conditions, and FEMA/NFIP data. Based upon the data and information gathered we then developed hydrologic and hydraulic models of the City's watershed-based stormwater system using XP-SWMM. We will also analyze the current stormwater infrastructure capability in relation to storm events and Sea level rise scenarios and provide recommendations for future infrastructure improvement.

Hydraulic Analysis for Downtown Stormwater System

Boynton Beach, FL

As part of an overall infrastructure and ancillary services and consulting and engineering service for the Boynton Beach General Consulting Services contracts, our primary responsibility included professional services related to stormwater master planning, SCADA, lift station design and construction services, and water supply planning and permitting.

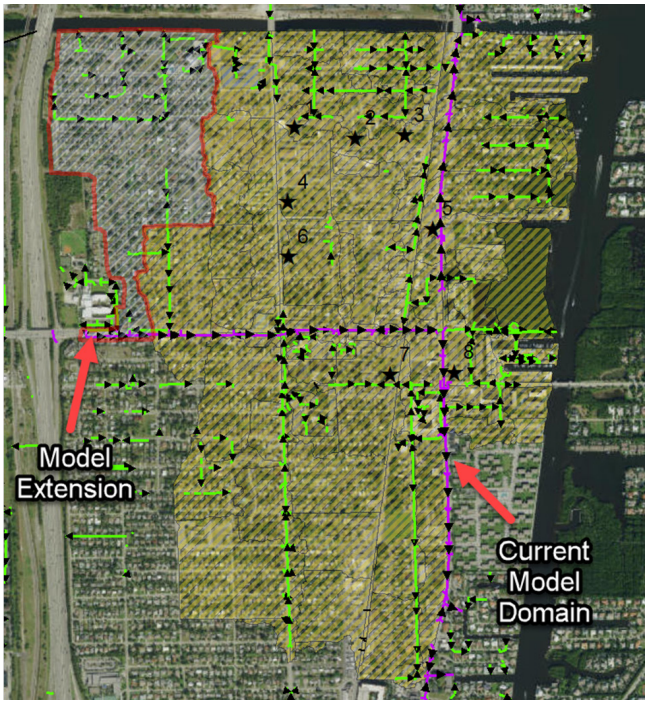
Total Compensation for Services: $100K
Project Duration: 08/2018 to 12/2018
Client Name: City of Boynton Beach
Contact: Christopher Roschek, Engineering Division Manager
Telephone Number: 561.742.6413
E-mail: roschekc@bbfl.us

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

CDM Smith Project Manager: Yanice Mercado

CDM Smith provided consulting services for work in connection with updating the City's hydraulic modeling of the downtown stormwater conveyance and treatment system. The updated hydraulic model will manage stormwater runoff of the downtown watershed for Town Square development. After review of the hydraulic capacity and water quality retrofit needs of the Downtown Watershed/Town Square development, CDM Smith further updated the existing stormwater model for the remaining Downtown Watershed. The 2018 stormwater model update refined the 1999 model, originally developed by CDM Smith, based on updated conveyance infrastructure data. This included migration of the stormwater model data sets to be compatible with the Environmental Protection Agency (EPA) Stormwater Management Model (SWMM) Version 5 using the PCSWMM interface. We reviewed the 10-year, 72-hour design storm flooding events. As part of the effort, we identified improvements including exfiltration, detention basin, and other innovative alternatives. An objective of the analysis is to develop a tool/ database to assist the City in knowing where there is excess capacity when making decisions for future development.



SWMP and Update

Lake Worth, FL

CDM Smith developed a citywide SWMP to evaluate the study area and the City's primary stormwater management system along with associated outfalls to receiving waters.

Total Compensation for Services: $525K
Project Duration: 10/2011 to 12/2012; 7/2016 to 10/2016
Client Name: City of Lake Worth
Contact: Felipe Lofaso, Assistant Director of Public Service
Telephone Number: 561.586.1720
E-mail: flofaso@lakeworth.org

CDM Smith Project Manager: Brian Mack (Active); Lena Rivera (Former)

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

The City desired to develop a City-wide SWMP to evaluate the study area and the City's primary stormwater management system (PSMS) along with associated outfalls to receiving waters (Lake Worth Lagoon and C-16 and C-51 systems). The City selected CDM Smith for this effort. As a part of evaluating the stormwater system, we met with the City and established objectives, priorities, and goals for the SWMP and for the capital improvement program (CIP). Discussion included talks of stormwater flood control, aquifer recharge, stormwater harvesting, conservation, and improving water quality discharges to the main watersheds and receiving waters of Lake Worth drainage (Intracoastal Waterway, Lake Osborne, and C-16 and C-51 canals). The established goals included water quality protection and improvement for discharges to Lake Worth, the Intracoastal Waterway, Lake Osborne, and canals consistent with state water quality standards and pending numeric nutrient criteria (NNC); flood control and relief of nuisance problems; aquifer recharge to protect and replenish potable groundwater supplies and to reduce salt water intrusion; harvesting and reuse of stormwater; and multi-benefit solutions for parks, roads, and green area restoration.

Based on these goals, performance standards were established in the SWMP for the goals that could be quantified (e.g., water quality standards, flood control levels of service). Specific objectives were defined for each goal so that measurable achievement could be identified as implementation progressed. Since the City was relatively built-out, the SWMP focused on sustainable best management practices (BMP) for existing land use conditions and redevelopment criteria.

The SWMP developed a ranking for the City's CIP projects to be funded by the stormwater utility program. The SWMP supported the stormwater utility program with a list of capital improvements and documentation to support the program costs. We identified green BMP stormwater solutions for water quality, aquifer recharge, stormwater harvesting and reuse, and flood control. CDM Smith provided a stormwater management system inventory to support operations and maintenance (O&M), regulatory requirements, and spill management and prevention. Our team developed geographic information system (GIS) stormwater system coverage and database to facilitate updates of system information and documentation for O&M. We also developed framework quantity and quality stormwater models—SWMM and WMM—to evaluate and define cost-effective CIPs and to provide equitable stormwater management criteria for development and redevelopment. Our team provided capital, operation, and maintenance cost estimates for the recommended stormwater improvements with a summary of the benefits in terms of pollutant load reduction, stormwater harvesting potential, increases in aquifer recharge to reduce saltwater intrusion, and flood stage reductions. CDM Smith developed a SWMP for the 20-year horizon and with the prioritized five and 10-year CIP lists. Results from the SWMM simulations for the five-year storm event showed to be compatible with observed historical flooding conditions. The results of the simulated flooding conditions provided the means to select areas in need for drainage retrofit. The potential retrofit projects were ranked to meet the desired level of service. The CIP project ranking list provided decisions and priorities of alternative solutions and recommendations to retrofit the problem areas identified.

Master Stormwater Management Plan Update and FEMA Map Modernization

Jacksonville, FL

CDM Smith conducted SWMM stormwater modeling including model setup, calibration, and alternative evaluations for water quality and quantity improvements.

Total Compensation for Services: $8.6M
Project Duration: 03/2007 to 12/2012
Client Name: City of Jacksonville
Contact: William (Bill) J. Joyce, PE, Chief of Engineering
Telephone Number: 904.255.8763
E-mail: joyce@coj.net

CDM Smith Project Manager: Lisa Sterling

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

Based on CDM Smith's comprehensive stormwater experience and understanding related to updating Jacksonville's stormwater master plan (SWMP), CDM Smith was retained to provide engineering services to the City in updating their SWMP, developing a 20-year capital improvement plan (CIP), and producing a digital flood insurance rate map (DFIRM). CDM Smith also performed water quality modeling for the 800-square mile watershed, modernized their Federal Emergency Management Agency (FEMA) flood maps for up to 60 sub-basins, provided public outreach for the flood map modernization and total maximum daily load (TMDL) program, and provided technical support to meet the City's pollutant load reduction goals.

CDM Smith converted the existing SWMM models to the current version of SWMM and updated H&H data in the models to reflect changes and development in the City since the original 1992 master plan. CDM Smith developed the rainfall data to drive model simulations for the mean annual, 5-, 10-, 25-, 50-, 100-, and 500-year 24-hour storm events. More than 4,500 model nodes define approximately 600 river miles, which are explicitly modeled, including all bridge crossings and roadway culverts.

The project team developed a methodology to convert the model output to a flood plain delineation that complied with FEMA standards and specifications. The process involved the manipulation of output model results and the preparation of geographic information system (GIS) layers to convert the information into geographic coordinates for batch processing and delineation of a floodplain. During the mapping task, the team determined floodways accounting for both conveyance and storage based on standard methods used by the US Corps of Engineers (USACE). The floodway determination was made under dynamic evaluations, solving the entire stream system at once. This is an important upgrade to the standard floodway methodology, which is based on steady analysis and solves individual branches separately. The project team was able to obtain approval from FEMA through a series of memoranda.

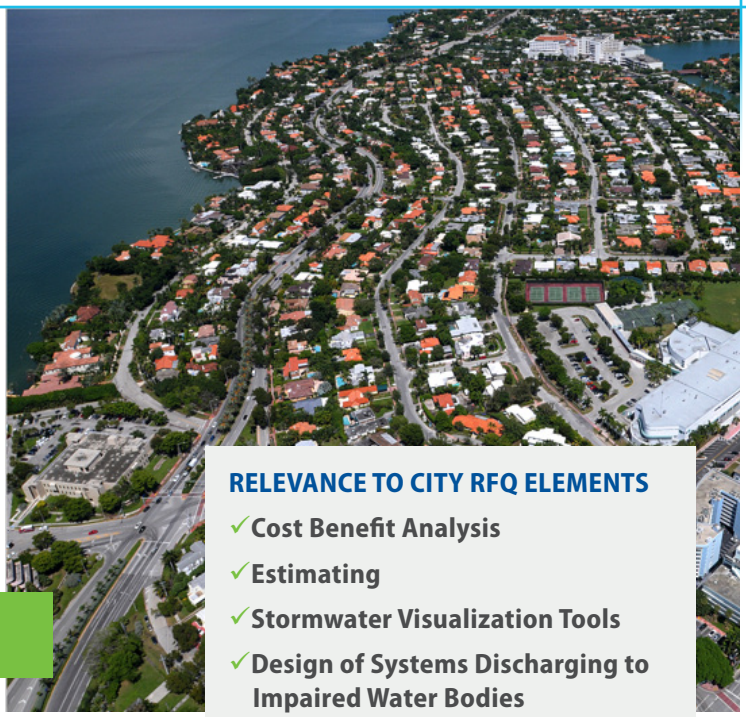
During Tropical Storm Fay, the project team deployed several staff and surveyors in the field to collect information regarding actual flooded locations, high water marks. The information was used to prepare a long-term simulation to verify the model results under tidal and riverine flooding conditions. The outcome enabled the project team to adjust model parameters to further improve the model results.

Upon completion of the base model and delineation of the regulatory subbasin, we identified and ranked capital improvement projects. For each subbasin, the cost-effective frontier was established, which represents the project or combinations of projects that optimize the cost-benefit analysis with respect to the physical and economic constraints present in the project area. CDM Smith was able to provide decision support on a local, regional, and county-wide basis by ranking and prioritizing projects using the cost-effective frontier approach.

Stormwater Management Master Plan and Update

Miami Beach, FL

Worked with the City of Miami Beach to establish SWMP, identify BMP recommendations, provide public outreach, and identify alternatives for flood control for this project.



Total Compensation for Services: $1.1M
Project Duration: 03/2010 to 6/2012
Client Name: City of Miami Beach
Contact: Richard W. Saltrick, (Former) City Engineer
Telephone Number: 954.540.6560
E-mail: saltrick@hotmail.com

CDM Smith Project Manager: Ignacio Lizama (Active); Jose Guzman (Former)

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

CDM Smith developed the comprehensive stormwater master plan (SWMP), system inventory, and model to evaluate the existing system flood control levels of service (LOS) and alternatives for flood control, water quality, and aquifer recharge on the urbanized island systems with sensitive receiving waters, world famous bathing beaches, flat terrain, tidal influence, and sea level rise considerations. CDM Smith developed a cost-effective best management practices (BMP) treatment train approach to build upon National Pollutant Discharge Elimination System (NPDES) MS4 and other activities to improve and document water quality benefits for permitting.

The SWMP established program goals of:

- Flood control
- Water quality improvement and protection
- Aquifer recharge
- Stormwater harvesting and reuse
- Operations and maintenance (O&M)
- Coordination with parks and other projects

CDM Smith evaluated the current LOS of the existing systems, as well as identified and prioritized problem areas, existing and future regional O&M needs, and projected costs. The study considered future climate change projections into the planning, engineering design, construction, and operations of the systems. Under this scenario, our team developed and applied comprehensive SWMM quantity and WMM quality representations for existing and future conditions.

The stormwater system and problem area inventory consisted of evaluating and benchmarking the City's existing stormwater infrastructure, using the City's existing library records and geographic information system (GIS), as well as Federal Emergency Management Agency (FEMA) repetitive loss data. We used the FEMA HAZUS-MH software to calculate structural and economic damage during storm events through the use of vulnerability curves.

To support early-out projects for critical problem areas, CDM Smith evaluated cost-effective alternative refinements to ongoing capital improvement plan (CIP) projects to further improve LOS and water quality BMP recommendations. We also prepared design criteria packages for the design teams.

The SWMP also included CIP projections, as well as an outline of available funding options and opportunities, including grants, loans, and/or stormwater utility rate revenues. As part of the SWMP update, we reviewed the stormwater utility rate structure to identify options for funding the updated CIP to address stormwater and sea level rise.

Nova Canal Flood Control and Integrated Water Resource Program

Volusia County, FL

CDM Smith provided stormwater management planning, conceptual design, and cost-benefit analysis support to identify a cost-effective implementation plan to achieve flood control, water quality improvement, aquifer recharge, and stormwater harvesting for reuse.

Total Compensation for Services: $761K
Project Duration: 06/2009 to 7/2010
Client Name: Eastern Volusia Regional Water Authority
Contact: Judy Grim, PE, Road and Bridge Director (Retired)
Telephone Number: 386.290.3289
E-mail: jsgrim56@gmail.com

CDM Smith Project Manager: Mike Schmidt

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

In May 2009, a major flood event occurred in Volusia County. The overall study area encompassed 26 square miles and the evaluation was performed with the SWMM5 which had previously been developed. The model was updated and validated for the May storm, which spanned five days and dropped between 20 and 27 inches of rainfall. Statistical analysis estimated a rainfall recurrence interval of 310 years for this event.

Various flood control components such as above and below ground storage, conveyance, infiltration, pump stations, flow diversions, and tide-weir gates were evaluated individually and in combination to achieve comprehensive flood control benefits within the study area for the EVRWA. Floodplain storage protection was also recommended for any development and redevelopment. The potential flood reduction benefits provided by the project components were compared to the estimated capital costs to implement the components into the Nova Canal Flood Control and Integrated Water Resource Program (IWRP). The summary plan and report presents the individual program components, combinations of components and alternatives, flood reduction benefits (depth, area, and flood damage cost reduction), and capital costs.

An assessment of costs and benefits was developed to screen and select the alternative that provided the best flood mitigation investment and to demonstrate benefit versus cost for potential Federal and/or State funding support.

The recommended alternative provided the following benefits:

- Reduced peak stages
- Reduced inundated areas
- Shortened flood durations
- Capability to pump down the system in advance of an approaching storm
- Prevention of tidal back surge for more extreme tidal conditions (e.g., Hurricane Dora or King)
- Capture of stormwater before release to tide to allow future design modifications to pump flow west for water supply and/or additional water quality benefits

The recommended alternative cost $98M (plus land) and reduced flood damages from $52M to $26M for the May 2009 storm alone. Overall project life flood damage reduction includes other potential events (e.g., mean annual 5, 10, 25, and 100-year) and is estimated to be approximately $111M, which considered the probability of storm event damages over the 50 year design life for the proposed facilities (flood damage reduction for multiple storms in 50 years). Typically, the cumulative benefit-cost ratio must exceed 1.0 to qualify for federal funding and the recommended Alternative satisfies this requirement. These estimates of cumulative project benefits do not yet include potential alternative water supply benefits, water quality benefits, or ecosystem restoration benefits that may result from these improvements. Therefore the benefit-cost ratio would likely be higher with water supply and water quality benefits considered.

Stormwater Master Plan

Virginia Beach, VA

For the City of Virginia Beach, VA, we assisted in program and model development, neighborhood mitigation plans, and other stormwater-related consulting services for this coastal community.

Total Compensation for Services: $5.6M
Project Duration: 11/2014 to Ongoing
Client Name: City of Virginia Beach
Contact: CJ Bodnar, PE, Project Manager
Telephone Number: 757.385.8430
E-mail: cbodnar@vbgov.com

CDM Smith Project Manager: Martin Malone

CDM Smith is helping the City of Virginia Beach develop stormwater models. Modeling includes application of PCSWMM, 2-Dimensional hydraulic modeling, dynamic interaction between precipitation stormwater runoff and tidal conditions, sea level rise and resiliency consideration, and water quality modeling. Since project inception in late 2014, the City has executed 44 work orders to assist in program and model development, neighborhood mitigation plans, and other consulting services.

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

Criteria are currently being developed to utilize model results to prepare master plans that will provide the City with the basis for quantifying needed improvements to meet the desired stormwater management LOS. The water quality component of the modeling and master planning provides the City with an understanding of loads, load reductions provided by existing BMPs, and loads discharged at MS4 outfalls.

In addition to the watershed master plans, the project also included formulation of mitigation plans for the Ashville Park, Windsor Woods, and Princess Anne Plaza neighborhoods that experience critical flooding. The neighborhood-specific plans included analysis of complex hydrologic and hydraulic conditions and formulation of stormwater improvements to address existing vulnerability associated with limited stormwater system capacity and downstream tidal conditions. The completed plans are the basis for the engineering design currently underway for all three neighborhoods.

Ashville Park

Our modeling identified incorrectly sized pipes in the newly constructed neighborhood. In addition, the groundwater storage pond is also undersized. CDM Smith's modeling showed that downstream tailwater and tidal conditions were not properly considered during design.

Windsor Woods/Princess Anne Plaza

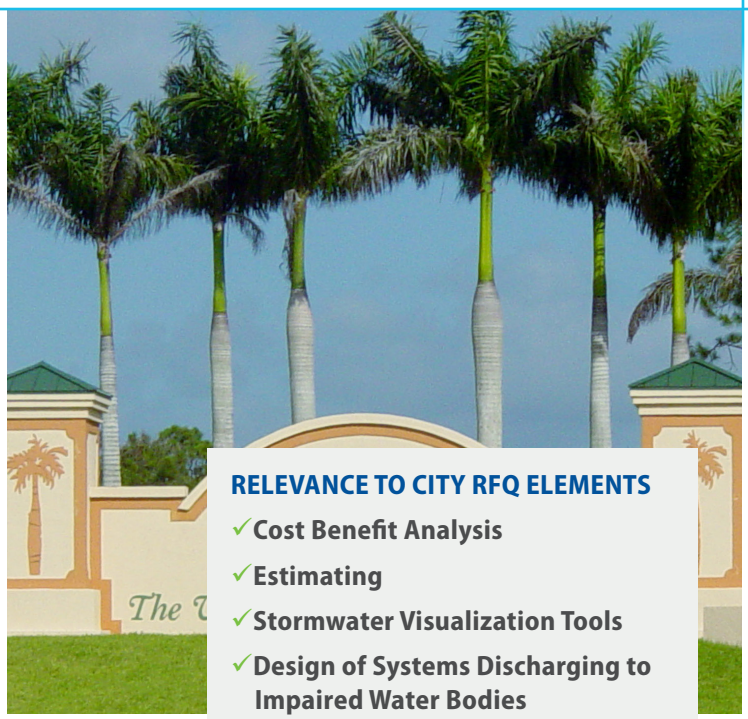
In these older established neighborhoods, CDM Smith's modeling developed realistic LOS goals and developed practical flooding mitigation solutions that factor in conveyance and tidal effects to address known flooding problems.

Stormwater Master Plan (SWMP) Update of System-wide Modeling

Royal Palm Beach, FL

The Village of Royal Palm Beach tasked CDM Smith with the development of an original SWMP in 2000 as well as an update in 2005. In 2013, the Village retained CDM Smith to use the existing model to evaluate two recent developments, which had the potential to impact the Village's primary storages and conveyances.

Total Compensation for Services: $2.4M (to date)
Project Duration: 03/1999 to Ongoing
Client Name: Village of Royal Palm Beach
Contact: Christopher A. Marsh, PE, LEED AP, Village Engineer
Telephone Number: 561.790.5161
E-mail: cmarsh@royalpalmbeach.com



RELEVANCE TO CITY RFQ ELEMENTS

- ✓ **Cost Benefit Analysis**
- ✓ **Estimating**
- ✓ **Stormwater Visualization Tools**
- ✓ **Design of Systems Discharging to Impaired Water Bodies**
- ✓ **Stormwater BMPs**
- ✓ **Permitting with Local, County, State, and Federal Agencies**
- ✓ **Environmental Mitigation**

CDM Smith Project Manager: Brian Mack

In 2013, the Village retained CDM Smith to use the existing models from previous iterations of our developed stormwater master plans to evaluate two recent developments, which had the potential to impact the Village's primary storages and conveyances. These developments included a soon-to-be permitted discharge of up to 200 cubic feet per second (cfs) from the adjacent Indian Trails Improvement District (ITID) through the Village's primary conveyance, the M-1 Canal, during large storm events as well as modifications to the operation of the Village's primary outfall, the C-51 Canal, and the preliminary results of an ongoing South Florida Water Management District (SFWMD) modeling effort of the C-51 Basin.

The primary stormwater management system consists of canals, pipes, ponds, and control gates that provides a planned level-of-service (LOS) for residents within the Village. The Village's primary stormwater management system also receives off-site flows from approximately 8,453 acres within the ITID. Our team developed a stormwater model using EPA-SWMM5, which was calibrated to Tropical Storm Isaac. The calibrated model was used to simulate the 10-year/24-hour, 25-year, and 100-year/72-hour design storm events to determine stages and flows within the modeled system. The results were used to determine if the system met the LOS criteria established for the Village. The stormwater model results were also used to assess the impact on the existing LOS for flood control if the SFWMD approved ITID's request to change flood gate operational controls that allowed more flow to enter the Village stormwater system. The model was validated and compared favorably with the SFWMD model of the M-1 Canal.

We developed an engineering report that documented the potential flooding locations within the Village's stormwater network and identified stormwater infrastructure deficiencies by comparing the resultant peak flood stages to the assigned critical elevation (top-of-road, finished floor elevation, etc.) for each modeled structure. Floodplain maps generated using LiDAR-based topographic information was used to identify structures at risk to flooding. Our team also identified conceptual design improvements of the canal network that had lost conveyance and storage capacity due to sedimentation. Conceptual costs were developed for canal retrofits back to its original design condition. These costs were incorporated into the justification for a new stormwater utility also completed by CDM Smith.

Districtwide Surface Water Model Update

Southwest Florida Water Management District, FL

In support of SWFWMD's groundwater model and future water supply projects, CDM Smith was retained to update a total of 12 HSPF models that cover the entire District and portions of SJRWMD.

Total Compensation for Services: $1.3M
Project Duration: 2/2015 to Ongoing
Client Name: SWFWMD
Contact: Hua Zhang, PhD, PG; Project Manager
Telephone Number: 352.796.7211 ext. 4239
E-mail: hua.zhang@swfwmd.state.fl.us

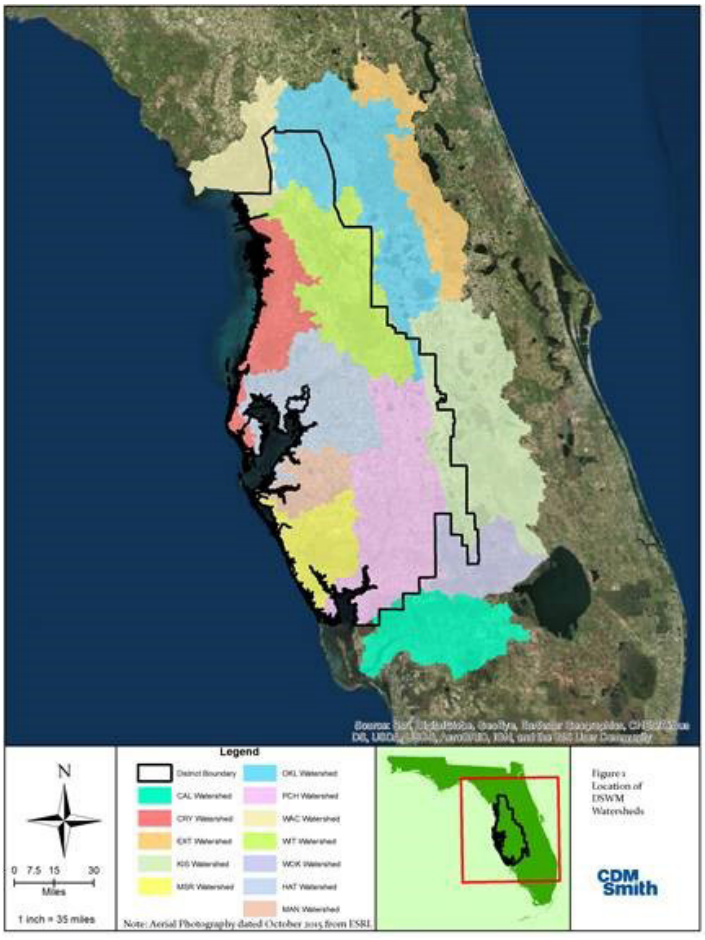
CDM Smith Project Manager: Danielle Honour

RELEVANCE TO CITY RFQ ELEMENTS

- ✓ Cost Benefit Analysis
- ✓ Estimating
- ✓ Stormwater Visualization Tools
- ✓ Design of Systems Discharging to Impaired Water Bodies
- ✓ Stormwater BMPs
- ✓ Permitting with Local, County, State, and Federal Agencies
- ✓ Environmental Mitigation

The Districtwide Surface Water Model (DSWM) was updated to extend the simulation period to include the years 2007 through 2015. Measured streamflows at select gages were compared to the HSPF model results to assess how well the modeled flows matched the observed values. In addition, model results were processed to develop a water budget by subbasin for each of the 12 watershed models, and the model results for groundwater recharge and groundwater evapotranspiration (ET) were processed on a grid basis compatible for input to the District's MODFLOW groundwater model.

HSPF model inputs that were updated included rainfall, potential evapotranspiration (PET), irrigation, diversions, well pumping, and springs. Rainfall and PET data provided by the SWFWMD were reviewed by CDM Smith for completeness, and missing or duplicate data issues were resolved through discussion with SWFWMD. Irrigation data were developed by our team based on surface water and groundwater withdrawal records provided by the SWFWMD. Using procedures from the initial model development, we processed the data to determine monthly irrigation quantities by drip and spray irrigation, distributed the monthly values based on daily PET deficits, and distributed the daily irrigation based on presumed time of day that irrigation is expected to occur. The data processing was accomplished using Python programming scripts developed by our team and provided to the SWFWMD. All of the more recent data (2007-2015) were merged with the original model data (1996-2006) and stored in model Watershed Data Management (WDM) files used by the HSPF models.



E. Litigation

Because of its size and volume of business, over the years CDM Smith Inc. has occasionally been involved in litigation. There are no past or currently outstanding legal proceedings, judgments or contingent liabilities that could adversely affect the financial position or ability of the firm to perform its contractual commitments. Below is a list of matters filed against CDM Smith Inc. over the past five (5) years involving the firm's performance on public projects:

Date Filed	Case Name	Forum	Cause of Action	Description	Status
28-Jan-20	City of Brevard, a North Carolina Municipal Corporation v. CDM Smith Inc.	NC Superior Court, County of Transylvania	Breach of Contract, Negligence	Plaintiff alleges breach of contract and negligence in engineering services performed for pump station and flow equalization tank at a wastewater treatment plant improvements project. Plaintiff alleges contaminated soil from nearby property was improperly handled.	Pending
01-Nov-19	Santa Clara Valley Water District v. CH2M Hill, Inc., CDM Smith, Inc., DOES 1 - 60	Superior Court of the State of California, County of Santa Clara	Negligence	Plaintiff alleges engineering errors in water treatment plant residuals management project.	Pending
25-Oct-18	Spence Brothers v. Board of County Road Commissioners of the County of Bay, and Board of County Road Commissioners of the County of Bay, Counter-Plaintiff, v. Spence Brothers, Counter-Defendant/ Third-Party Plaintiff, v. CDM Smith Inc., Third-Party Defendant.	Circuit Court for the County of Bay, State of Michigan	Third Party Complaint alleging Negligent Misrepresentation	Third Party Plaintiff alleges CDM Smith submitted project documents with errors.	Pending
21-Sep-18	Cambria Community Services District, a California Independent Special Services District v. CDM Smith Inc., a Massachusetts Corporation, and DOES 1 through 25, inclusive	Superior Court of the State of California for the County of San Luis Obispo	Breach of Contract, Negligence	Plaintiff alleges CDM Smith breached its contract and was negligent in the performance of engineering services in water treatment facility design project.	Pending
29-Jun-18	Morange Lake Association, Inc. v. South Carolina Department of Transportation, South Carolina Department of Health and Environmental Control, CDM Smith, Inc., Phillips & Jordan, Inc.	State of SC Court of Common Pleas, County of Lexington	Negligence, Trespass, Conversion, Strict Liability, Nuisance, Civil Conspiracy	Plaintiff alleges defendants negligently damaged their dam by wrongfully destroying spillway.	Pending
02-Apr-18	Daniel Nishihara, et al. v. CDM Smith Inc., f/k/a/ Camp Dresser & McKee Inc., Damien Herrera, P.E., S.J. Louis Construction of Texas Ltd., S.J. Louis, LLC, and City of San Antonio, acting by and through its San Antonio Water System Board of Trustees	285th Judicial District in Bexar, Texas	Wrongful Death, Survival Action, Personal Injury	Wrongful death action allegedly arising from damage to roadway due to wastewater pump failure.	Closed
28-Dec-17	Suleymar Ramos-Castro, et al v. Wilbur Smith Associates, Inc. and CDM Smith Inc.	Superior Court J.D. of New Haven, CT	Negligence	Plaintiff alleged defective signal design at intersection caused auto accident.	Closed
28-Apr-17	The City of Meridian vs. Hemphill Construction Company, Inc.	Circuit Court of Lauderdale County, MS	Breach of Contract, Negligence	Plaintiff alleged damages related to pump failures.	Closed
28-Apr-17	City of Santa Barbara, etc., vs. CDM Smith Inc., etc., et al	Santa Barbara County, Superior Court - Santa Barbara, CA	Breach of contract	Plaintiff alleged Defendant breached its contract and was negligent in water treatment plant improvement project. Defendant was found liable for negligence and the matter was promptly resolved.	Closed
31-Mar-17	St. Bernard Parish Government v. CDM Smith Inc., et al	34th Judicial District Court for Parish of St. Bernard, LA	Negligence	Plaintiff alleges damages related to blowers that operate the wastewater treatment plant's aeration basin.	Closed
12-Jan-17	W.C. English Inc. v. Rummel, Klepper & Kahl, LLP, and CDM Smith Inc.	US District Court, Western District of Virginia	Negligence	Alleges negligent inspection services during freeway bridge construction.	Pending
17-Jun-16	Commonwealth of Massachusetts v. Veolia Water North America North-East LLC, et al. including CDM Smith and Town of Plymouth	Superior Court Department, Suffolk County, MA	Breach of Warranty, Breach of Contract	Third party complaint alleging damages resulting from sewage main failure alleged to result from negligent preliminary design.	Closed
02-May-16	Town of Plymouth vs. Veolia Water North America - Northeast LLC, Veolia Water North America Operating Services, et al including CDM Smith Inc.	US District Court District of Massachusetts	Negligence	Damages resulting from to sewage main failure alleged to result from negligent preliminary design.	Closed

F. Similar Staff Experience

The successful completion of any project depends on the experience and capabilities of the project team. Our team has the right experience and diversity of talent to deliver high-quality, cost-effective engineering services for the successful completion of the City's stormwater master plan. We have described their experience in conducting similar projects, as well as relevant educational background, in the resumes included at the end of this section.

HIGHLY EXPERIENCED PROJECT MANAGER

- ✓ Experience includes coastal stormwater programs across South Florida including the Cities of Miami and Fort Lauderdale, and Miami and Fort Lauderdale-Hollywood International Airports
- ✓ Orchestrates teams to exceed client needs, and coordinates with clients to address any new goals and modify our approach accordingly
- ✓ Jon is the resilient project manager that bridges the gap between driving budgets and schedules, and developing innovative technical solutions for the City of Hollywood's SWMP
- ✓ Served as project manager on the planning and development of three large stormwater management systems

JONATHAN Z. GOLDMAN, PE, BCEE | PROJECT MANAGER

Providing overall administrative and technical coordination and leadership, Jon will be responsible for client service, coordination and involvement of the project team, hands-on management of tasks, and facilitation of communication and coordination between the team and the City.

EDUCATION
ME – Environmental Engineering, University of Florida;
BS – Environmental Engineering, University of Florida

REGISTRATION
Professional Engineer (FL); Board Certified Environmental Engineer (BCEE)

TOTAL YEARS OF EXPERIENCE
33

EXPERTISE WITH SIMILAR PROJECTS

COASTAL METROPOLITAN

Project Manager, Stormwater Master Plan, City of Miami, FL. The City of Miami's primary stormwater management system was hydraulically modeled and capital improvements were developed for implementation to alleviate the occurrence and duration of flooding and to enhance water quality treatment to meet current NPDES regulations. Jon was responsible for the schedule, quality, and budget of the project, managed CDM Smith staff for data collection, modeling, and alternatives analyses, developed the CIP, and presented the results to the City.

Project Manager, City-Wide Stormwater Master Plan, City of Fort Lauderdale, FL. This project included an evaluation and update of the City's stormwater management practices, infrastructure, funding, and regulatory compliance. Jon was responsible for the schedule, quality, and budget of the project, managed CDM Smith staff for data collection, modeling, and alternatives analyses, developed the CIP, and presented the results to the City.

DIVERSE STAKEHOLDERS

Project Manager, Stormwater Master Plan, Miami International Airport, Miami-Dade County Aviation Department, FL. Jon completed the stormwater master plan that involved data collection and evaluation, system capacity analysis, a pollution control master plan, and federal NPDES permitting assistance. The NPDES Group Permit application involved all airports operated by the Miami-Dade County Aviation Department.

Project Manager/Design Engineer, Fort Lauderdale-Hollywood International Airport Stormwater Master Plan, Fort Lauderdale, FL. Jon developed a GIS-based US EPA SWMM Runoff and EXTRAN Model of the airport site with recommendations for the primary stormwater management system facilities upgrade and capital improvements program, and the development of the ERP permit for construction of these facilities. The model was calibrated to actual conditions from Hurricane Irene rainfall/stage data.

SWMP

Project Manager, Stormwater Master Plan, City of North Miami, FL. Jon served as the project manager to assist the City in updating their SWMP. The updated master plan supported the City to comply with City and Department of Environmental Resources Management (DERM) Level of Service (LOS) standards NPDES municipal separate storm sewer system (MS4) permit requirements and Federal Emergency Management Agency (FEMA) requirements and audits. The updated SWMP provided the City a defined and defensible document to support long-term stormwater management capital improvements and equitable development/redevelopment standards for the City.

Stormwater Master Plan, City of Boynton Beach, FL. As lead practitioner, Jon completed a stormwater master plan, which included computer modeling, cost analyses, and design of detention/retention ponds, exfiltration systems, and storm sewer drainage systems.

G. Organization of Proposed Project Team

As shown in the organization chart below, the CDM Smith team will be led by highly-qualified, local project manager **Jon Goldman**. Jon brings more than 33 years of local management experience, including the development of local SWMPs for the Cities of Miami, North Miami, Fort Lauderdale, and Boynton Beach. He will be responsible for coordination and involvement of the project team, hands-on management of tasks, and facilitation of communication and coordination between the team and the City. Lead engineer **Mike Schmidt** will lead the day-to-day development of the City's SWMP, overseeing data collection, modeling, and planning tasks. Mike brings 36 years of experience from more than 57 coastal stormwater and tidal control projects including considerations for sea level rise and storm surge for 26 programs. Client service leader **Suzanne Mechler** is a long-time South Florida resident with more than 19 years of experience in the local area. Suzanne will be responsible for contract oversight and ensuring the overall satisfaction of the City with CDM Smith's services.

The staff listed in our organizational chart are the engineers, scientists, and experts who will be working with your staff locally—they will be the faces you work with daily for the duration of this contract and are committed to the City's project. We have estimated their level of involvement in the availability table on the following page.

CITY OF Hollywood FLORIDA

CLIENT SERVICE LEADER
Suzanne E. Mechler, PE, BCEE

QUALITY ASSURANCE/QUALITY CONTROL
Brian W. Mack, PE, DWRE
Mark Maimone, PhD, PE*, DWRE, BCEE [1]

PROJECT MANAGER
Jonathan Z. Goldman, PE, BCEE, PMP

LEAD ENGINEER
Michael F. Schmidt, PE, BCEE, DWRE

DATA COLLECTION, EVALUATION, AND FIELD VERIFICATION
Daniel R. Maher, PE, BCEE, PMP
Dornelle S. Thomas, PE, ENV SP
Katie E. Thorp
Biscayne Engineering Co Inc. [2]

GIS DATABASE/ASSET MANAGEMENT
Andrew J. Baranowski, GISP
Jayson D. Brennen
Brendan M. Susino

MODELING AND EVALUATIONS OF STORMWATER/SEA LEVEL RISE
Thomas E. Nye, PhD, PE
Robert W. Rooney, PhD
Richard A. Wagner, PE, DWRE

GROUNDWATER AND HYDROGEOLOGY
Stewart J. Magenheimer, PG, PMP
Lee P. Wiseman, PE, BCEE
Jason M. Mills, PG

CAPITAL IMPROVEMENTS PROGRAM
James T. Wittig, PE
Roderick K. Cashe, PE, CDT, LEED™ AP [8]
Maurice Tobon, PE, PMP [9]

STORMWATER FEE/UTILITY SUFFICIENCY AND O&M COSTS
Scott I. McClelland
David Mason, PE, PMP, DWRE

FUNDING AND GRANT MANAGEMENT
Diane Kemp
Anfield Consulting Inc. [1]
Richard Czlapinski, PE, D.CE [8]

SUSTAINABLE INFRASTRUCTURE, VULNERABILITY PLANNING, AND DESIGN CRITERIA DEVELOPMENT
William E. Cesanek, AICP
Lauren M. Miller, CC-P
Carol L. Hufnagel, PE [8]
Sujoy B. Roy [8]
FernLeaf Interactive [6]

WETLANDS, NATURAL SYSTEMS, WATER QUALITY, AND ENVIRONMENTAL
Brendan V. Brown, PWS
Danielle M. Honour, PE, DWRE
Maria C. Loinaz, PE, PhD [4]
Curtis + Rogers Design Studio, Inc. [5]

LOCAL RESILIENCY/COMMUNITY AND PUBLIC OUTREACH
Alec S. BogdanoffF, PhD [3]
Michael A. Antinelli, PE, CFM [3]

PERMITTING/REGULATORY
Christopher Zavatsky, PE [8]
Danielle M. Honour, PE, DWRE

FLOODPLAIN MANAGEMENT IMPLEMENTATION
Stephanie Y. Dunham, PE [4]
Anna Leitschuh, PE [4]
Brizaga, Inc. [3]

STORMWATER DESIGN AND CONSTRUCTION STANDARDS
Seth M. Nehrke, PE, DWRE
Janine M. Alexander, PE [8]
Christopher Zavatsky, PE [8]

COST ESTIMATING
Craig A. Gadberry, PE

GEOTECHNICAL
Nutting Engineers of Florida, Inc. [7]

SUBCONSULTANTS

1 Anfield Consulting Inc.
2 Biscayne Engineering Co Inc.
3 Brizaga, Inc.
4 Collective Water Resources, LLC (***WBE***)
5 Curtis + Rogers Design Studio, Inc. (***WBE***)
6 FernLeaf Interactive
7 Nutting Engineers of Florida, Inc.
8 Tetra Tech
9 Tobon Engineering (***MBE***)

* PE in state other than FL

Estimated Level of Involvement

Team Member	Project Role	%
Jon Goldman	Project Manager	60
Mike Schmidt	Lead Engineer	60
Suzanne Mechler	Client Service Leader	50
Brian Mack	QA/QC	30
Mark Maimone	QA/QC	30
Dan Maher	Data Collection, Evaluation, and Field Verification	50
Dornelle Thomas	Data Collection, Evaluation, and Field Verification	60
Katie Thorp	Data Collection, Evaluation, and Field Verification	90
Andy Baranowski	GIS Database/Asset Management	90
Jayson Brennen	GIS Database/Asset Management	65
Brendan Susino	GIS Database/Asset Management	90
Tom Nye	Modeling and Evaluations of Stormwater/Sea Level Rise	100
Robert Rooney	Modeling and Evaluations of Stormwater/Sea Level Rise	100
Rich Wagner	Modeling and Evaluations of Stormwater/Sea Level Rise	65
Stew Magenheimer	Groundwater and Hydrogeology	30
Lee Wiseman	Groundwater and Hydrogeology	30
Jason Mills	Groundwater and Hydrogeology	30
Jim Wittig	Capital Improvements Program	60
Roderick Cashe	Capital Improvements Program	50
Maurice Tobon	Capital Improvements Program	100
Scott McClelland	Stormwater Fee/Utility Sufficiency and O&M Costs	20
David Mason	Stormwater Fee/Utility Sufficiency and O&M Costs	50

Estimated Level of Involvement

Team Member	Project Role	%
Diane Kemp	Funding and Grant Management	30
Richard Czlapinski	Funding and Grant Management	60
Bill Cesanek	Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development	60
Lauren Miller	Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development	50
Carol Hufnagel	Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development	50
Sujoy Roy	Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development	90
Brendan Brown	Wetlands, Natural Systems, Water Quality, and Environmental	65
Danielle Honour	Wetlands, Natural Systems, Water Quality, and Environmental; Permitting/Regulatory	50
Maria Loinaz	Wetlands, Natural Systems, Water Quality, and Environmental	60
Alec Bogdanoff	Local Resiliency/Community and Public Outreach	45
Michael Antinelli	Local Resiliency/Community and Public Outreach	90
Christopher Zavatsky	Permitting/Regulatory; Stormwater Design and Construction Standards	50
Stephanie Dunham	Floodplain Management Implementation	75
Anna Leitschuh	Floodplain Management Implementation	90
Seth Nehrke	Stormwater Design and Construction Standards and Stormwater Design Services	90
Janine Alexander	Stormwater Design and Construction Standards	50
Craig Gadberry	Cost Estimating	30

Our Subconsultant Team Members Bring Added Value to the City's Project

CDM Smith has put together a diverse, experienced team of subconsultants to support this important project. The following highlights the benefits of each and the important role they will play. As detailed on the following page, we are uniquely qualified to achieve your stormwater master plan goals.

Anfield Consulting brings more than 136 years of experience in government relations, and has successfully represented clients before the Florida Legislature, the Governor and Cabinet, state agencies, boards, task forces, commissions, water management districts, and local governments. They are best known for their work in securing funding support for water management initiatives, such as the City's, which have enabled local governments throughout the State to accelerate their implementation of key water supply, water quality and environmental restoration projects.

Biscayne Engineering has more than 120 years of experience in South Florida; as such, no one has their finger on the local pulse better than they do. Having completed nearly 800 surveying and mapping projects in South Florida since their inception, Biscayne's familiarity with the City of Hollywood and the surrounding areas will allow them to hit the ground running during the critical early data collection tasks.

Brizaga is dedicated to helping municipalities such as the City to understand and address the effects of a changing environment, including sea level rise. Their team has experience assessing vulnerability and risk, planning adaptation strategy, and public outreach associated with assessments, planning, and implementation, distilling complex scientific topics for policy-makers and the general public. With 20 years of political experience, 15 years of environmental science work, and 5 years of engineering consulting experience, including for the City of Hollywood, Brizaga is best suited to ensure a successful community and public outreach effort for the City's project.

Collective Water (WBE) has worked on several recent modeling projects in greater Broward County (MIKE-SHE), Fort Lauderdale (ICPR), and the C-11 Basin (ICPR and SWMM) and, as a result, have a local knowledge of the area surrounding the City. They will bring the entire breadth of experience to the City—including a proven track record of increasing CRS ratings through strategic planning, mapping, and modeling—and proactively helping the City react to the many potential challenges of FEMA floodplain mapping. They were also one of the first firms in Florida to integrate resiliency planning into the Stormwater Master Plan for West Palm Beach and have a proven track record of working with both Brizaga and NEMAC+FernLeaf, also team members, throughout the Southeastern United States on a variety of challenging resiliency projects and vulnerability assessments.

Curtis + Rogers Design Studio is well known throughout South Florida for providing quality award-winning landscape architectural services. Their landscape architects have more than 100 years of combined experience with complex projects and bring a proven ability to create environments which engage the senses and lift the spirits, while meeting the operational demands and functional realities of urban, coastal environments such as the City. Understanding the City's vision includes green landscapes, they will work to identify alternatives to restore natural systems functions, where possible, to address extreme precipitation events and other sources of flooding.

FernLeaf Interactive has worked with local governments to provide resilience planning support and the US federal government to provide tools to analyze and visualize climate data. Having co-developed the Federal resilience process for understanding risk and building resilience to natural hazards, and partnered with Esri to tailor this process to the local government level on the ArcGIS platform, they will support the City's local-scale community resilience. In fact, they performed similiar services as part of the West Palm Beach Community Resilience Plan to assist the City in prioritizing limited resources available in order to build maximum resilience to existing hazards and possible future change.

Nutting Engineers of Florida has been one of the premier geotechnical engineering firms in South Florida since its inception in 1967. What's more, Nutting has partnered with CDM Smith for the past eight years on projects for Broward County, Miami, and the Solid Waste Authority of Palm Beach County. Their comprehensive range of services include geotechnical exploration and engineering including soil borings and groundwater well drilling, monitoring of pile installation, groundwork modification and chemical grouting procedures, quality control/quality assurance testing of construction materials, and structural inspections (special/threshold) of structures.

Tetra Tech brings the most recent experience with the City's stormwater system, including knowledge of the locations of backflow prevention valves along surface waters as well as assessing the condition for the ten City-owned stormwater pump stations. Tetra Tech has been a trusted and valued consultant to the City's Public Utilities Department for over a decade. Although both large firms, Tetra Tech supplements the CDM Smith team well with additional local knowledge and design criteria experience with the City.

Tobon Engineering brings over 30 years of experience in water, wastewater, stormwater engineering, master planning, utilities management, hydraulic modeling, and climate change in South Florida and internationally. The owner and president of Tobon Engineering, Maurice Tobon served for fifteen years at the highest management levels of two of the largest water utilities in South Florida (Palm Beach County and City of Fort Lauderdale) and was responsible for nearly $1B in capital improvements. As such, he is best suited for the City's Capital Improvements Program.

Sample Insurance Certificate

As per the County's RFQ, we have included a filled out sample insurance certificate below listing the insurance companies names and dollar amounts of coverage.

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 12/27/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Aon Risk Services Northeast, Inc. Boston MA Office 53 State Street Suite 2201 Boston MA 02109 USA	**CONTACT NAME:** **PHONE (A/C. No. Ext):** (866) 283-7122 **FAX (A/C. No.):** 800-363-0105 **E-MAIL ADDRESS:**

INSURED	**INSURER(S) AFFORDING COVERAGE**	**NAIC #**
CDM Smith Inc. 75 State Street, Suite 701 Boston MA 02109 USA	**INSURER A:** LM Insurance Corporation	33600
	INSURER B: Liberty Insurance Corporation	42404
	INSURER C: Liberty Mutual Fire Ins Co	23035
	INSURER D: ACE Property & Casualty Insurance Co.	20699
	INSURER E: Lloyd's Syndicate No. 2623	AA1128623
	INSURER F: Commerce & Industry Ins Co	19410

COVERAGES **CERTIFICATE NUMBER:** 570079833915 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:			TB7611B8T8Z6040	01/01/2020	01/01/2021	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$2,000,000 $1,000,000 $10,000 $2,000,000 $4,000,000 $4,000,000
C	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			AS2-611-B8T8Z6-060	01/01/2020	01/01/2021	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$2,000,000
D	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION			XEUG28194687004	01/01/2020	01/01/2021	EACH OCCURRENCE AGGREGATE	$5,000,000 $5,000,000
A A	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		WA561DB8T8Z6010 AOS WC5611B8T8Z6020 WI	01/01/2020 01/01/2020	01/01/2021 01/01/2021	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
F	Env Contr Poll			CPO1213030 Pollution Liab.	01/01/2020	01/01/2022	Each Loss Aggregate	$30,000,000 $30,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Re: Proposal Use Only.

CERTIFICATE HOLDER

CDM Smith Inc.
75 State Street, Suite 701
Boston MA 02109 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Services Northeast, Inc.

Holder Identifier :

Certificate No : 570079833915

Jonathan Z. Goldman, PE, BCEE, PMP

Project Manager

Project Manager/Engineer-of-Record (EOR), Stormwater Master Plan (SWMP) and Stormwater Consulting, Miami-Dade Aviation Department (MDAD), Miami-Dade County, FL. Jon was responsible for the development and execution of several stormwater-related projects for the Miami International Airport (MIA), and the Miami Executive (Tamiami) and Miami Opa-Locka Executive general aviation airports including the creation of geographic information system (GIS)-based stormwater utility atlases for each site, manatee barrier analysis and design, wetlands assessments, electronic stormwater design standards manuals for bus by developers at the sites, technical reviews of proposed project conceptual and final design plans and reports for adherence with the adapted SWMP and permits, and SWMP updates for the airports which included Xp-SWMM modeling for regulatory design storms to FAA requirements, water quality treatment calculations, conceptual environmental resource permitting, and a phased capital improvements plan for the future airport land uses to meet Federal Aviation Administration (FAA) criteria for length, depth and duration of ponding on the airside, and to meet permitted runoff water quality and peak volumes at the outfalls.

Project Manager, SWMP, MDAD, Miami-Dade County, FL. Jon completed the preparation of the SWMP at the MIA for MDAD. This SWMP involved data collection and evaluation, system capacity analysis, a pollution control master plan, and federal National Pollutant Discharge Elimination System (NPDES) Group Permit application involved MIA and the other airports operated by MDAD. Additionally, Jonathan performed construction inspection of ongoing designs for the aviation department.

Project Manager/EOR, Comprehensive SWMP, City of Miami, FL. Jon is responsible for the multi-year, multi-million dollar effort which includes the creation of an interactive stormwater GIS from several decades of mixed media records and as-builts, comprehensive survey of topography, LiDAR, stormwater feature verification of location, elevation, and connectivity, development of basin boundaries, seawall heights, finished-floor elevations of critical infrastructure, and channel cross sections, hydraulic modeling of the system using dynamic Storm Water Management Model (SWMM) modeling, cost benefit analysis using Federal Emergency Management Agency (FEMA) HAZUS methodology, a phased 10- and 20-year capital improvements program (CIP) which considers sea-level rise and storm surge resiliency for multiple levels of service across seven major watersheds, water quality treatment for the protection of Biscayne Bay, an electronic stormwater design standards manual, a public awareness campaign and stakeholder workshops, funding options, and grant assistance.

Project Manager/EOR, Water and Wastewater Master Plan, City of Miami Beach, FL. CDM Smith developed a CIP for the City's water and wastewater systems including energy-saving in-line master wastewater booster stations, resiliency upgrades for dry pit stations, new water booster stations and ground storage tanks, new control room and SCADA system, water and force main system valve and pipeline upgrades. Jon managed the design of upgrades to the City's existing five water booster stations and 23 wastewater pump stations. For the existing water booster pump stations, we updated pumps as well as new electrical equipment and controls located in ground buildings (above the 100-year flood elevation); changed system voltage from 4,160 to 480; installed high-efficiency motors and variable frequency drives, new emergency generators, and general building renovations. Our team also designed the new Terminal Island water booster pump station, improving pressures and fire flow capabilities in the southern end of the City.

Project Manager, SWMP, City of Boynton Beach, FL. Jon completed a SWMP, which included computer modeling, cost analyses, and design of detention/retention ponds, exfiltration systems, and storm sewer drainage systems. He was also involved in the design of an emergency effluent outfall system for the City of West Palm Beach's East Central Regional wastewater treatment plant. This project included flow prediction, runoff and canal modeling, and open channel and floodgate design.

Education

ME - Environmental Engineering;
BS - Environmental Engineering

Registration/Certification/Licensing

Professional Engineer (FL); Project Management Professional (PMP); Board Certified Environmental Engineer (BCEE)

Years of Experience

33

Michael F. Schmidt, PE, BCEE, DWRE

Lead Engineer

Lead Engineer, Comprehensive SWMP, City of Miami, FL. CDM Smith is responsible for the multi-year, multi-million dollar effort which includes the creation of an interactive stormwater GIS from several decades of mixed media records and as-builts, comprehensive survey of topography, LiDAR, stormwater feature verification of location, elevation, and connectivity, development of basin boundaries, seawall heights, finished-floor elevations of critical infrastructure, and channel cross sections, hydraulic modeling of the system using dynamic SWMM modeling, cost benefit analysis using FEMA HAZUS methodology, a phased 10- and 20-year CIP which considers sea-level rise and storm surge resiliency for multiple levels of service across seven major watersheds, water quality treatment for the protection of Biscayne Bay, an electronic stormwater design standards manual, a public awareness campaign and stakeholder workshops, funding options, and grant assistance. Mike is responsible for technical direction and review for the program.

Project Engineer, Project Manager, and Technical Manager, SWMP, Update and Implementation, City of Jacksonville, FL. Mike served as project engineer, project manager, and technical manager over the past 32 years for the 800-square mile study area for the City of Jacksonville SWMP with detailed hydrologic, hydraulic, and water quality modeling; permitting; design; and implementation of over $150M in stormwater facilities as part of the Lower St. Johns River Restoration Program for the city and the St. Johns River Water Management District (SJRWMD). He also innovated floodplain, floodway, and detention techniques for sustainable river management systems, including volume-time detention controls for the full range of hydrology and dynamic floodway methodologies that consider both storage and conveyance.

Technical Advisor-Reviewer, SWMP, City of Virginia Beach VA. Mike serves as technical reviewer and advisor for the SWMP to manage stormwater in the City. This has included standards for analysis and level of service (LOS), model selection, SWMMs for multiple watersheds using PC SWMM, consideration of sea level rise and tidal surge, water quality guidance, detention pond and seepage evaluations, and evaluation of alternative solutions for priority problem areas.

Technical Director/Advisor, SWMP and Stormwater Consulting, MDAD, Miami-Dade County, FL. Mike served as technical director for the development of the SWMP; state and federal permitting; monitoring; and implementation of $180M of stormwater and environmental infrastructure over 17 years. The SWMP included comprehensive evaluations of hydrology, hydraulics, water quality, best management practices (BMPs), and facility planning in phases to allow cost-effective implementation of the CIP while aircraft operations continued and increased to serve growing air traffic demands. He developed a BMP Treatment Train capture and treatment plan that saved nearly $50M while bringing the airport into water quality compliance as it redeveloped. The BMP Treatment Train consists of structural and non-structural BMPs, as well as construction and monitoring activities. These activities were designed to minimize the potential for pollution by controlling the generation of pollutants in stormwater runoff and by controlling pollutants as close to potential sources as possible.

Technical Expert/Lead Engineer, SWMP and Update, City of Lake Worth, FL. Mike served as technical manager for the City-side SWMP to evaluate the study area and the City's primary stormwater management system along with associated outfalls to receiving water (Lake Worth Lagoon and C-16 and C-51 systems). The SWMP developed a ranking for the City's CIP projects to be funded by the Stormwater Utility Program. The SWMP supported the Stormwater Utility program with a list of capital improvements and documentation to support the program costs. The 2016 update included sea level rise and refinements to the CIP for these contingencies.

Technical Expert/Lead Engineer, Nova Canal Flood Control and Integrated Resource Plan, Eastern Volusia Regional Water Authority (EVRWA), FL. Mike was the project manager and technical expert on our team that provided stormwater management planning, conceptual design, and cost-benefit analysis support to identify a cost-effective implementation plan to achieve food control, water quality improvement, aquifer recharge, and stormwater harvesting for reuse for this project to support five cities, Volusia County, and the Florida Department of Transportation (FDOT).

Education
BS - Environmental Engineering

Registration/Certification/Licensing
Professional Engineer (FL, LA); BCEE; Board Certified Environmental Engineer (BCEE); Diplomate Water Resource Engineer (DWRE)

Years of Experience
36

Suzanne E. Mechler, PE, BCEE

Client Service Leader

Client Service Leader, Hydraulic Analysis for Downtown Stormwater System, City of Boynton Beach, FL. Suzanne is client service leader for CDM Smith's update of the spatial domain of the City's downtown stormwater system model. Project details include LIDAR-based delineation, stage storage relationships, land-use based runoff parameters, and soil-based infiltration parameters. We also provide recommendations for volumetric and water quality stormwater infrastructure improvements.

Project Manager/EOR, Lakeside Ranch Stormwater Treatment Area (LRSTA), South Florida Water Management District (SFWMD), Martin and Okeechobee Counties, FL. This $75M, fast-track project included the design of approximately 2,400 acres of stormwater treatment reservoirs, two pump stations, multiple hydraulic structures, and over four miles of canal conveyance improvements. Suzanne served as engineer-of-record for the design of the S-650 Pump Station (250-cfs pump station to supply water to the LRSTA) and the S-191A Pump Station (300-cfs pump station for flood control and recirculation), part of the LRSTA project. Suzanne served as project manager and EOR for engineering services during construction of the S-650 Pump Station (Phase I of the LRSTA project). The facility includes three electric-driven pumps housed within a 2,500-square foot pump station building, trash rakes and conveyors, propane gas backup generation system, and a seal water system. Suzanne directed a multi-disciplined team of engineers for the final design, bidding, and construction services. The construction cost of the S-650 Pump Station was $7M.

Task Manager/EOR, Lake Okeechobee Fast-Track (LOFT) Lakeside Ranch Stormwater Treatment Area (LRSTA), Martin County, FL. This $230M, fast-track project includes the design of approximately 7,000 acres of storage and stormwater treatment reservoirs, three 500 cubic feet per second (cfs) pump stations, multiple hydraulic control structures, and over four miles of canal conveyance improvements. Suzanne served as task manager and EOR for the design of the S-650 Pump Station and the S-191A Pump Station, part of the LRSTA Project. The design includes a 450-cfs pump station to supply water to LRSTA and a 450-cfs pump station for flood control and recirculation. Suzanne directed a multi-disciplined team of engineers responsible for the final design and bidding packages. The anticipated construction cost for each pump station is approximately $15 to $20M.

Client Service Leader (CSL) and Design Manager, Ion Exchange Resin Plant and East Water Treatment Plant (WTP) Improvements Progressive Design-Build (DB), City of Boynton Beach, FL. Suzanne served as the CSL for the $25.5M DB of new ion exchange resin facility and upgrading/capacity expansion of the existing lime softening, filtration, and residuals handling systems at the East WTP to a capacity of 24-million gallons per day (mgd). Additionally, this project incorporated replacement of the existing high services pumps and new re-pump station located on-site with a 3.0-MG ground storage tank. She served as design project manager during the first phase of the project.

Project Manager, Wastewater Treatment Plant (WWTP) Permit Renewal, Village of Royal Palm Beach, FL. Suzanne prepared a permit application for renewal of the WWTP permit. The permit application included a capacity analysis report, reuse feasibility study, and operation and maintenance performance report. She also coordinated with Palm Beach County who purchased the WWTP and submitted the application for a permit to Florida Department of Environmental Protection (FDEP).

Project Engineer, WWTP Expansion, Village of Royal Palm Beach, FL. Suzanne conducted final design of the wastewater treatment expansion. The design was due to the growth in the village's service area and wastewater future flow projections. The project included expansion of the headworks structure, additional Orbal® discs for the aeration basin, construction of two new clarifiers, expansion of the chlorine contact basin, and new equalization basin for alternate bid.

Project Manager, Central Monitoring Facility, Palm Beach County, FL. Suzanne was the project manager for design and construction services for this secure facility with communications and computer system capabilities that will be accessible to the County staff prior to, during, and after a storm/disaster event. This 2,900 square foot facility is an extension of their central regional operations center. The construction cost of the facility was $2M.

Education
ME - Environmental Engineering;
BS - Environmental Engineering

Registration/Certification/Licensing
Professional Engineer (FL); Board Certified Environmental Engineer (BCEE)

Years of Experience
19

Brian W. Mack, PE, DWRE

Quality Assurance/Quality Control

Project Engineer, MIA Fuel Tank Farm Drainage Study, MDAD, Miami-Dade County, FL. Brian was responsible for developing a stormwater model that represented the existing drainage network (including the secondary system) at the fuel tank farm site at MIA.

Project Engineer, Opa-Locka Airport Stormwater Drainage Study, MDAD, Miami-Dade County, FL. Brian assisted in the development of a SWMP for Opa-Locka Airport. He was responsible for the development of a stormwater model that represented the existing drainage network at the airport. Brian assisted with stormwater model simulation of alternatives to address existing and future flooding problems, as well as meeting SFWMD requirements.

Project Engineer, Kendall Tamiami Airport Stormwater Drainage Study, MDAD, Miami-Dade County, FL. Brian assisted with the development of a SWMP and was responsible for the development of a stormwater model that represented the existing drainage network at the airport. He also assisted with stormwater model simulation of alternatives to address existing and future flooding problems, as well as SFWMD requirements.

Project Manager, SWMP Update, City of Boynton Beach, FL. Brian was the project manager for the City of Boynton Beach SWMP update. He updated the existing master plan to include an assessment of the potential swale retrofit of neighborhoods constructed prior to the implementation of water quality standards by the State of Florida. This analysis included a field inventory and mapping effort, identification of a swale retrofit area, and preparation of conceptual swale construction and maintenance costs.

Project Director, SWMP, City of Lake Worth, FL. Brian served as the project director for this effort, which included the development of a hydrologic and hydraulic evaluation of the City 's stormwater management system using the EPA SWMM for the purpose flood control. The project included developing conceptual improvements to identify stormwater conveyance deficiencies. In addition to flood control, CDM Smith evaluated water quality strategies to address changing regulatory requirements using the Watershed Management Model (WMM). These strategies looked at reducing the pollutant loads from the major outfalls from the City to the major receiving waters that includes the intercoastal waterway. Stormwater improvements included conveyance system upgrades, provision of additional detention storage, recharge wells, and use of exfiltration trench technologies.

Officer-in-Charge, Nova Canal Flood Control Project, EVRWA, Volusia County, FL. Brian served as Officer-in-Charge on this project. CDM Smith provided SWMP, conceptual design, and cost-benefit analysis support to identify a cost-effective implementation plan to achieve flood control, water quality improvement, aquifer recharge, and stormwater harvesting for reuse.

Project Manager, SWMP, Village of Royal Palm Beach, FL. Brian was the project manager for the development of a SWMP for the Village of Royal Palm Beach. This project included developing a stormwater model of the primary stormwater management systems within the Village using EPA-SWMM to identify flooding problems and solutions to identified problems. Conceptual design, permit requirements, and conceptual capital costs were then developed for each recommended solution.

Project Director, SWMP Update, Village of Royal Palm Beach, FL. Brian served as the project director for the SWMP Update. Efforts included updating the stormwater model representation of the Village's stormwater management system using EPA SWMM Version 5. A key component of this effort was determining the extent of flooding predicted for the 100-year/72-hour design storm event and comparing that result against the results of the 100-year floodplain established by the FEMA. CDM Smith used the results to assess areas at risk to flooding.

Technical Reviewer, Watershed Model Peer Review, Southwest Florida Water Management District (SWFWMD), FL. CDM Smith performed peer reviews of the Double Hammock and Lower Coastal regional hydrologic/hydraulic watershed models developed by others. The team was responsible for peer reviewing components of model development (i.e. model input parameters) and simulation results for both calibration simulations as well as design storms (i.e. model development and floodplain delineation). The reviews were done in tandem with completion of milestones by District's watershed management plan consultant. Brian provided technical review for this project.

Education
BS - Civil Engineering;
BS - Mining Engineering

Registration/Certification/Licensing
Professional Engineer (GA, VA); Diplomate Water Resource Engineer (DWRE)

Years of Experience
35

Mark Maimone, PhD, PE, DWRE, BCEE

Quality Assurance/Quality Control

Project Manager, Development of Philadelphia Stormwater Regulations, Philadelphia Water Department, City of Philadelphia, PA. For the City of Philadelphia, Mark directed a study to revise the citywide stormwater management regulations. New regulations designed to decrease stormwater flows, lower the frequency of combined sewer overflow (CSO) discharges, increase infiltration, and stimulate redevelopment in the city went into effect in January 2006. Part of the study included the development of a stormwater management planning manual for guidance to developers, as well as a web-based stormwater permitting application process. Mark is helping Philadelphia write a new stormwater permit, and implement landbased stormwater controls to meet permit requirements.

Task Manager, Tacony-Frankford and Cobbs Creek Integrated Water Resources Plans, Philadelphia Water Department, PA. Mark was the project manager for the development of an integrated water resources plan for the Tookany/Tacony-Frankford Creek, Pennsylvania. The plan addresses objectives of several programs, including CSO Long Term Planning, Pennsylvania Stormwater Management programs, potential or existing total maximum daily loads (TMDL), River Conservation Plans, and Phase II Stormwater permits. An extensive sampling and monitoring program of chemical, physical, and biological parameters was carried out to characterize conditions in the watershed. The study included hydrologic and water quality analysis, SWMM modeling, and biological, and habitat assessment techniques. The Cobbs Creek Plan also included fluvial geomorphological assessments of the entire length of Creek. The SWMM modeling was developed to simulate the watershed response from storm sewers as well as combined sewers. The model was applied to assess current pollutant loading from CSOs and from stormwater water. The model was adapted to simulate a wide array of CSO controls and stormwater BMPs. BMPs included swales, green roofs, infiltration basins, porous pavement, and similar techniques. By simulating BMPs at various levels of implementation, graphs of urban BMP effectiveness in controlling CSOs and stormwater were developed and used to assemble cost-effective watershed management alternatives. The alternatives were assembled and evaluated through an extensive stakeholder participation process using a watershed partnership. The plan has resulted in a careful assessment of the potential for restoration of an urban stream. Under consideration are an array of CSO controls, storm water BMPs, stream restoration measures, non-structural measures, and public education/participation programs. Implementation of the plan recommendations will be carried out in phases to allow for an adaptive management approach.

Project Manager, Development of Stormwater Planning Manual, County of Westchester, NY. For the County of Westchester, Mark directed a study to develop a stormwater management planning manual for municipalities within the Croton Watershed. The manual is designed to help municipalities using the most recent developments in stormwater planning, modeling, and stream assessment. The manual discusses a step by step approach to stormwater planning, and includes discussions on planning objectives, data collection and analysis, fluvial geomorphic assessments, stormwater modeling, problem definition and prioritization, and BMP selection. A case study in which stream assessment, SWMM modeling, and prioritization approaches is included to illustrate the planning concepts.

Project Engineer, Water Management Program, Nassau County, NY. As part of the Nassau County water management program, Mark developed and managed a research program on urban runoff in the flat, sandy soil conditions of Long Island. The field data was collected and analyzed for over a year and helped in developing the recharge rates used to model Nassau County's groundwater system.

Project Manager, Stormwater and Groundwater Study, Westchester, NY. Mark was the project manager for a stormwater and groundwater study at the Westchester Airport. The study included an assessment of the environmental impacts of airport activities on the groundwater and surface water, including the nearby Kensico Reservoir of New York City. The study included the development and use of a SWMM model of the stormwater system at the airport.

Education

PhD - Water Resource Planning;
MS - Environmental/Regional Planning;
BS - Civil Engineering

Registration/Certification/Licensing

Professional Engineer (NY); Diplomate Water Resource Engineer (DWRE); Board Certified Environmental Engineer (BCEE)

Years of Experience

30

Daniel R. Maher, PE, BCEE, PMP

Data Collection, Evaluation, and Field Verification

Project Manager, Miami-Dade County Stormwater Master Plan Update Independent QA/QC Reviews of Various County Hydraulic and Hydrologic Basins, RER, Miami-Dade County, FL. CDM Smith was retained by RER-DERM in providing professional services for the Miami-Dade County stormwater master plan update. Dan serves as project manager for assisting the County to perform independent QA/QC reviews for base map, hydrology and hydraulic data, model updates of various County basins, and preparing independent QA/QC reports related to the update of six stormwater models across the County.

Project Manager, Miami-Dade County Stormwater Master Plan of Various County Hydraulic and Hydrologic Basins, RER, Miami-Dade County, FL. CDM Smith was retained by RER-DERM in providing professional services for the Miami-Dade County stormwater master plan update. Dan serves as project manager for assisting the County to coordinate and produce calibrated hydraulic and water quality model for various basins and/or clusters of sub-basins, including compilation of data, updating delineation maps, setting up and calibrating hydrologic and hydraulic models and mapping to identify flood risks and water quality problem areas, develop pollutant load estimates, identify and prioritize stormwater problems, evaluate effectiveness of control measures related to the update stormwater models across the County.

Task Leader, Comprehensive Stormwater Master Plan, City of Miami, FL. CDM Smith is responsible for the multi-year, multi-million dollar effort for the preparation of a citywide stormwater master plan. Dan serves as the task leader for the as-built verification, data gathering, and field verification task that included the creation of an interactive stormwater geographic information system (GIS) from several decades of mixed media records and as-builts, comprehensive survey of topography, LiDAR, stormwater feature verification of location, elevation, and connectivity, development of basin boundaries, seawall heights, finished-floor elevations of critical infrastructure, and channel cross sections. Completion of this task was critical for the modeling of the primary stormwater management system and development of a prioritized and phased capital improvements plan.

Project Manager, South Miami Heights Water Treatment Plant, Injection Well System and UFA Test Production Well Program, Contract W-930, WASD, Miami-Dade County, FL. CDM Smith's scope of services includes providing professional engineering services for the design, permitting and implementation of a hydrogeologic test plan in preparation for the proposed ultralow pressure reverse osmosis Water Treatment Plant and UFA wellfield for Miami-Dade County. The test plan program includes the installation and testing of three UFA test production wells, and a new Class V injection well to the Boulder Zone. Dan's duties for this project include overseeing the preparation of the hydrogeologic test plan, drawing and specifications development, and preparation of permit documents and guiding the project through the Florida Department of Environmental Protection (FDEP) permitting process. Dan is currently managing the construction phase services for installation of the wells, completion of aquifer performance testing and development of hydrogeologic test report. His responsibilities also include preparing monthly invoices and status reports; conducting project meetings; as well as coordination with the client's construction management and hydrogeology staff, and coordinating resource management for full-time project representation.

Project Manager, South Miami Heights Water Treatment Plant, Design-Build Operate Finance and Maintain (DBFOM), WASD, Miami-Dade County, FL. CDM Smith's scope of services included providing professional engineering services for development of a design build criteria package that will serve as the basis for preparing the final design for a new raw water supply and membrane water treatment facility with an initial capacity of 20 mgd, and preparation of procurement documents for a design-build alternative delivery, including operation and financing, for Miami-Dade County. The program includes Upper Floridan aquifer and Biscayne aquifer wellfields, deep injection well system for concentrate disposal and the membrane treatment process. Dan is responsible for overseeing the preparation of design criteria documents, probable construction cost estimates, request for qualifications and request for proposals procurement documents and supporting the project through the Miami-Dade County procurement process. In addition, Dan is responsible for preparing monthly invoices, status reports, and schedule updates, conducting project coordination meetings, as well as day-to-day project management activities.

Education
BS - Civil Engineering

Registration/Certification/Licensing
Professional Engineer (FL); Board Certified Environmental Engineer (BCEE); Project Management Professional (PMP)

Years of Experience
23

Dornelle S. Thomas, PE, ENV SP

Data Collection, Evaluation, and Field Verification

Project Engineer, NPDES Compliance and Environmental Permitting Services, Indian Creek Village, FL. Dornelle served as the project engineer for NPDES compliance and environmental permitting. She assisted the village with their NPDES program, including the preparation of the standard operating procedures and associated plans for their stormwater structures, and completion of an inventory of the system per records and GIS files to provide feedback to the regulatory agency. She also prepared the annual NPDES report for compliance and represented the village at all regulatory meetings.

Project Engineer, Stormwater Infrastructure Services, Indian Creek Village, FL. Dornelle is a project engineer for this project. She created data reports for stormwater structures, visually inspected and photographed stormwater structures, prepared deliverable report binder, and communicated project status and needs directly with the Indian Creek Village.

Project Engineer, Florida Keys Aqueduct Authority (FKAA) Water Supply Protection Program: Phase I- Data Compilation and Analysis, Florida Keys, FL. Dornelle was a project engineer for the initial phase of the FKAA Water Supply Protection program. The project was conducted to assist FKAA in maintaining its current permitted supply from loss due to saltwater intrusion, competing users and potential regulatory encroachment. Dornelle was responsible for reviewing FKAA's water use permit, researching historical water use data for FKAA and its neighboring competitors, compiling existing data on water levels, water quality, rainfall, regional system operations and consumptive use, analyzing the data compiled to determine the hydrologic and anthropological influences on water quality in the Biscayne Aquifer that could be affecting production and limitations on the FKAA's permitted withdrawals from the aquifer. The data sets reviewed included over 30 years of withdrawal of the Aquifer by Users, chloride concentrations and groundwater levels from monitoring wells in the identified project limits. Data for over 20 years of rainfall data and canal flows and stages were also reviewed. Trends and correlations found as a result of the analysis completed under this initial phase of work identified specific areas of concern for the maintenance of a long term water supply protection program. Groundwater monitoring improvements were recommended, as well as additional interaction with the permitting agency. Areas of additional study and analysis were also recommended.

Project Engineer, City of Miami Beach Sanitary Sewer Evaluation Survey (SSES)– Phase I and II, City of Miami Beach, FL. Dornelle was a project engineer for the City of Miami Beach SSES project. The project was conducted to determine the locations and causes of inflow and infiltration (I/I) to identify problem areas and recommend cost-effective corrective actions in five of the City's sanitary basins. Dornelle was responsible for project scheduling, closed-circuit television (CCTV) assessment, project oversight, field inspections, flow monitoring analysis, and report preparation.

Project Engineer, SSES Rehabilitation, City of Miami Beach, FL. Dornelle was a project engineer for the City of Miami Beach SSES Rehabilitation Project. The project was conducted to determine the locations and causes of I/I to identify problem areas and recommend cost-effective corrective actions, including how to mitigate or reduce infiltration from entering the system. As part of this project, over 70,000 -feet of sanitary sewer lines and 500 manholes were inspected. Dornelle evaluated the inspection data for the manholes and CCTV inspection of mainlines and provided recommendations for the rehabilitation of the lines and manholes. Dornelle was then responsible for the analysis of the flow monitoring data conducted after the rehabilitation was complete. The rehabilitation efforts implemented have resulted in a 58-percent reduction in I/I in seven basins that in 2006 were not in compliance (Basins 11, 19, 27B, 28D, 29, 31A, and 31B) with the Department of Permitting, Environmental, and Regulatory Affairs (PERA) standard.

Project Engineer, Jefferson County Collection System Map, Jefferson County, AL. Dornelle was a project engineer involved with the data review of CCTV inspection of mainlines for the County. She was responsible for reviewing the inspection data for accuracy and consistency.

Education
MS - Civil Engineering - Environmental;
BS - Civil Engineering - Environmental

Registration/Certification/Licensing
Professional Engineer (FL); Envision Sustainability Professional (ENV SP)

Years of Experience
13

Katie E. Thorp

Data Collection, Evaluation, and Field Verification

Environmental Engineering Intern, Miami Dade Stormwater Flooding, Miami, FL. Katie cataloged evidence of stormwater flooding in Miami Dade using ArcGIS. She generated a coordinate grid to organize stormwater management maps for ease of access.

Environmental Engineering Intern, Ocean Outfall Legislation Project, Miami, FL. Katie executed quality assurance and quality control reviews for project submittals. She documented construction progress and equipment specifications of Miami wastewater treatment plants using photo evidence. Additionally, she participated in construction management meetings by creating outline agendas and consolidating drawings.

Project Engineer, Annual Renewal and Replacement Report, City of Fort Lauderdale, FL. The City of Fort Lauderdale's contract with the Large Users of the Central Regional Wastewater System (Regional System) requires CDM Smith to prepare an annual schedule that projects facility renewal and replacement costs over a 20-year span. This analysis estimates the amount of funding to be set aside by the City for anticipated renewal and replacement expenditures for the Central Regional wastewater System. We were responsible for identifying areas of improvement to regional wastewater facilities through a review of accounting records, system operation and maintenance manuals, and construction contract documents; estimating the remaining useful life of major equipment and facilities on the basis of age and observed condition; developing a schedule for anticipated future equipment replacement; estimating the anticipated equipment replacement expenditures; determining the balance of the Replacement and Improvement Reserve Account and determining the amount of additional funding needed for the planned renewal and replacement expenditures over the next 20-years; calculating annual equipment replacement funding requirements for FY 2019-20; and summarizing the results of the analysis in a written report.

Project Engineer, Annual Capacity Analysis Report, City of Fort Lauderdale, FL. The City enacted an annual capacity update for the benefit of city-wide development planning. CDM Smith tabulates and charts 10-years of historical flows and biological loading data record by the City. And 10-years of future flows and biological loadings based on given population projections recorded by City. We compare flows being treated at wastewater facilities with the permitted capacities of the treatment plant. CDM Smith provides recommendations for future expansion needs if the permitted capacity will be equaled or exceeded within 5-years. The capacity analysis report meets the requirements of Rule 62-600.405, Florida Administrative Code, which was created to ensure that the City conducts timely planning, design, and construction of the wastewater facility necessary to provide proper treatment and reuse or disposal of domestic wastewater and management of domestic wastewater residuals.

Intern, University of Florida Institute of Food and Agricultural Science, Immokalee, FL. While with a previous employer, Katie input and synthesized water quality measurements using Microsoft Excel and data loggers. She assembled data collection devices and installed monitoring probes into agricultural fields and wetlands. She partnered with farmers and harvesters to implement BMPs. She collected and analyzed soil and water data for moisture, pH, bulk density and conductivity.

Undergraduate Research Fellow, National Institute of Food and Agriculture, Cayo, Belize. Prior to CDM Smith, Katie investigated water quality of creeks in the Vaca Forest Reserve as a function of land use. She quantified phosphate, nitrate, DO, turbidity and E. coli in creeks using meters and water test kits. She assisted project leaders in communicating with local stakeholders on the importance of clean drinking water. She designed sample collection maps by creating Google Earth layers and logging GPS data points. She drafted a manuscript for publication in a peer reviewed scientific journal.

Intern, Delft University of Technology, Environmental Biotechnology, Delft, The Netherlands. While with another firm, Katie investigated purple non-sulfur photoheterotrophic bacteria (PNSPB) for sustainable wastewater treatment applications. She measured pH, redox, temperature, and dissolved oxygen using a bioreactor. She monitored development of PNSPB by assessing TSS, VSS and by using a microscope. She collaborated with professors and students in an international setting to determine methods and obtain results. She presented results of bacteria isolation techniques to the international faculty of TU Delft Applied Sciences.

Education
BS - Environmental Engineering

Years of Experience
4

Andrew J. Baranowski, GISP

GIS Database/Asset Management

Production Manager, MIA Stormwater Atlas, MDAD, Miami, FL. Andy is leading the effort to create an accurate Stormwater atlas for MIA based on as-built drawings, record drawings and CAD files verified by survey and field inspection.

Data Conversion Manager/QA Process Design Lead, City of Miami Comprehensive SWMP, City of Miami, FL. The City of Miami Comprehensive SWMP involves the development of a hydrologic and hydraulic evaluation of the City of Miami stormwater management system using the SWMM for the purpose of flood control. The GIS component involves combining existing stormwater data from various sources and formats into a single GIS database capable of supporting the modeling tasks required for the project. Andy is responsible for coordinating the GIS data conversion activities required to support the SWMP for the City of Miami. Andy also managed the design and the implementation of the QA/QC processes used in support of the data conversion effort.

GIS Integration Manager, SWMP, City of Lake Worth, FL. The City's SWMP involved the development of a hydrologic and hydraulic evaluation of the City of Lake Worth's stormwater management system using the EPA SWMM for the purpose flood control. The project included developing conceptual improvements to identify stormwater conveyance deficiencies. In addition to flood control, CDM Smith evaluated water quality strategies to address changing regulatory requirements using the WMM. These strategies looked at reducing the pollutant loads from the major outfalls from the City to the major receiving waters that includes the intracoastal waterway. Stormwater improvements included conveyance system upgrades, provision of additional detention storage, recharge wells, and use of exfiltration trench technologies. Andy provided oversight of data collection activities pertaining to topography, rainfall data, land use, soils, and stormwater infrastructure along with other project hydro-geometric properties and migration of this data into a GIS geodatabase to support the project.

Project Technical Coordinator/Conversion Manager, IMS Data Conversion Project, City of Miami Beach, FL. Andy was the project technical coordinator/conversion manager responsible for all GIS and technical activities for an ARC/INFO-based project that involved the database design and data conversion of five layers of infrastructure for the City. These layers included sanitary sewer, storm sewer, water, streetlights, and street Planimetric features.

GIS Integration, SWMP, City of Fort Lauderdale, FL. The City's SWMP involved the development of a hydrologic and hydraulic evaluation of the City. The multifaceted objectives of the project established goals for flood control, water quality protection and improvement, wetlands management, and funding for stormwater improvements. To support these efforts, the numeric models SWMM5 and WMM were applied to provide quantitative measures of flood protection and water quality evaluation, respectively. In addition to assessing water quantity and quality, an evaluation was done related to dredging, stormwater ordinances, the city's existing stormwater utility, as well as other regulatory issues for the City related to its permits. Andy served as the GIS integrator to the City, assisting in developing a city-wide SWMP and data collection activities pertaining to topography, rainfall data, land use, soils, and stormwater infrastructure along with other project hydro-geometric properties.

Project Manager, FDOT District 4 Stormwater NPDES Permit Support System Inventory Projects, FL. The FDOT District 4 NPDES Permit Support activities included maintaining an inventory of District stormwater management infrastructure throughout Broward, Palm Beach, Indian River, Martin and St. Lucie Counties as required by the District IV NPDES Phase II permit. The infrastructure within the District was regularly inspected and evaluated. As project manager, Andy's duties included Phase II inventory and inspection management of the NPDES permitted outfall facilities within FDOT District 4.

Project Manager, FDOT District 3 Stormwater NPDES Permit Support System Inventory Projects, FL. The FDOT District 3 Stormwater NPDES Permit Support activities included maintaining an inventory of District stormwater management infrastructure throughout the Florida Panhandle as required by the District III NPDES permit. As project manager, Andys duties included Phase I inventory and inspection management of the NPDES permitted outfall facilities within FDOT District 3.

Education
BA - General Studies

Registration/Certification/Licensing
Geographic Information Systems Professional (GISP)

Years of Experience
27

Jayson D. Brennen

GIS Database/Asset Management

Project Manager, City-Wide Stormwater and Wastewater GIS, Providence, RI. Jayson serves as project manager for the City's sewer and stormwater GIS development project. This project involves extensive plan research, GPS data collection, invert survey, GIS data development, and applications programming. As part of this project, hundreds of miles of utilities are being migrated to an Esri-based GIS environment. In addition, Cloud GIS tools enable the client to access the data as it is being developed, and iPad and web applications are being implemented to support enhanced system operations and asset management. Key technologies include ArcGIS Enterprise, ArcSDE, ArcGIS Server, ArcGIS Online, Portal for ArcGIS, custom web and mobile applications, and policies for system quality review and sustainment.

Project Manager, City-Wide Stormwater and Wastewater GIS, City of Stamford, CT. Jayson serves as project manager for the City's sewer and stormwater GIS development project. This project involves extensive plan research, GPS data collection, invert survey, GIS data development, and applications programming. As part of this project, hundreds of miles of utilities are being migrated to an Esri-based GIS environment. In addition, Cloud GIS tools enable the client to access the data as it is being developed, and iPad and web applications are being implemented to support enhanced system operations and asset management.

Project Manager, Stormwater and Wastewater GIS Development, Cities of Manchester and Nashua, NH. Jayson managed utility GIS development projects for Manchester and Nashua. Combined, these projects consisted of over 1,000 miles of sewer, combined sewer, and stormwater systems. For these cities, Jayson led a team to: design Esri geodatabases; develop the GIS database based on field and plan research; implement mobile and web GIS solutions to support in-field data access and reporting; and prepare the data to support their CSO and MS4 stormwater programs. Jayson helped form GIS management committees, developed GIS implementation plans, facilitated the development of accurate aerial base mapping, managed the development of extensive GIS databases (parcels, water, sewer, stormwater, zoning, etc.), and implemented internet-facing public GIS applications based on Esri's ArcGIS Server software. These systems are all integrated with major city applications including municipal assessing and planning applications.

Program Manager, Photogrammetric Mapping and City-Wide GIS Implementation, City of Lowell, MA. Jayson managed the implementation of a city-wide GIS project that spanned nearly every city department. Key to this project was the completion of a photogrammetric mapping update task in which the City's planimetric, topographic, and ortho imagery was updated city wide. This mapping, which meets 100-scale mapping accuracy standards, was integrated with the City's ArcSDE environment. In addition, extensive City-wide GIS data was developed (parcels, street centerlines, utilities, etc.), web applications were developed, and system integration was completed.

GIS Task Manager, Naval Facilities Engineering Command (NAVFAC) World-Wide Asset Management Program, Norfolk, VA. Jayson served as GIS task manager for NAVFAC's large-scale, world-wide asset management program. As part of this process, he coordinated the development of GIS databases for over 250 individual utility systems (water, wastewater, gas, electric, steam, compressed air, etc.) at more than 65 naval installations world-wide. All data was developed based on the Esri software environment and in accordance to strict Department of Defense GIS standards. Extensive system architecture, data development, and systems integrated was completed for this program. In addition, he was instrumental in the development of innovative web and mobile technology solution that helped field crews inventory and assess nearly 500,000 Navy utility assets. The mobile solution leveraged Panasonic ToughPad hardware and incorporated Maximo CMMS and Esri GIS information into a single environment. The application was leveraged by over 250 field crews world-wide and resulting data became the base for NAVFAC's asset management program. Web and business intelligence applications were implemented to support data visualization, risk assessment, and capital planning. The overall program was large and complex and changed the way in which the US Navy manages their utility assets on a global scale.

Education
BA - Geography

Registration/Certification/Licensing
GISP

Years of Experience
32

Brendan M. Susino

GIS Database/Asset Management

GIS Specialist, Comprehensive Stormwater Masterplan, City of Miami, FL. The City of Miami Comprehensive Stormwater Master Plan is a project to prepare a stormwater master plan for Miami. The GIS component involves combining existing stormwater data from various sources and formats into a single GIS database capable of supporting the modeling tasks required for the project. Brendan's tasks also include database management and creation of an ArcGIS Online environment workspace for applications used in the aid of data collection and verification. He has also performed a variety of spatial data analysis tasks to support the development of stormwater models.

GIS Specialist, Miami-Dade Aviation Department (MDAD) Opa-Locka and Tamiami, FL. Brendan has assisted with the development of future conditions topographic data by updating digital elevation models (DEM) from as-built plans. He also has updated geometric networks to include stormwater features and structures for use in the Airport Stormwater Management Master Plan Update.

GIS Specialist, Stormwater Assessment, City of Delray Beach, FL. Brendan has conducted statistical/historical analysis of parcel data in support of a stormwater assessment update. Tasks also included QA/QC of building and parcel data via aerial imagery and other sources.

GIS Specialist, Martin County Stormwater Assessment, Martin County FL. Brendan conducted statistical/historical analysis of parcel data in the support of a stormwater assessment for Martin County.

GIS Specialist, Arizona State University Utility Conversion, Tempe, AZ. GIS creation of tunnel utility network from source documents, as-built drawings, and CAD, into a geodatabase environment. Brendan has also developed QA/QC workflow and methodologies that are being implemented during the utility GIS data conversion.

GIS Technician II, Iselin, NJ. Brendan assisted with gas main production, as-build updates utilizing SmallWorld GIS. He performed historical document review and attribute updates. He performed market analyses utilizing ArcGIS and ArcSDE, which included analyzing customer data and parcel data and mapping potential customer locations. This was completed prior to his time with CDM Smith.

Graduate Teaching Assistant, Florida Atlantic University, Boca Raton, FL. Prior to CDM Smith, Brendan assisted in course oversight for Introduction to GIS and Mapping. He aided students in a variety of GIS applications and methods for advanced geoprocessing, spatial analysis, remote sensing, and cartography.

Education
MA - Geography;
BA - Geography

Registration/Certification/Licensing
N/A

Years of Experience
4

Thomas E. Nye, PhD, PE

Modeling and Evaluations of Stormwater/Sea Level Rise

Modeling Task Leader/Lead Modeler, SWMP Update, City of Miami, FL. Tom is leading efforts to model the City to a resolution of approximately 10 acres which includes 2,500 subbasins in eight separate watersheds. The project includes hydrologic and hydraulic models that will map the primary stormwater management system down to a level of 24-inch diameter pipe and greater, as well as canals, ditches, pumps, weirs, and other stormwater structures. The models will be calibrated to historical storms and run multiple design storms to determine existing LOS. Part of the SWMP is to determine the LOS of the existing seawalls and how high they would need to be to protect the City. Alternative corrective measures will also be analyzed to improve LOS.

Lead Modeler, Stormwater Modeling, City of Virginia Beach, Department of Public Works, City of Virginia Beach, VA. Tom conducted SWMM stormwater modeling for the City of Virginia Beach SWMP Updates as well as local models for the City's Ashville Park and Windsor Woods neighborhoods. Tasks include 1-D and 2-D model setup, calibration, and alternative evaluations. He directed a team of eight modelers in the development of nine watershed models (to date) of up to 5000 (1D) nodes each that encompass much of the city. Two of the models use up to 40,000 2-D cells to model low-lying areas in detail. He has written multiple sections of the watershed reports including the volume on model development.

Senior Modeling Advisor, Miami-Dade County Stormwater Master Plan Update Independent QA/QC Reviews of Various County Hydraulic and Hydrologic Basins, RER, Miami-Dade County, FL. CDM Smith was retained by RER-DERM in providing professional services for the Miami-Dade County stormwater master plan update. Tom served as the senior modeling advisor for assisting the County to perform independent QA/QC reviews for base map, hydrology and hydraulic data, model updates of various County basins, and preparing independent QA/QC reports related to the update of six stormwater models across the County.

Project Engineer, Stormwater Modeling, SWFWM, Okeechobee, Martin, and St. Lucie Counties, FL. Tom was task leader for hydrologic and hydraulic modeling of the LOFT project components of the basins in Okeechobee, Martin, and St. Lucie Counties. He directed a team of four modelers in developing the SWMM, including model setup, calibration, alternative investigation, analyzing and sizing project components, and report writing. For the preliminary design of the LOFT project LRSTA, a subsequent phase, he again served as task leader and coordinated a team of four modelers to calibrate and produce continuous year-long simulations and provide real time control to test operational guidelines.

Technical Reviewer/Project Advisor, SWMP, City of Lake Worth, FL. Tom served as a technical reviewer and advisor for this effort, which includes the development of a hydrologic and hydraulic evaluation of the City's stormwater management system using the EPA SWMM for the purpose flood control. The project included developing conceptual improvements to identify stormwater conveyance deficiencies. In addition to flood control, CDM Smith evaluated water quality strategies to address changing regulatory requirements using the WMM.

Lead Modeler, SWMP Update, Village of Royal Palm Beach FL. Tom conducted SWMM stormwater modeling for the Village of Royal Palm Beach SWMP Update. Tasks included model setup, model validation, and design storm evaluations. The model update included using a LiDAR-derived DEM to provide topographic accuracy to delineate between areas with direct runoff to canals and areas with runoff to the primary stormwater system. The additional topographic accuracy allows better estimates of precipitation-driven flood levels within these neighborhoods and better estimates of canal stages where out-of-bank flows can inundate the adjacent neighborhoods. Tom managed the project, wrote the report, and presented the findings to the Mayor and City Council.

Lead Modeler, Stormwater Modeling for the City of New Orleans Drainage Improvement Plan, City of New Orleans, LA. Tom conducted SWMM stormwater modeling for the City of New Orleans Drainage Improvement Plan. Tasks included model setup, calibration, and alternative evaluations. He directed a team of seven modelers in the development of 15 neighborhood-scale models of up to 3000 nodes each that encompass the entire city. He wrote multiple sections of the report including Model Development, Design Alternatives/Methodology and the System Assessment Summary.

Education
PhD - Applied Marine Physics;
BS - Civil Engineering; BS - Geology

Registration/Certification/Licensing
Professional Engineer (FL)

Years of Experience
21

Robert W. Rooney, PhD

Modeling and Evaluations of Stormwater/Sea Level Rise

Stormwater Modeler, Comprehensive SWMP, City of Miami, FL. Robert developed hydrologic and hydraulic models of the stormwater system (watershed based) using XP-SWMM. Subsequently analyzes current stormwater infrastructure capability in relation to storm events and sea level rise scenarios and provides recommendations for future infrastructure improvement.

Stormwater Modeler, Hydraulic Analysis for Downtown Stormwater System, City of Boynton Beach, FL. Robert is responsible for updating the spatial domain of the City's downtown stormwater system model. Project details include LIDAR-based delineation, stage storage relationships, land-use based runoff parameters, and soil-based infiltration parameters. Robert also provides recommendations for volumetric and water quality stormwater infrastructure improvements.

Stormwater Modeler, SWMP Services, City of Virginia Beach, VA. CDM Smith signed a five-year annual service contract with the City to evaluate the performance of the city's stormwater system. Robert developed 1d and 2d hydrologic and hydraulic models of the stormwater system (watershed based) using PC-SWMM. Additionally, he provided model input precipitation volume and distribution expertise, GIS support, and assistance to junior modelers.

Stormwater Modeler, Comprehensive Utility Master Plan: WO10 Stumpy Lake Wet Weather Operation Plan, City of Virginia Beach, VA. Using the latest LIDAR, land-use, impervious and soils coverages, Robert updated the City's current WS 12 model with an emphasis on the Stumpy Lake contributing Area. He assessed potential operational control scenarios for increased flood protection including dam spillway modifications, pump operational changes, as well as the potential use of syphons as a lake level control structure.

Stormwater Modeler, Western Everglades Restoration Project (WERP) RSM Model Developer, South Florida Water Management District (SFWMD), FL. Robert assisted in the expansion and refinement of a regional scale stormwater and flow routing model encompassing 1194 square miles. His assistance included mesh refinement, evaluation and development of hydrologic parameters, incorporation of existing and proposed canal segments, evaluating and coding operational controls, and the development, assessment and reporting of proposed structural improvements.

Wastewater Modeler, Wastewater Management Master Plan, Broward County, FL. Robert is assisting in modeling Broward County's water and wastewater system using InfoSWMM. His assistance includes developing future population growth projections, processing and analyzing model results for future conditions, and making prioritized recommendations regarding infrastructure and pump station improvements.

Technical Reviewer, FEMA Hazard Mitigation Technical Assistance Program (HMTAP), United States of America. Robert was a primary technical reviewer on a FEMA HMTAP contract to review Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM) Grant program applications. His responsibilities included reviewing grant applications for technical and cost feasibility and effectiveness. Benefit-cost analysis (BCA) was performed using FEMA BCA Tool (V5.2.1) to determine if the proposal had a passing benefit-cost ratio (BCR) and approval for funding and implementation.

Quality Assurance Reviewer, Water Resources Studies, Al-Harrat, Saudi Arabia. Robert performed a final QA review of several large HEC-HMS watershed models in southwest and central Saudi Arabia. Analysis was focused on identifying errors in the modeled water budget results and subsequently locating the source of the errors whether they were due to model development, simulation setup, or data processing.

Education
PhD - Agricultural and Biological Engineering;
ME - Environmental Engineering;
BS - Chemical Engineering

Registration/Certification/Licensing
Engineer in Training (FL)

Years of Experience
5

Richard A. Wagner, PE, DWRE

Modeling and Evaluations of Stormwater/Sea Level Rise

Technical Reviewer, Lake Worth Stormwater Master Plan, Lake Worth, FL. Rich served as a technical reviewer for the water quality analysis using CDM Smith's WMM. He reviewed the WMM application to validate model input including imperviousness and surface runoff water quality concentrations for various land use categories and pollutant removal efficiencies for potential BMPs. Rich also reviewed the model output summaries that were prepared for the project report.

Modeler, Hydrologic Modeling for the Jacksonville Harbor Corrective Action Plan, U.S. Army Corps of Engineers (USACE), Jacksonville District, FL. Rich calibrated 10 Hydrologic Simulation Program – Fortran (HSPF) watershed models that contribute flows to the Lower St. Johns River including the Jacksonville Harbor area. He used the Parameter Estimation (PEST) software to optimize the assignment of hydrologic parameter values based on comparison of modeled flows to measured gage flows in the watersheds. Timeseries of flows from the HSPF models to the Lower St. Johns River were provided to the USACE for their use as input to an EFDC model of the river. Sensitivity analyses were also conducted to evaluate the uncertainty of the HSPF model results.

Technical Reviewer/Hydrologic and Hydraulic Modeler, Nova Canal Flood Control Project, EVRWA, FL. For EVRWA, Rich was the lead modeler in developing an EPA SWMM5 hydrologic and hydraulic model of the Nova Canal system, which includes the Nova Canal and tributary canals including the 11th Street Canal, Reed Canal and Halifax Canal. The model was developed by combining several existing models developed in an earlier version of SWMM. Rich used the model to evaluate potential benefits of pump stations and tide weir-gate structures at the downstream end of the 11th Street, Reed and Halifax Canals, in order to reduce flooding impacts during extreme design storm events. Rich also provided technical review for other alternatives including storage and pump stations in other locations within the system.

Technical Review and Guidance, City of Virginia Beach SWMP Services, Virginia Beach, VA. Rich has contributed to multiple tasks associated with the master planning services project. He reviewed and provided comments on SWMM5 hydrologic and hydraulic applications for several subwatersheds within the city, to ensure that model results were reasonable and appropriate. He was the primary author of a methodology document that outlined the proposed approach for refining the SWMM5 applications to add water quality simulations, including calculation of watershed pollutant load and the load reduction benefits of BMPs. Rich then directed the application of the water quality modeling methodology to one of the watersheds in the city. He also developed a technical memorandum on the advantages and disadvantages of wet detention pond liner applications in the city to avoid impacts to adjacent groundwater.

Modeler and Technical Reviewer, Moving Lake Okeechobee Water South to Benefit the Everglades, SFWMD, FL. Rich conducted and reviewed modeling using the HEC-RAS model to evaluate potential options for routing flows south through existing or modified conveyance pathways to the Everglades. Five different alternatives, which included various combinations of new or enhanced canals, gate structures and pump stations, were evaluated in the analysis. All of the alternatives were designed to convey an additional 300 cfs of flow to Storage Treatment Area (STA) 5/6.

Technical Leader, Arlington Office of Economic Development (OED) SWMP, City of Jacksonville, FL. Rich provided technical guidance in the development of a conceptual SWMP for a redevelopment area in the city. The plan was designed to provide water quality treatment to the associated stormwater runoff, utilizing green infrastructure practices to the extent practicable. Rich contributed to the identification of potential green infrastructure applications in the area, considering potential sizing of the infrastructure facilities and potential limitations such as seasonal high groundwater table elevations in some areas. The green infrastructure applications were supplemented by traditional wet detention pond treatment where required. The BMPTRAINS model was used to assess the water quality benefits of the conceptual green infrastructure applications.

Education
MS - Civil Engineering;
BS - Civil Engineering

Registration/Certification/Licensing
Professional Engineer (FL, VA); DWRE

Years of Experience
32

Stewart J. Magenheimer, PG, PMP

Groundwater and Hydrogeology

Project Manager, City-wide SWMP, City of Fort Lauderdale, Broward County, FL. To plan for the impact of increased development on stormwater infrastructure within its limits, the City of Fort Lauderdale undertook a comprehensive, city-wide SWMP. The tasks completed under the plan included: the identification, cataloging, and categorization of existing stormwater problems; the establishment of program goals such as flood control and water quality protection; the compilation and evaluation of water quantity, water quality, and funding data; wetlands assessment; the development of a base, city-wide SWMM to be used in more detail for evaluation of localized problem areas as needed; the evaluation of regional and local alternatives to manage flooding; and the evaluation of funding options for stormwater improvements. Stew led a multidisciplinary engineering team that developed the applicable models, performed the evaluations, and compiled the results into a comprehensive master plan which has served as a planning document for policy makers and as a baseline for subsequent flooding evaluations, and served as a principal author of the SWMP.

Project Manager, Stormwater Quality Monitoring Projects, MDAD, Miami-Dade County, FL. Stew managed a 24-month program to evaluate the quality of stormwater discharging from the MIA. His duties included evaluation of data collected and negotiation of the appropriate criteria with regulatory agencies.

Project Manager, Stormwater Pollution Prevention Plans, MDAD, Miami-Dade County, FL. Stew was responsible for the development of pollution prevention plans for three airports in Miami-Dade County. His tasks included evaluation of industrial activities and development of BMPs to reduce their impact on stormwater quality.

Project Manager, Stormwater Recharge Wells, Boynton Beach, FL. Stew was responsible for the design, permitting, and construction of two stormwater injection wells constructed in the surficial aquifer system.

Hydrogeologist, Injection Well System Re-rating Study Plan, Village of Royal Palm Beach, FL. Stew developed and implemented a plan to re-rate an injection well system for the village. This allowed the client to inject wastewater flow at a higher rate and precluded them from having to drill an additional well.

Project Manager, NPDES Municipal Separate Storm Sewer System Permit Compliance Program, FDOT District 4, FL. Stew assisted FDOT District 4 with complying with the various provisions of their NPDES MS4 permit. These provisions included inventorying, inspection, surveying, and field screening all of FDOT's stormwater drainage facilities within the permit areas. Additionally, Stew was responsible for assisting FDOT in negotiating permit and inter-local agreement conditions, preparing annual reports on the condition of the drainage system, and in the development of their stormwater drainage system database.

Project Manager and Lead Hydrogeologist, Lower Tamiami Aquifer Expansion, Collier County, FL. As part of this project, Stew identified potential locations and evaluated their logistical and aquifer characteristics for suitability as wellfield expansion sites. The scope of the project included: 1) a compilation and review of available geologic, hydraulic, and water quality data collected during previous hydrogeologic investigations; 2) construction of three test wells and associated monitoring wells; 3) collection and analysis of lithologic, geotechnical, and water quality data during well construction and testing; 4) aquifer performance and geotechnical testing to determine pertinent aquifer hydraulic characteristics; 5) pipeline hydraulic modeling to evaluate the hydraulic capacities of the wellfield raw water transmission system; 6) computer modeling to estimate draw down and water quality impacts associated with wellfield pumpage; and 7) report preparation summarizing the results of the investigation. Stew coordinated these activities and provided technical support through hydrogeologic data evaluation and model conceptualization.

Project Manager, FDEP Indian River County TMDL program, FL. As part of a multi-year contract, Stew led a multidisciplinary team that assisted FDEP in the development/updating of existing watershed hydrologic and water quality models for several impaired tributaries that discharge into the main stem of the Indian River Lagoon. Under this task assignment data collection and evaluation, data needs assessment, existing model evaluation, and model setup, calibration, validation, simulation, and refinement tasks were performed. A report was developed as part of the scope to document the project findings.

Education
MS - Geology; MBA; BS - Geology

Registration/Certification/Licensing
Professional Geologist (FL); PMP

Years of Experience
31

Lee P. Wiseman, PE, BCEE

Groundwater and Hydrogeology

Lead Practitioner, Miami-Dade Water and Sewer Department's Water Supply Development of South Miami Heights, Miami-Dade Water and Sewer Department (WASD), Miami-Dade County, FL. As part of an alternative water supply initiative included as a condition of Miami Dade WASD's 20-year WUP, WASD will supply the South Miami Heights (SMH) WTP with 23.3-mgd of raw brackish water from a proposed Upper Floridan Aquifer (UFA) wellfield. Lee was the lead practitioner for the hydrogeological services provided for the development and execution of a comprehensive hydrogeologic test program for the evaluation of potential yield and quality of groundwater from the UFA. The evaluation provided the preliminary design bases for the design of a brackish water treatment plant and associated wellfield to be constructed at the SMH site. The project installed three spatially representative UFA test production wells, a continuous core boring to over 1,600 feet, conducting extensive testing including four long-term (30-day) UFA aquifer performance tests (APTs) and the drilling and testing of a Class V exploratory well and associated dual zone monitor well (DZMW) for verification of a suitable zone for the disposal of concentrate from the LPRO process.

Task Manager, Groundwater Modeling of Floridan Aquifer Withdrawals, WASD, FL. WASD submitted an application to SFWMD for a 20-year Water Use Permitting (WUP) application to increase their Biscayne aquifer withdrawals from approximately 323- to 418-mgd. WASD received a consent order from the SFWMD to develop alternative water supply (AWS) sources. CDM Smith worked with WASD to increase reuse that offset impacts to the regional system and also to withdraw water from the Floridan aquifer for treatment with LPRO. CDM Smith revised the WASD WUP application to address these changes in supply sources and to provide groundwater modeling to support the requested allocation. CDM Smith conducted groundwater modeling for the Biscayne aquifer withdrawals using the SFWMD lower east coast sub-regional groundwater flow model, which is a MODLFOW-based model. This model was used to evaluate pumping withdrawals from WASD wellfields and all other wellfields in Miami-Dade County relative to the SFWMD water resources evaluation criteria and regional water availability. Several proposed reuse projects were simulated with the model to evaluate if implementation of these projects would provide offsets to regional system withdrawals associated with projected pumping from WASD and other existing legal users. Lee directed the development of MODFLOW-based groundwater flow models for the Floridan aquifer system to simulate proposed withdrawals from the upper Floridan aquifer. WASD received their 20-year WUP from SFWMD in November 2007

Task Manager, 20-Year WUP Application and Associated Groundwater Modeling, City of Boynton Beach, FL. Lee prepared the 20-year WUP application for the City for an average annual allocation of 21.9-mgd from the surficial aquifer and Floridan aquifers. The City has historically used water directly from only the surficial aquifer system, which indirectly takes water from the regional conveyance system. ASR was used to help the City meet seasonal demands. However, with the passing of the regional water availability rule by the SFWMD in 2005, the City developed AWS sources, including maximizing reuse and construction of a reverse osmosis (RO) treatment facility to process water from the Floridan aquifer. The City developed an aggressive reuse program that helps provide offsets to impacts to the regional system. Population projections, per capita use, and projected demands with reuse credit were significant issues that the City had to overcome. CDM Smith used the MODFLOW-based model of south Palm Beach County to evaluate pumping related impacts relative to the SFWMD water resources criteria and the regional availability rule. This 20-year WUP was obtained within 18 months of permit application submittal.

Technical Advisor, Collier County WUP Support, Collier County, FL. CDM Smith oversaw the multi-year permitting process to modify Collier County's existing WUP for additional freshwater allocation. Lee served as a technical advisor to document the justification for the permit increase, perform field testing of the County's wellfield, develop groundwater modeling to support the permit request and negotiate an agreement with the SFWMD on the issued permit. After nearly three years of work, the County was issued the requested allocation increase, which is anticipated to save the County approximately $145M over the next 20 years.

Education
MS - Environmental Engineering;
BS - Microbiology

Registration/Certification/Licensing
Professional Engineer (FL); BCEE

Years of Experience
35

Jason M. Mills, PG

Groundwater and Hydrogeology

Project Hydrogeologist, MIA, MDAD, FL. Jason worked as a project hydrogeologist providing fieldwork and reports for MDAD at MIA. Jason performed assessments, which included soil and surface water analysis for volatiles and semi-volatiles, pesticides, metals, and various chemicals.

Senior Project Geologist, Miami Dade Water and Sewer Department's Water Supply Development of South Miami Heights, Miami-Dade Water and Sewer Department (WASD), Miami-Dade County, FL. As part of an alternative water supply initiative included as a condition of Miami Dade WASD's 20-year WUP, WASD will supply the South Miami Heights (SMH) WTP with 23.3-mgd of raw brackish water from a proposed Upper Floridan Aquifer (UFA) wellfield. Jason was the lead senior professional geologists overseeing the hydrogeological services provided for the development and execution of a comprehensive hydrogeologic test program for the evaluation of potential yield and quality of groundwater from the UFA. The evaluation provides the preliminary design bases for the design of a brackish water treatment plant and associated wellfield to be constructed at the SMH site. The project involved installing three spatially representative UFA test production wells, a continuous core boring to over 1,600 feet, conducting extensive testing including four long-term (30-day) UFA aquifer performance tests (APTs) and the drilling and testing of a Class V exploratory well and associated dual zone monitor well (DZMW) for verification of a suitable zone for the disposal of concentrate from the LPRO process. Jason is the lead technical consultant for this multi-tasked project (with a combined contract value >$20M) directing all field tasks for drilling and testing. Four drill rigs, drilling simultaneously, with a fluid management system costing over $1.8M were required for this 24/7 project. Jason provided review of all generated data, directed the field drilling and testing program, managed field staff, interfaced directly on a weekly basis with FDEP, maintaining reporting project status and testing results for regulatory compliance.

Project Geologist, South District Water Reclamation Facilities Project, WASD, Miami-Dade County, FL. WASD received a 20-year water use permit in 2007. A condition to the permit requires the County to develop projects that use treated wastewater for reuse. Miami Dade WASD's South District Water Reclamation Facility will provide 21-mgd of highly treated reclaimed water to recharge the Biscayne Aquifer and offset regional demands. Jason provided technical oversight to the geotechnical and hydrogeologic assessment for the recharge site. In addition, he provided design criteria for shallow injection wells as a recharge method option. Jason was also the task manager for the hydrogeochemical modeling, which is investigating the chemical reactions of the treated recharge water and the aquifer matrix (water and rock). This task involved whole rock geochemical analysis of core samples, scanning electron microscope assessment, water quality analysis, and modeling. This was a high profile project with complete regulatory engagement from the local, state, and federal level.

Field Task Manager, Lake Okeechobee Fast-Track (LOFT), Okeechobee, FL. Jason provided a key role in designing, planning, and executing a fast track extensive geotechnical and hydrogeological investigation of two large tracks of land, totaling in excess of 6,500 acres, for the preliminary design of impoundments for treatment of nutrient loading in Taylor Creek. Tasks and objectives included coordination and leadership of CDM Smith project field team and multiple subcontractors. The project included SPT and sonic borings, piezometer installations, geoprobe surveys, test pits, geophysical surveys, aquifer performance tests, slug testing, double ring infiltrometer tests, and land surveying. Responsibilities also included providing technical input for interpretation of lithology and geophysical logs, analysis of APTs, quality assurance of subcontractors, coordination with task managers, review of invoices, and problem solving encountered during the project implementation and co-authored in the report writing of the means and method summary report.

Project Geologist, Evaluation of Floridan Production Wells, Jacksonville, FL. Jason provided technical direction for evaluating and implementing maintenance and rehabilitation of Atlantic Beach Utilities' Floridan Production Wells. Jason interpreted and evaluated borehole geophysical and video logs and determined methods for well rehabilitation.

Education
BS - Geology

Registration/Certification/Licensing
Professional Geologist (FL, GA)

Years of Experience
21

James T. Wittig, PE
Capital Improvements Program

Project Manager, Leu Gardens and Colonial Town Stormwater Improvement Design and Construction Services, City of Orlando, Florida. The Colonial Town and Leu Gardens Drainage Improvements projects (when fully constructed) will serve to alleviate flooding in multiple problem areas of the City that have experience chronic flooding for years. CDM Smith was selected to provide engineering services for the first of three phases of this project to alleviate flooding in three areas of the Colonial Town neighborhood. Jim lead the team that provided final design and post-design services for these stormwater projects.

Technical Advisor, SWMP, Lake Worth, FL. Jim served in the roles of technical guidance and technical review for this effort, which includes the development of a hydrologic and hydraulic evaluation of the City of Lake Worth's stormwater management system using the EPA SWMM for the purpose flood control. The project included developing conceptual improvements to identify stormwater conveyance deficiencies. In addition to flood control, CDM Smith evaluated water quality strategies to address changing regulatory requirements using the WMM. These strategies looked at reducing the pollutant loads from the major outfalls from the City to the major receiving waters that includes the intercoastal waterway. Stormwater improvements included conveyance system upgrades, provision of additional detention storage, recharge wells, and use of exfiltration trench technologies.

Technical Reviewer, SWMP Update and Digital Flood Mapping, City of Jacksonville, FL. CDM Smith completed the first Master SWMP for the City of Jacksonville. Since the first SWMP, CDM Smith has continuously assisted the City in evaluating and implementing stormwater water quality and flood control projects to address local needs and meet LOS goals throughout the County. Jim provided technical review for this project.

Project Engineer, Implementation of BMPs for Homeland Basin, Pinellas Park, FL. This project includes the design, permitting, and limited construction services for improvements to stormwater quality and LOS within the Homeland Basin. Project funding is shared between the City of Pinellas Park and the SWFWMD. The project interfaces with a proposed lead remediation and wetland restoration project called Sawgrass Lake Restoration Project. As project engineer, Jim's tasks included final design, alternative workshop participation, permitting, and technical review.

Lead Practitioner, Immokalee SWMP, Collier County, FL. Jim served as lead practitioner for the Immokalee SWMP implementation, for which CDM Smith updated the SWMP and provided 100-percent design improvements in the downtown area. Project elements included the review, update, and prioritization of the conceptual plans; design and construction drawings; permitting; and bidding assistance. As lead practitioner, Jim worked with the project team to update the master plan, and conduct hydraulic modeling, and provide technical review of the project design.

Project Engineer, SWMP, City of Fort Myers Beach, FL. Jim was the project engineer responsible for evaluating existing data, hydraulic modeling, alternatives evaluation, and quality management during the development of the Town's comprehensive SWMP, which was designed to develop processes, systems, organizations, costs, and cost funding mechanisms to facilitate reliable, compliant stormwater management practices for current and future use.

Technical Reviewer, Lake Hiawassee Drainage Basin Study, Orange County, FL. We completed a stormwater inventory and mapping effort and a flooding LOS assessment, as well as prepare updated floodplain maps for the study area. We developed a stormwater model representation of the Lake Hiawassee study area, which is a landlocked system within the larger Shingle Creek Basin. Jim was responsible for reviewing the project approach, analysis, stormwater modeling, and recommendations.

Project Manager, North College Park Flood Study, Orlando, FL. To establish the base flood elevations in areas classified as being in Flood Zone A by FEMA, the City of Orlando contracted with CDM Smith to establish base flood elevations for Little Lake Fairview, Lake Sarah, Lake Daniel, and Lake Silver, collectively known as the North College Park Study Area (NCPSA). Jim led the CDM Smith team in performing data collection and analysis of the existing stormwater management system in the NCPSA.

Education
ME - Environmental Engineering;
ME - Industrial and Systems Engineering;
BS - Environmental Engineering

Registration/Certification/Licensing
Professional Engineer (FL)

Years of Experience
35

Scott I. McClelland

Stormwater Fee/Utility Sufficiency and O&M Costs

Project Director, SWMPs, Various Locations, Dates. Scott has directed a number of SWMPs or needs assessments, including those for Escambia, Leon, Seminole, Volusia, Pasco, and Brevard Counties. Scott is experienced in the study, assessment, and implementation of stormwater utilities. He has also worked on projects for Dunedin, Hillsborough County, Daytona Beach, Miami, Sarasota County, Clearwater, and Plant City in Florida; Concord and Wake County in North Carolina; and Austin and Houston in Texas.

Project Manager, Florida Keys SWMP, Monroe County, FL. Scott served as the project manager and was the technical expert for the preparation of the SWMP working for Monroe County. The purpose of the SWMP was to assess the adequacy of existing systems, prioritize stormwater management needs for each island, identify regulations and policy needs, and develop a plan to finance the construction, and operations and maintenance (O&M) of required facilities. The scope of work included: comprehensively compiling and evaluating existing data; defining project goals and objectives; assessing potential stormwater management strategies and solutions defining an implementation plan; and conducting a public awareness program. Due to the sensitive environmental nature of the Florida Keys and the governmental scrutiny on all environmental matters there, every product of CDM Smith was reviewed by multiple federal, state, and regional agencies including EPA, USACE, U.S. Fish & Wildlife Service (FWS), U.S. National Oceanic and Atmospheric Administration (NOAA), Everglades National Park, state of Florida Governor's Office, Florida Department of Community Affairs (DCA), Florida Department of Environmental Regulation (DER), and SFWMD.

Technical Reviewer, City-wide SWMP and Update, City of Lake Worth, FL. Scott provided technical guidance and review for the city-wide SWMP in order to evaluate the study area and the City's primary stormwater management system along with associated outfalls to receiving waters (Lake Worth Lagoon, C-16, and C-51 systems).

Technical Advisor, Stormwater Utility Development and Implementation, City of Jacksonville, FL. During development of the City's stormwater management program, the City had determined that a user fee program was necessary to support its expenditures; however, a utility was previously determined to be unacceptable on three separate occasions. Scott provided technical guidance as the project team worked closely with the Department of Public Works, the Information Technology Division, and the Finance Division to implement the necessary user fee system.

Technical Advisor, NPDES Phase II Program Assistance, Volusia County, FL. Scott provided technical guidance for the development of the NPDES Phase II municipal separate storm sewer system stormwater management plan for Volusia County, and the incorporated Cities within the County. The project included working with the governments within the County that were required to join the statewide general permit through a notice-of-intent by March 2003. Program elements included mapping waters of the United States, outfall inventory efforts, and identifying programs to meet the six minimum criteria of the program, including public education and outreach, public participation, illicit connection detection and elimination, construction discharge controls, stormwater runoff controls from new development, and municipal operations pollution prevention.

Technical Support, Homeland Basin Improvements, City of Pinellas Park, FL. This project included the design, permitting, and limited construction services for improvements to stormwater quality and level of service within the Homeland Basin. Project funding is shared between the City of Pinellas Park and SWFWMD. The project interfaced with a proposed lead remediation and wetland restoration project called Sawgrass Lake Restoration Project. Scott helped address potential water quality issues and TMDL related to the project.

Technical Expert, SWMP, City of Fort Lauderdale, FL. Scott served as a technical expert for the preparation of the City of Fort Lauderdale SWMP. The plan considered flooding and water quality related to stormwater runoff, ordinance and regulatory support to improve the regulation of runoff, and a stormwater funding assessment.

Education
MS - Oceanography;
BA - Mathematics

Registration/Certification/Licensing
N/A

Years of Experience
32

David Mason, PE, PMP, DWRE

Stormwater Fee/Utility Sufficiency and O&M Costs

Project Manager, Stormwater Utility Feasibility Project, City of Parkland, FL. David is currently managing a feasibility study and rate study evaluation for the City of Parkland. The first phase of the project includes the development of a comprehensive stormwater management program for the City that would be supported by a non-ad valorem assessment. CDM Smith is working with the City to perform a level of service and cost of service analysis that fits within their budgetary constraints and political support expectations. This includes the development of a 5-year budget forecast that includes new staffing, organizational re-structuring, and capital project planning, all to address local flood improvement projects, operations and maintenance needs and to satisfy NPDES MS4 regulatory requirements.

Project Manager, SSWMP and Stormwater Utility Feasibility Study, City of Kingsport, TN. David served as project manager for the evaluation of a stormwater utility funding option for the City of Kingsport, TN. The project also included the development of a preliminary stormwater master to estimate the existing capital improvements needs across the City. David's duties included development of the preliminary SWMP, assessment of the city's current stormwater program, and co-facilitation of public meetings for the city's Stormwater Management Advisory Committee.

Project Manager, Stormwater Utility Feasibility Study and Implementation, City of Cleveland, TN. David managed the evaluation of the City's stormwater management program and the implementation of a stormwater utility fee. The project involved an assessment of the City's program for compliance with NPDES regulatory permitting as well as the program's ability to address pending USACE flooding improvement recommendations to address long-standing flooding issues in the City. David led all aspects of the project, including the program assessment, public outreach, ordinance/policy development and implementation of the billing system.

Project Manager, Stormwater Utility Development, City of Petersburg, VA. David served as project manager for the evaluation and development of a stormwater utility funding program for the City of Petersburg, VA. David's duties included the facilitation of a series of public stakeholder meetings to build support for the program. He also assisted the City in the development of stormwater program options to remain in compliance with the City's NPDES permit. Following approval by the City's Board, he managed the successful implementation of the stormwater fee.

Project Manager, South Cypress Creek SWMP, City of Memphis, TN. David is serving as project manager for the development of a SWMP for South Cypress Creek in the City of Memphis. The project involves the use of InfoSWMM to evaluate necessary infrastructure improvements to resolve roadway and structural flooding complaints. In addition, the project includes the development of a stormwater infrastructure inventory in a GIS environment.

Project Manager, Stormwater Program Assessment, City of Memphis, TN. David served as project manager for assessment of the City's stormwater management program. The assessment included interviews with City staff to identify successful elements of the program as well as areas requiring improvement. For improvement areas, David developed revised programs and policies, specifically as they related to the City's NPDES permit requirements. David also performed a rate study to assess the City's ability to fund the existing program as well as any program improvements. Finally, David worked with the City to develop a long-term CIP strategy.

Task Leader, SWMP – Indefinite Quantity Contract, Norfolk, VA. David is serving as task leader for this contract, with specialization in the areas of stormwater management. His role includes the evaluation of watershed-scale and neighborhood scale drainage issues, the identification of BMP opportunities for the Chesapeake Bay TMDL, and support for the stormwater utility funding program.

Project Engineer, Stormwater Management Plans, City of Raleigh, NC. David served as a project engineer for the development of a stormwater management plan for the Mine and Richland Creek drainage basins in the City of Raleigh. The project involved hydraulic and hydrologic modeling of the drainage basins to evaluate existing and potential new stormwater facilities for controlling stormwater and enhancing overall water quality within the Crabtree Creek watershed. David's duties included using GIS utilities to extract subbasin parameters, building HEC-1 hydrologic and HEC-RAS hydraulic models of each drainage basin, locating/designing potential detention sites, and examining streambank restoration/ rehabilitation needs.

Education
MS - Environmental and Water Resources Engineering; BS - Civil Engineering

Registration/Certification/Licensing
Professional Engineer (VA, NC, TN); PMP; DWRE

Years of Experience
20

Diane Kemp

Funding and Grant Management

Financial Specialist, Stormwater Rate Study, City of Cape Coral, FL. CDM Smith was engaged to determine the stormwater utility revenue requirements, based upon the current level of service. Additional objectives were to determine the cost for an enhanced level of service and to analyze the costs of the quality versus quantity functions as they relate to development project credits. The revenue requirements were identified for a 5-year period. Adjustments to the current stormwater utility fee were recommended, with the increase to be phased in over the 5-year period.

Financial Specialist, Stormwater Rate Study, Metropolitan St. Louis Sewer District (MSD), St. Louis, MO. MSD retained CDM Smith to develop the "Report on Revenue Requirements, Costs of Service and Rates for Wastewater and Stormwater Service." This report presented a comprehensive study of the wastewater and stormwater services MSD provides, as well as summarizing the costs of the existing services and associated rates. The wet weather percent and the customer/capacity ratios developed in a previous inflow/inflation study were input into the rate model as well. In addition, the "Stormwater User Charge Report" (CDM Smith, 2003) was updated to include operation and maintenance requirements for the original and annexed areas, phasing schedule for new services and credit policy for new stormwater charges. Diane assisted MSD with information required to develop and determine stormwater rates using the existing wastewater rate model. Once the report was finalized it was submitted to MSD's Rate Commission.

Financial Specialist, State Revolving Fund (SRF) Funding, City of Cape Coral, FL. Diane has provided SRF assistance to the City of Cape Coral, beginning in 1991 and includes nearly $400M in funds. Diane was called on to complete the disbursement requests for the Southwest area projects and was instrumental in the financial sections of the North 2 UEP loan process. Ms Kemp prepared the financial section of the Facility Plan, including the impact of the project on existing customer costs. Diane reviewed and assisted in compiling data for the projects receiving SRF funding and met with City staff, consultants and FDEP in finalizing the SRF funding for the expansion projects, maximizing the eligibility and completing the application process. Upon completion of these updates, Diane assisted the City in modifying the existing letter report outlining the findings, status and recommendations for funding through the FDEP SRF Program.

Financial Specialist, Analysis of Reclaimed Water Rates, Town of Longboat Key, FL. Diane prepared a ten-year financial analysis for four design scenarios and the following funding options; with and without grant funding, revenue bonds, State Revolving Fund loans, and general obligation bonds. The impact of each of these scenarios was viewed in terms of the rates required, with and without various off-setting considerations; support from water and wastewater for coverage, equalization of reclaimed water rates with potable water rates and the use of ad valorem taxes.

Financial Specialist, Water and Wastewater Rate Study, Town of Herndon, VA. Diane prepared a Water and Sewer Utility Rate Study for the Town of Herndon. The rate study identified the water and sewer utility funding requirements and the recovery of those funding needs through water and sewer rates. The following steps were undertaken to identify the financial needs of the water and sewer systems: The operating and capital costs for the water and sewer systems were projected for the next five years, taking into consideration the recommended replacement projects and reserve funding need. The costs of service were identified by customer class. As a result of the above determinations and requirements, a recommended schedule of water and sewer rates was prepared. The increase in water and sewer rates was recommended to be phased in over the five years analyzed. Increases were also recommended regarding the capital charges. A policy for calculating a required balance in the Operating Reserve and the R&R Reserve Fund was recommended.

Education
BA - Economics and Accounting

Registration/Certification/Licensing
N/A

Years of Experience
50

William E. Cesanek, AICP

Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development

Project Manager, City of Newark and Together North Jersey Greenstreets/Green Stormwater Infrastructure (GSI) Study, Newark, NJ. Bill served as the project manager for the City of Newark NJ Green Streets Infrastructure Study, creating a plan and pilot projects to implement GSI. The program represents a foundational strategy for Newark to both manage stormwater more sustainably, and promote community renewal. Based on this city-wide site opportunity characterization, and in coordination with water and sewer, engineering, neighborhood and recreational services and planning departments, CDM Smith identified GSI pilot site opportunities, developed conceptual designs for green infrastructure facilities, and identified staff and organizational capacity improvements that would improve GSI implementation.

Project Manager, Environmental Assessment, New Jersey Water Supply Authority, NJ. Bill managed the preparation of an environmental assessment for the New Jersey Water Supply Authority. This project involved an evaluation of the environmental effects of constructing facilities that would redirect stormwater originating in the City of Trenton from the Delaware and Raritan Canal, a major potable water supply source, to a nearby waterway. Important issues addressed in this project include water quality effects, changes in flooding, sediment transport, construction impacts, and cultural resources.

Team Member, Stormwater Planning, Demographic Analysis, and GIS Mapping, Multiple Locations. Bill was involved in the GIS mapping and stormwater management planning phases of comprehensive CSO management strategies and facility plans for three urban infrastructure agencies: the Philadelphia Water Department, the Allegheny County Sanitary Authority (ALCOSAN) in Pittsburgh, and the City of Wheeling, West Virginia. For each project, Bill managed the disaggregation of existing and projected demographics from the local level to the watershed level, to determine existing and projected wastewater flows in the study communities, using Arc/Info GIS, and oversaw mapping of facilities for analytical and modeling purposes.

Environmental Planner, CSO Management Strategy and Facility Plan Development, Allegheny County Sanitary Authority (ALCOSAN) Pittsburgh, PA. Bill was involved in GIS, mapping, and stormwater planner phases of comprehensive CSO management strategies and facility plans for ALCOSAN in Pittsburgh, Pennsylvania, and the City of Wheeling, West Virginia. Both projects involved collection, conveyance, and treatment systems serving multiple communities and included developing and implementing a plan to optimize the hydraulic operation of the sewer system to minimize the frequency and volume of CSOs and to identify the receiving water quality effects of CSO discharges.

Project Manager, Environmental Impact Assessment, Hackensack Meadowlands, NJ. Bill was the project manager responsible for preparation of an Environmental Impact Statement (EIS) for a Special Area Management Plan in the Hackensack Meadowlands District (HMDC) of NJ, under the direction of EPA, USACE, and NOAA. This project identified a regional plan that balanced environmental protection and improvement with reasonable economic development. The SAMP/EIS is regarded as a national model for the coupling of sustainable development and environmental protection. Bill's accomplishments on the HMDC project included: development of a regional GIS database for the project, with coverages for wetlands, land use, zoning, transportation systems, important wildlife habitats, locations of contamination sources, and utility infrastructure; screening-level analysis of alternative future development scenarios using GIS; and detailed analysis of potential resource impacts using GIS tools. Bill directed the installation of an Arc/Info GIS system at HMDC, and managed training and support for HMDC staff.

Environmental Planner, Water Supply Master Plan, Middlesex County, NJ. Bill prepared a water supply master plan for Middlesex County, NJ, that evaluated alternative water supply sources and estimated loss of resources caused by water quality deterioration, watershed development, and hazardous waste disposal. He prepared future water demand projections based on land development and population/employment growth trends.

Education
MCRP - City and Regional Planning;
BA - Urban Planning

Registration/Certification/Licensing
American Institute of Certified Planners (AICP)

Years of Experience
39

Lauren M. Miller, CC-P

Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development

Inventory Specialist and Greenhouse Gas Strategic Expert, Boynton Beach Climate Action Plan, City Boynton Beach, FL. The City of Boynton Beach received Energy Efficiency and Conservation Block Grant (EECBG) funding from the Department of Energy to conduct a greenhouse gas (GHG) City facilities and community-wide GHG inventory and Climate Action Plan. Using the ICLEI Clean Air Climate Protection software, Lauren created a GHG inventory based on data collected by City and state officials. Working with City officials, she established GHG emission forecasting years along with GHG emission scenarios to assist the City with GHG planning. She wrote a detailed report analyzing the results of the GHG inventory and forecasting. Lauren presented the resulting information to the Boynton Beach City Council. She task managed the GHG inventory aspect of this project.

Inventory Specialist and Greenhouse Gas Strategic Expert, Lake Worth Greenhouse Gas Inventory, City of Lake Worth, FL. The City of Lake Worth conducted a GHG city facilities and community-wide GHG inventory and Climate Action Plan. Using an excel based model that incorporated calculation methodologies from the EPA GHG Mandatory Reporting Rule (40 CFR 98) and The Climate Registry, Lauren created a GHG inventory based on data collected by city and state officials. Working with City officials, she established GHG emission forecasting years along with GHG emission scenarios to assist the City with GHG planning. Lauren wrote a detailed report analyzing the results of the GHG inventory and forecasting. She task managed the GHG inventory aspect of this project.

Greenhouse Gas Expert, City of Asheville Sustainability Plan, City of Asheville, NC. The City of Asheville created a city-wide Sustainability Plan which will address five major components – buildings, transportation, water systems, solid waste, and land use. Lauren collaborated with the lead technical experts for each component to quantify greenhouse gas emissions reduced as part of each recommended sustainable option. These GHG reduction estimates helped the city evaluate each recommendation relative their city-wide reduction goal of no less than two-percent per year.

Project Manager and Sustainability Research Analyst, Sustainability Rating Systems Evaluation, Massachusetts Port Authority, MA. Massport tasked CDM Smith with researching sustainability rating systems (SRS) that would be applicable and more meaningful for Massport's airport and port non-building facilities to replace existing Sustainable Design Guidelines (SDG). To accomplish this, Lauren researched 20 possible SRS, based on the Massport's agreed-upon needs. The research included: Envision, BREEAM (Building Research Establishment's Environmental Assessment), CEEQUAL (Civil Engineering Environmental Quality Assessment and Award Scheme), and SuRe® - the Standard for Sustainable and Resilient Infrastructure, along with three project-type-specific SRS: Greenroads, Parksmart, and PEER (Performance Excellence in Electricity Renewal).

Sustainability Research Analyst, Municipal Environmental Department Analysis, City of Arlington, TX. For the City of Arlington to become a leader in sustainability, it is important for the City to understand how other U.S. cities with similar populations organize themselves to be more sustainable. Lauren provided Arlington City leaders with information on how some of the most sustainable cities run their departments. In addition, she analyzed the recycling programs and budgets of the top recycling cities in the U.S.

Project Director and Resilience Expert, Passaic River Basin Climate Resilience Plan, North Jersey Transportation Planning Authority (NJTPA), Newark, NJ. NJTPA selected CDM Smith to assess the current and future vulnerability of the transportation assets to extreme heat events, extreme precipitation events, and sea level rise and storm surge in the Passaic River Basin, New Jersey. This project identifies adaptation strategies for a more resilient transportation system. As Project Director, Lauren is responsible for shaping the direction of the project and leading the cross-disciplinary team of water resource engineers, hydraulic and hydrologic (H&H) modelers, transportation planners, asset management specialists, and GIS experts.

Education
MA - Energy and Environmental Analysis;
BS - Environmental Studies

Registration/Certification/Licensing
Climate Change Professional (CC-P)

Years of Experience
15

Brendan V. Brown, PWS

Wetlands, Natural Systems, Water Quality, and Environmental

Project Scientist, Wetland Functional Assessments, SWMPs, Various Municipal Clients, FL. Brendan was responsible for completing functional assessments for the wetlands in various basins that were part of larger SWMPs. This included using national wetland inventory (NWI) GIS coverages to identify wetlands located in the basins, selecting wetlands for field verification and functional assessments, and updating NWI GIS coverages. He also generated reports in support of these activities.

Project Scientist, Miami Dade WASD Water Facilities Master Plan, 48-inch Water Main Project, Miami Dade, FL. Brendan was responsible for conducting the contamination assessment along the proposed route and evaluated potential contamination concerns associated with construction. He also evaluated potential environmental issues including impacts to wetlands, surface waters, and protected species.

Project Biologist, Lake Worth Park of Commerce (POC) Infrastructure Needs Assessment and Preliminary Engineering Study, Lake Worth, FL. Brendan assisted with the environmental analysis portion of this project. He conducted preliminary wetland evaluations on five vacant parcels within the boundaries of the POC.

Project Scientist, Deep Creek SWMP, Volusia County, Florida 2009. The Volusia County Public Works Department contracted with CDM Smith to develop a SWMP for the Deep Creek Basin, a 164-square-mile watershed in south-central Volusia County. Brendan inventoried the wetlands in the basin using GIS data from NWI. He also conducted a wetland functional assessment at selected wetlands throughout the basin.

Project Scientist, Deep Creek SWMP Phase II, Volusia County, FL. Brendan evaluated wetlands on a 7.5-square-mile parcel adjacent to Deep Creek. He also conducted transects across to identify ecotones in the riparian zone of Deep Creek. These transects included data on vegetation, soils, and hydrologic indicators.

Senior Environmental Scientist, Solary Stormwater Treatment Facility, City of Winter Springs, FL. Brendan evaluated both state and federal permitting requirements for the potential project. He assisted with the permit application preparation for the USACE nationwide permit and state ERP.

Project Scientist, Little Wekiva River/Lake Lotus Park Regional Stormwater Treatment Facility, Orange County, FL. Brendan served as the project scientist for the preliminary feasibility of alternatives for a regional stormwater treatment facility in the Little Wekiva River basin to help address TMDLs. He evaluated the presence and extents of state and federally jurisdictional wetlands. He also conducted a protected species evaluation. He assessed wetland quality and the potential for wetland re-hydration.

Project Scientist, Jarvis Street Stormwater Improvements Project, Pasco County, FL. Brendan was the environmental task manager responsible for evaluation of environmental resource issues including wetlands, surface waters, and state and federally protected species. He led the field team to conduct the wetland and surface water delineation in addition to the protected species evaluation. He conducted gopher tortoise surveys within the project area. He coordinated with USACE and SWFWMD and led pre-application meetings with each agency in the field and office. He evaluated wetland hydrology within the adjacent wetlands and researched the wetland mitigation areas on adjacent parcels.

Project Scientist, Pinellas Park Water Management District Projects, Pinellas Park, FL. The District is considered a Special District by the State of Florida and is tasked with managing the primary stormwater drainage system for a portion of central Pinellas County. Brendan evaluated state and federal permitting needs for project work including surface water ditch stabilization projects.

Wetland and Ecology Task Leader, Devil's Garden Wetland Reserve Plan of Operation, Hendry County, FL. CDM Smith is preparing a Wetland Reserve Plan of Operation and final engineering plans and specifications for the restoration of over 10,000 acres of historic agricultural areas. Brendan is responsible for the ecological evaluation of the site including evaluating historic conditions, existing conditions, wetland habitat and quality, threatened and endangered species. He is also responsible for the development of post-restoration target communities, the wetland reserve plan of operation, and habitat management plan. He led the wetland team in developing the proposed wetland restoration extents based on SWMM modeling data.

Education
MS - Biological Science;
BS - Forest Environmental Resources

Registration/Certification/Licensing
Professional Wetland Scientist (PWS)

Years of Experience
19

Danielle M. Honour, PE, DWRE

Wetlands, Natural Systems, Water Quality, and Environmental; Permitting/Regulatory

Project Engineer, SWMP Update, City of North Miami, FL. Danielle served as project engineer and task manager for the update to the City of North Miami's SWMP, originally developed in 2000. CDM Smith converted the City's existing hydrologic and hydraulic model using EPA SWMM5. The SWMP update: 1) addressed LOS deficiencies and recommended alternative solutions to mitigate flooding; 2) assessed the City's current floodplain management program as it relates to the Community Rating System (CRS) program; 3) evaluated water quality issues affecting the City; and 4) provided a limited stormwater utility funding analysis to address the proposed long-term capital improvements.

Project Engineer, Lake Worth SWMP, City of Lake Worth, FL. As part of the water quality data evaluation, Danielle reviewed current water quality impairments affecting the City, existing TMDLs, and analyzed current water quality data and trends. Danielle also developed a city-wide pollutant load analysis to evaluate existing conditions as well as the recommended SWMP alternatives using the WMM. These results were used in order to assess the anticipated pollutant load reduction benefits of the proposed BMPs.

Project Manager, Deep Creek Basin SWMP, Volusia County, FL. Danielle served as the project manager for this effort, which included developing a SWMM model for a 164-square-mile watershed in south central Volusia County. Additional tasks included 100-year floodplain mapping, alternatives for deficiencies, and water quality pollutant load analyses.

Project Manager, NPDES Services, Volusia County, FL. Danielle served as project manager for the preparation of Volusia County's Annual NPDES reports. As the County is a Phase II permittee, she assisted the county in becoming familiar with the requirements of the NPDES program and preparing the annual report for compliance with the permit, as well as providing support to the County during regulatory inspections.

Project Engineer, SWMP, Village of Royal Palm Beach, FL. For the Village of Royal Palm Beach in Palm Beach County, Danielle assisted in preparing a SWMP. This project involved delineating sub-basins, identifying flooding problems, and modeling the stormwater system using EPA SWMM.

Project Manager, Watershed Model Peer Review, SWFWMD, FL. CDM Smith was retained by the SWFWMD to perform peer reviews of both the Double Hammock and Lower Coastal regional hydrologic/hydraulic watershed models and floodplain mapping developed by others. Danielle served as project manager, responsible for leading our team in the peer review components of model development (i.e. model input parameters) and simulation results for both calibration simulations as well as design storms (i.e. model development and floodplain delineation). The reviews were done in tandem with completion of milestones by District's watershed management plan consultant.

Project Manager, Recharge & Evapotranspiration (ET) – District-wide Surface Water Model Update, SWFWMD, FL. The SWFWMD Surface Water Model is comprised of 12 HSPF models that cover the entire District and portions of SJRWMD. The Surface Water Model was updated to extend the simulation period to include the years 2007 through 2015. HSPF inputs that were updated included those representing water budget terms including rainfall, potential evapotranspiration (PET), irrigation, diversions, well pumping, and springs. Training was provided to the District in HSPF model application to ensure transition of information and knowledge of the updated models including model file management and documentation of all tasks under the work order. CDM Smith updated existing HSPF hydrologic models, to extend the model simulation period, evaluating the model, and developing a summary report, training curriculum, and instruction of training.

Project Manager, Little Wekiva River/Lake Lotus Park Regional Stormwater Treatment Facility, Orange County, FL. Danielle served as project manager for the preliminary feasibility of alternatives for a regional stormwater treatment facility in the Little Wekiva River basin to help address TMDLs. Feasibility included development of various alternatives, pollutant load estimates and conceptual costs and engaged multiple stakeholders (Orange County, FDOT).

Education
ME - Environmental Engineering;
BS - Civil and Environmental Engineering

Registration/Certification/Licensing
Professional Engineer (FL); DWRE

Years of Experience
21

Seth M. Nehrke, PE, DWRE

Stormwater Design and Construction Standards

Project Engineer/Technical Reviewer, SWMP Update, City of Miami Beach, FL. The City of Miami Beach selected CDM Smith to update the SWMP to meet flooding conditions that are becoming more frequent and noticeable to the community. The technical component of this project required a multi-disciplinary team to address geotechnical, structural, electrical, and civil aspects of a series of projects to control flooding in a tight urban environment. Seth provided technical review of the system stormwater models. Seth also performed statistical analyses of measured tidal data to set project boundary conditions and develop the sea level rise mitigation plan. Additionally, he performed continuous simulation modeling to analyze the combine effect of rainfall and tidal backwater conditions on the existing system as well as the proposed alternatives.

Project Engineer, Modeling to Update SWMP, City of Jacksonville, FL. As project engineer, Seth conducted SWMM stormwater modeling for the City of Jacksonville SWMP, including model setup, calibration, and alternative evaluations for water quality and quantity improvements. Other duties included report writing and technical review of other team members' models.

Project Manager/EOR, Stormwater Design and Permitting, Upper Deer Creek Regional Stormwater Treatment Facility Expansion, City of Jacksonville, FL. Seth acted as project manager and engineer-of-record for the construction design development and permitting of the Upper Deer Creek Regional Stormwater Treatment Facility. Also included was a hydraulic barrier around the east side of the facility to prevent contaminated groundwater intrusion from the adjacent industrial remediation site. The permitted facility provides retrofit treatment for 516 of the 710 highly developed acres in the basin. Chronic flood problems in the area are also reduced by the facility. He provided design, modeling, analysis, and permitting services to maximize the treatment potential while ensuring that the facility complies with all pertinent stormwater regulations.

Project Engineer, Nova Canal Flood Control and Integrated Water Resource Program, Volusia County, FL. After the historic flooding experienced in Volusia County, Florida during the unnamed storm of May 2009, the community stakeholders retained CDM Smith's services to model, design, and permit three flood control structures to mitigate the effects of overland and tidal backflow during storm events. Seth worked as part of a multi-discipline team to successfully complete a Stormwater Modeling Preliminary Engineering Report that was used as the basis of design for the flood control infrastructure design and permitting.

Task Leader, Ashville Park Additional Storage Model, City of Virginia Beach, VA. Seth performed hydraulic and hydrologic modeling to analyze the source of flooding and develop improvement alternatives for the Ashville Park subdivision. Multiple alternatives were analyzed in terms of their hydraulic performance benefit to cost ratio.

Project Engineer, Fort Lauderdale SWMP, City of Fort Lauderdale, FL. Seth worked as part of a multi-discipline team to successfully complete a SWMP assessing water quality and quantity, flood relief, wetlands, dredging, stormwater ordinances, the existing stormwater utility, as well as regulatory issues for the City of Fort Lauderdale. He provided support for the SWMM stormwater modeling the entire city, and took the lead on development of one of four detailed local models. Seth assisted with data collection pertaining to topography, rainfall data, land use, soils, and stormwater infrastructure along with other project hydrogeometric properties. His responsibilities included assisting with model set-up, calibration, control measure evaluation, alternative investigation, statistical analysis, and report writing.

Project Manager/Senior Technical Reviewer, SWMP Update, City of St. Augustine, FL. Seth served as project manager and also provided senior technical review for the St. Augustine's SWMP Update. The update consisted of data collection, hydrologic model development, hydraulic schematic development, priority area modeling and improvement planning; while also incorporating a stormwater utility update evaluation and support. The hydrologic and hydraulic model was performed using SWMM5.

Education
MS - Civil Engineering;
BS - Civil Engineering;
BA - Environmental Studies

Registration/Certification/Licensing
Professional Engineer (FL, GA, LA, MS, TX, CO);
DWRE

Years of Experience
24

Craig A. Gadberry, PE
Cost Estimating

Chief Estimator, Engineer's Opinion of Probable Cost of Construction (OPCC) Estimates, Southeastern US. Mr. Gadberry serves as the chief estimator for all OPCC's for the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisana, Mississippi, North Carolina, South Carolina & Tennessee. His Group routinely estimates over 100 OPCC's every year. The types of projects include Concept/Master Plan, PER/PDR, 30%, 60%, 90% and Bid Design. These OPCC's basis range from unit pricing based on size material, depth, and more to a complete detail design.

Chief Estimator, Leu Gardens Drainage Improvements, City of Orlando, FL. The Leu Gardens Drainage Improvements project removes a downstream stormwater flow constriction that will allow upstream improvements (Colonial Town) to alleviate flooding in multiple problem areas of the City that have experienced chronic flooding for years. CDM Smith was selected to provide engineering services for the first of three phases of this project to improve downstream conveyance and alleviate flooding in three areas of the Colonial Town neighborhood. Distance from ultimate outfall (Lake Rowena) and low topography presented several design challenges. These challenges included developing a comprehensive interconnected storm system to reduce flooding, the need to construct within built-out neighborhood and botanical garden areas, and permitting in regard to peak flows and stages conveyed to downstream receiving waters. Our design team also worked closely with OUC to design water main relocations within limits of construction.

Chief Estimator, Disaster Recovery Services, Palm Beach County, FL. CDM Smith was contracted to perform design-build consulting services for the Palm Beach County Water Utilities Department (PBCWUD) for disaster and recovery. PBCWUD has recognized the need to prepare facilities to withstand a Category 4 or 5 hurricane event and be able to restore services as soon as possible. CDM Smith's role was to provide design, construction management, and/or construction services for hardening, repair, or replacement of facilities owned, operated, or maintained by PBCWUD. We were authorized by PBCWUD to provide design-build services for the hurricane hardening of their facilities for the Customer Service Building, WTP #9, WTP #2, and Central Regional Operations Center. We performed engineering and construction services for improving the survivability of the buildings during a Category 4 or 5 hurricane. Craig served as chief estimator for this project.

Chief Estimator, Bayou Marcus Wetlands Restoration System, Emerald Coast Utilities Authority (ECUA), Escambia County, FL. ECUA contracted CDM Smith to design, permit, and provide construction administration for expansion of the Bayou Marcus Wetland Application System, with a new reclaimed water main and distribution system to the southern portion of the system. The project included the design and construction of approximately 6,000-linear feet of reclaimed water main connecting the BMWRS to the southern portion of the system.

Chief Estimator, Kerr Lake Regional Water System (KLRWS) Progressive Design-Build (PDB) for WTP Process Improvements, City of Henderson, NC. CDM Smith is providing design and construction services for the PDB KLRWS WTP expansion and process improvements. KKLRWS provides daily drinking water to a population of more than 50,000 North Carolinians in four counties, and as growth continues in the service areas, the partner communities have determined to expand the treatment facility to 20-mgd. A Progressive Design-Build form of delivery has been selected by KLRWS. KLRWS has selected a ballasted-flocculation and sedimentation process with carbon adsorption as the primary treatment process to replace the existing conventional sedimentation-flocculation process. This project includes a new ballasted flocculation and sedimentation process with carbon adsorption, a new redundant filter, appurtenances, controls, American Disability Act compliant infrastructure and includes expanding the Water Treatment Plant from 10- to 20-mgd. The facilities to be expanded include: refurbishing the laboratory, new filters, rehabilitating old filters, additional high-service pumping capacity, expanded solids handling, capacity, rehabilitation of the existing clearwell, construction of a redundant clearwell, new conference/training rooms, new bathrooms and kitchen/breakroom, increased parking for visitors, and architectural enhancements of the Administration Building. Craig serves as the chief estimator for this $37M project overseeing the development of the pricing for this first of its kind PDB WTP in NC.

Education
BS - Civil Engineering

Registration/Certification/Licensing
Professional Engineer (FL)

Years of Experience
26

MICHAEL A. ANTINELLI, PE, CFM

LOCAL RESILIENCY/COMMUNITY AND PUBLIC OUTREACH

Position: Principal, Director of Projects & Engineering

Specialization: Project Management, Civil and Coastal Engineering, Floodplain Management, Public Outreach and Engagement

Education: **M.Sc.**, Coastal & Oceanographic Engineering, Univ. of Florida, 2011
B.Sc., Civil Engineering, Univ. of Florida, 2010

Licensure: Professional Engineer, State of Florida (#78513)
Certified Floodplain Manager (US-17-09709)

Affiliations: Sustainability and Resilience Committee (Chair, American Society of Civil Engineers, FL Section); Coasts, Oceans, Ports and Rivers Institute (Chair, South FL Regional Chapter); Association of State Floodplain Managers

KEY QUALIFICATIONS

Michael A. Antinelli, PE, CFM is the Vice President and Director of Projects & Engineering of Brizaga, responsible for the oversight and management of all projects and engineering practices conducted by the firm. He has extensive experience in the practices of coastal, waterfront, and site civil engineering and has managed projects at every level, from initial project planning and conceptual design through construction and project closeout. As a Certified Floodplain Manager, he couples the technical components of engineering with the laws and regulations enforced by the local, state, and federal governing bodies to provide clients with the most comprehensive planning tools in preparation of flood related incidents and disasters, including sea level rise and storm surge. Michael serves as the Chair of the Sustainability and Resilience Committee for the Florida Section of the American Society of Civil Engineers, where he works to engage and educate the civil engineering community relative to the importance and methods of considering the interdependencies between the built environment and its impacts on economic, social, and natural environmental systems. He was selected by his peers as the Engineer of the Year for the Broward Branch of ASCE in 2019.

SELECT PROFESSIONAL EXPERIENCE

Adaptation Guide Prototype for the Bloomberg Mayor's Challenge, City of Miami, FL, 2018 - Completed
Developed content for a prototypical mobile application to provide sea level rise adaptation alternatives to residents of the City of Miami. Developed the prioritization structure to present appropriate adaptation alternatives based upon user responses and flood risk information queried from relevant geodatabases.
Contact: Jane Gilbert, Chief Resilience Officer (305) 416-1048 *Total Project Value: $14,200*

Flood Protection for Vizcaya Museum and Gardens, Vizcaya Museum & Gardens Trust, Inc., 2019 - Ongoing
Performed vulnerability analyses, developed design of flood mitigation systems for protection against the worst-case Category hurricane. Prepared supporting documentation for Florida Emergency Management grant application, including conceptual drawings and cost estimates for the successful application package awarding $194,000 to VMGTI for flood mitigation projects in the highest-rated application submission statewide. Currently in design development phase.
Contact: Joel Hoffman, Executive Director/CEO (305) 860-8452 *Total Project Value: $194,000*

Flood Barrier Technology Development, Mooring Manufacturing, Jupiter, FL 2017 - Ongoing
Engineering and project management of readily deployable, easy-to-use, elegantly designed flood barrier solutions for commercial clients and governmental institutions, including the Port Authority of New York and New Jersey for use in protecting critical infrastructure, and developing design flood conditions consistent with local dynamic coastal processes.
Contact: Kathleen Caputo, President (973) 445-4496 *Total Project Value: $75,000+*

ALEC S. BOGDANOFF, PHD

LOCAL RESILIENCY/COMMUNITY AND PUBLIC OUTREACH

Position: Principal, Director of Science & Communications

Specialization: Resilience Policy and Communications, Public Outreach and Engagement, Outreach Strategy, Meteorology and Oceanography

Education: **Ph.D.**, Physical Oceanography, Massachusetts Institute of Technology (MIT) / Woods Hole Oceanographic Institute (WHOI), 2016
M.S. & **B.S.**, Meteorology, Florida State University, 2010/2008

Affiliations: Resilience Committee (Chair, Greater Fort Lauderdale Chamber of Commerce); American Meteorological Society; American Geophysical Union; Urban Land Institute (Co-Chair, Resilience Committee, SE Florida)

KEY QUALIFICATIONS

Alec Bogdanoff, Ph.D. is a policy-trained oceanographer and meteorologist with nearly two decades of political experience, including managing campaigns. He has extensive experience in simplifying and effectively communicating complex scientific processes with private citizens and other interested parties. As Director of Science and Communication, he is responsible for monitoring and identifying scientific research and advances in the areas of sea level rise and extreme weather, including datasets and models, to further develop internal technologies, as well as strategic communications and public outreach and engagement for Brizaga. Prior to founding Brizaga, Alec served as a John A. Knauss Sea Grant Fellow in the Office of U.S. Senator Edward J. Markey, where he coordinated policy with senior staff, drafted speeches, legislation, policy briefs, oversight letters, and press releases on issues pertaining to the environment, oceans, fisheries, water, and wildlife.

SELECT PROFESSIONAL EXPERIENCE

Fort Lauderdale Cemetery Master Plan, City of Fort Lauderdale, FL, 2018 - Completed
Led the sea level rise vulnerability component of the master planning process, evaluating the risks of sea level rise to site layouts and proposed programming. Conducted research of precedent and provided strategic recommendations and timelines for implementation of best management practices.
Contact: Stacy Spates, Cemetery Administrator (954) 524-2947 *Total Project Value: $238,750*

Business Case Analysis of the Stormwater Resiliency Program, City of Miami Beach, FL, 2018 - Ongoing
Led the individual adaptation portion of the project, examining and quantifying the cost/benefit of various resilience and adaptation measures for individual properties, independently and as part of the larger City-wide stormwater resiliency improvements. Additionally, led the public communication for the entire project in coordination with City staff and other project consultants.
Contact: Susanne Torriente, Chief Resilience Officer (305) 673-7000 *Total Project Value: $395,000*

Storm Water Master Plan Update, City of Miami, FL, 2017 - Ongoing
Directed and provided the outreach and education associated with the City of Miami's Stormwater Mater Plan Update. Served as project manager for the communications and outreach team, which included the development of a communication strategy, assistance with creation of materials for print, social media, and newsletters, and planning and execution of the public outreach meetings. The materials developed were non-technical and designed for consumption by the general public. Our team ensured that all meetings were informative and interactive.
Contact: Sylejman Ujkani, Bond Manager (305) 416-1267 *Total Project Value: $4,300,000*

Presentation list available upon request.

STEPHANIE Y. DUNHAM, PE

Floodplain Management Implementation

Ms. Dunham has supported comprehensive water resource management for public entities ranging from local, county, state, as well as Federal clients. Ms. Dunham is the Vice President of Engineering at Collective. Over her 20+ years as an engineer, Ms. Dunham has managed, developed, and reviewed surface water models as well as integrated surface-groundwater models using tools such as: ICPR, SWMM, and HEC-RAS, often coupled with ArcGIS tools and data management protocols such as ArcHydro. Ms. Dunham modeling experience includes dendritic, non-dendritic, lake, and urbanized/managed systems throughout central and south Florida, central Texas, and Louisiana. Additionally, Ms. Dunham developed an independent peer review technical approach utilized by SWFWMD for hydrologic and hydraulic models to determine whether they had sufficient resolution and accuracy for use in its Environmental Resource Permit review process. Model reviews incorporated both geospatial analysis using ArcGIS as well as statistical analyses using SAS. Throughout her career, Ms. Dunham has collaborated on as well as synthesized results from hydrologic, hydrualic, water quality, natural systems, and economic assessments to develop and prioritize strategies that address flood protection, water supply, natural systems, and public use priorities.

EDUCATION

BS, Civil Engineering, Texas A&M University

MS, Civil Engineering, The University of Texas at Austin

REGISTRATIONS

PE, Florida (59782)

AFFILIATIONS

FFMA

AWRA

SELECTED RELEVANT PROJECT EXPERIENCE

Stormwater Master Plan Modeling and Design Implementation, City of Fort Lauderdale, Broward County, Florida. *Project Manager.* Collective Water Resources is a sub-consultant serving as the stormwater modeling lead for the City of Fort Lauderdale supporting the development and implementation of integrated surface-groundwater models of the City using ICPR4. The models consist of a comprehensive analysis of the existing and proposed stormwater systems throughout the City's ten watersheds, and how they react to different boundary conditions, including future projected sea level rise. Ms. Dunham has completed a comprehensive literature review; developed the conceptual modeling approach and standards that has been applied City-wide; assembled data to address topographic voids – particularly bathymetry; identified field survey needs; performed parameterization with ArcHydro and other ArcGIS tools; leveraged parameters as appropriate from existing MIKE SHE/MIKE 11 (Broward County), SWMM (City of Fort Lauderdale), and SEAWAT (USGS) models encompassing the project area; developed 1D and 2D hydrologic, hydraulic, and groundwater input parameters (including six, projected future water table elevations based on USGS model of response of groundwater to rising tides); directed the model development of three out of ten City watersheds within ICPR4; developed QAQC tools for the independent review of each watershed's parameters and results; verified model results; developed flood inundation mapping and depth grids; and coordinated with Broward County regulatory staff on conceptual permitting of all watershed models. Ms. Dunham also develop the approach used for the City's flood protection level-of-service analysis considering inundation of structures as well as various classifications of roadways.

Marine Way Conceptual Design Stormwater Analyses, City of Delray Beach. *Technical Lead.* Collective Water Resources, as a subconsultant, provided stormwater analysis for conceptual design alternatives of stormwater improvements along Marine Way in the City of Delray Beach, Florida. Area residences have experienced reoccurring flooding due to king tides and the project aims to improve the stormwater system and elevate seawalls to mitigate localized flooding and strengthen community resilience. Collective used ICPR4 with a combination of 1D and 2D surface water components to analyze the existing and proposed stormwater systems to assess the feasibility of proposed seawall and pump

alternatives under existing and future tidal conditions. Existing condition and future condition scenarios based on sea level rise projections were simulated. Ms. Dunham directed the technical approach for parameterization and model development.

Stormwater Master Plan, City of West Palm Beach. *Task Manager.* Ms. Dunham served as task manager facilitating the data collection of stormwater infrastructure and hydrologic characteristics, water quality investigations and modeling, sea level rise vulnerability (SLR) assessment, preparation of the FEMA-prescribed Repetitive Loss Area Analysis, and identification of key opportunities to increase the use of green and sustainable stormwater best management practices and low-impact development. For the SLR vulnerability assessment, Collective investigated the added risk to City infrastructure due to various sea level rise scenarios. Modified sea level and associated groundwater elevation scenarios were simulated in the existing ICPR3 model created for the SWMP to identify impacts to the City.

Highlands County Flood Insurance Rate Map Modernization, Southwest Florida Water Management District. *Project Manager.* Ms. Dunham served as Project Manager overseeing the production of updated Flood Insurance Rate Maps (FIRMs) for Highlands County, Florida, on behalf of the Southwest Florida Water Management District (SWFWMD). Ms. Dunham was responsible for the management and technical reviews of the following: development of a digital terrain model based on three LiDAR data sets as well as two digitized contour data sets; Watershed Evaluations of 34 lakes, Josephine Creek, and the Channel between Lake June-in-Winter and Lake Placid to determine hydrologic and hydraulic characteristics of each flooding source; hydrologic and hydraulic analyses using ICPR3 to establish or update base flood elevations; preparation of a Watershed Management Plan according to SWFWMD's Guidelines and Specifications; response to independent peer review and public review comments; mapping Special Flood Hazard Areas; creating FIRMs per FEMA and SWFWMD specifications; and issuing FIRM products to Highlands County and incorporated communities. Since Highlands County is within the jurisdiction of both SWFMWD and SFWMD, Ms. Dunham coordinated regularly with SFWMD staff and its study contractor to create a single, countywide deliverable for FEMA and local jurisdictions.

Risk Assessment, Mapping, and Planning Partners (RAMPP) Production and Technical Services, FEMA Region VI, Louisiana. *Project Manager.* Ms. Dunham served as a project manager for the Rapides Parish levee analysis and digital Flood Insurance Rate Map (FIRM) revisions under a FEMA Region VI task order. Multiple levees within the parish were not certified according to Federal requirements and lost their provisional accreditation by FEMA, resulting in the need to map the residual risk behind these levees. Ms. Dunham was responsible for discovery, data acquisition and development, stakeholder outreach, coordinating a team of engineering and GIS professionals, technical review of deliverables, and project management. Project discovery included collection of available data for the flood insurance study and FIRM revisions; a meeting with local stakeholders, the U.S. Army Corps of Engineers, and the Red River, Atchafalaya, and Bayou Boeuf (RRABB) Levee District; and preparation of a report according to FEMA Guidelines. Data acquisition and development efforts included the development of digital topographic information, base maps, and hydrologic/hydraulic parameterization necessary to initiate 42.4 miles of detailed study and 7.3 miles of limited detail study utilizing HEC-RAS.

ANNA LEITSCHUH, PE

Floodplain Management Implementation

Anna Leitschuh, P.E. is a Project Manager at Collective Water Resources. She is a water resources engineer focused on hydrologic/hydraulic modeling and GIS analyses and mapping. Her technical expertise includes stormwater master planning, flood control assessment, data management, hydrologic and hydraulic analyses, watershed planning and assessment, and climate change/sea level rise analyses. Her career has been built on readily combining her technical skills in GIS and hydrologic and hydraulic modeling with her ability to create impactful maps and graphics on a wide variety of topics. Ms. Leitschuh is a power user of several notable H&H models, as well as an advanced user of ArcGIS and many extensions complementary to water resources.

EDUCATION

B.S., Ecological Engineering, Oregon State University, 2013

REGISTRATIONS

PE, Florida (84415)

KEY SOFTWARE SKILLSETS

ICPR (all versions, 1D and 2D)

HEC-RAS (1D and 2D)

MIKE-11

SWMM

Arc GIS

ArcHydro

Spatial Analyst

3D Analyst

RELEVANT PROJECT EXPERIENCE

Fort Lauderdale Stormwater Master Plan Modeling and Design Implementation, City of Fort Lauderdale, Fort Lauderdale, FL. *Task Manager*. Collective Water Resources is currently working as a subconsultant to Hazen & Sawyer to develop the Fort Lauderdale Stormwater Master Plan Modeling and Design Implementation approaches. The project will develop a city-wide watershed level stormwater model of the City's ten watersheds and provide solutions for individual neighborhood capital improvement projects. The project analyzes level of service for existing and future sea level rise conditions. Ms. Leitschuh's specific contributions have involved creating 1D/2D ICPR4 models using ArcGIS and AcHydro for development and modeling bridges in HEC-RAS for import into ICPR for three of the ten watersheds within the City. Ms. Leitschuh also assisted with mapping and analyzing floodplains from model outputs, documenting model inputs and results, and developing criteria for the level of service analysis.

West Palm Beach Stormwater Master Plan, City of West Palm Beach, West Palm Beach, Florida. *Task Manager – Sea Level Rise and Climate Change.* Collective Water Resources facilitated the creation of the City of West Palm Beach's Stormwater Master Plan. The plan developed a holistic guide to stormwater management for the next 30 years. Ms. Leitschuh assisted with analyzing areas for future infrastructure replacement and with analyzing the added impact of sea level rise on coastal infrastructure. Ms. Leitschuh constructed future (30 year) model scenarios for sea level rise and groundwater; analyzed model results; mapped floodplain inundation polygons and depth grids for the future sea level rise scenarios; and used the results to identify future risk to critical infrastructure. She also helped

with GIS analysis and mapping for the Community Rating System (CRS) program and prepared maps for the SWMP. Ms. Leitschuh routinely consults with the City on numerous issues related to their ICPR model, floodplains, FEMA grants, and various hydrologic questions that arise.

Marine Way Seawall and Docks Conceptual Stormwater Analyses, City of Delray Beach, Delray Beach, Florida. *Project Manager.* Collective Water Resources is currently a subconsultant to Wantman Group, Inc (WGI) as the lead H&H modelers in the development of plans for the Marine Way corridor. The project aimed to improve the stormwater system to mitigate localized flooding and strengthen community resilience. Collective was responsible for assessing stormwater quantity as input for the design of a seawall, pump, and other stormwater improvements. The modeling included analysis of effects of high tide, King tide, and sea level rise on the existing and proposed project site. Ms. Leitschuh was project manager for this project and was also responsible for gathering and reviewing existing data in GIS; developing an existing conditions ICPR4 (1D, 2D) model; incorporating proposed design elements into the model; and documenting data inputs, model development standards, and results in a technical memorandum. Ms. Leitschuh also prepared exhibits for a series of outreach meetings to explain the effectiveness of various alternatives and various issues related to flooding.

26th Street and Flagler Drive Stormwater Improvements, City of West Palm Beach, West Palm Beach, Florida. *Project Manager.* Collective Water Resources worked as a subconsultant to Holtz Consulting Engineers to develop plans for the 26th Street and Flagler Drive area in West Palm Beach. The existing stormwater pipe along 26th Street was evaluated as part of a condition assessment. Collective was responsible for assessing the hydraulic capacity for the existing and future conditions. The modeling included analysis of effects of sea level rise and future build out on the existing and proposed project site. Ms. Leitschuh was project manager for Collective and was also responsible for downscaling a city-wide model; incorporating proposed design elements into the model; documenting data inputs, model development standards, and results in a technical memorandum; presenting results and recommendations to City staff.

Hazard Mitigation Grant Program Application. City of West Palm Beach, FL. *Water Resources Engineer.* Collective Water developed a Hazard Mitigation Grant Program (HMGP) Application for the installation of tidal valves on six outfalls prone to tidal flooding in the City of West Palm Beach. Ms. Leitschuh was responsible for completing the hydraulic analysis and completing the application for the City of West Palm Beach. The project considered impacts to traffic and road closures due to historic tidal events and due to projected future tidal events with sea level rise. Ms. Leitschuh worked closely with City staff to develop the application on a tight schedule.

Peer Review Support for Vulnerability Analyses and Adaptation Planning, City of West Palm Beach, West Palm Beach, Florida. *Data Analyst.* Collective Water Resources worked with Fernleaf/NEMAC to assist the City of West Palm Beach in examining vulnerability to stormwater and sea level rise. Collective is responsible for reviewing reports, data, models, plans or calculations, and providing supporting datasets. Ms. Leitschuh is responsible for managing datasets in GIS to be provided for the vulnerability analysis.

MARIA C. LOINAZ, PE, PHD

Wetlands, Natural Systems, Water Quality, and Environmental

Ms. Loinaz is a Principal Engineer with Collective Water Resources. She is an experienced water resources engineer specializing in modeling of hydraulic / hydrologic systems and water quality, with an emphasis on surface water and groundwater interactions. Her experience includes numerous water resources applications, such as regional watershed restoration and planning studies, stormwater master plans, flood control assessments, wetland impacts studies, sea level rise scenarios, stormwater treatment areas, and reservoir design.

EDUCATION

PhD Department of Environmental Engineering, Technical University of Denmark

M.E. Department of Environmental Engineering Sciences, University of Florida

B.A. Environmental Studies, Washington University, St. Louis, MO

PE, Florida (68443)

SELECTED RELEVANT PROJECT EXPERIENCE

STA-1W Expansion Area #2 Preliminary Design Project, South Florida Water Management District *Lead Hydrologic/Hydraulic Modeler.* The Stormwater Treatment Area (STA)-1W Expansion Project consists of approximately 6,500 acres of STA expansion to the existing STA-1W. Expansion Area #2 is the proposed 2,000-acre addition to the 4,500-acre Expansion Area#1, which is currently in construction phase. The project evaluated several configuration alternatives for the preliminary design of the Expansion Area #2. In order to rank the performance of each alternative, evaluation criteria were defined based on hydraulic performance parameters, and other considerations, such as cost and operational feasibility. The hydraulic performance was evaluated with a surface water model of the entire STA-1W and Expansion #1 and #2 Area. One-dimensional (1D - MIKE 11) and 2D (ICPR4 and MIKE FLOOD) surface water modeling tools were conduct the alternative analysis and to optimize the infrastructure of the preferred alternative.

EAA A-2 Storage Reservoir and Treatment Wetlands Feasibility Study, SFWMD. *Lead Hydrologic/Hydraulic Modeler.* The project evaluated alternatives for the construction of the A-2 reservoir in the Everglades Agricultural Area with a storage capacity of 240,000 ac-ft and a 6,500-acre STA. Surface water models (MIKE 11) were developed to perform hydraulic design calculations associated with sizing of the reservoir inflow and outflow canals, seepage canals, and control structures. A 3-dimensional (3D) groundwater model coupled to a surface water model (MIKE SHE/MIKE 11) was developed to predict the potential groundwater seepage impacts of the reservoir into the adjacent lands using. The 3D groundwater model seepage output was compared and calibrated to the output of a fine scale 2D seepage model of the reservoir embankment. Verification of the groundwater model with MODFLOW different models were conducted. Several seepage management alternatives that included various depths of a seepage cutoff wall, seepage canal depths, as well as operational levels were evaluated to find optimal and cost-effective solutions. In addition, 1D and 2D (MIKE 11 and ICPR4) surface water models were developed in support of the preliminary design of the STA portion of the project. The hydraulic performance of several configuration alternatives for the STA are evaluated using several hydraulic measures representative of treatment efficiency. These will be assessed against other variables such as construction, operation and maintenance costs. The preferred alternative will be the optimized using the 1D and 2D models and established designed criteria by the SFWMD, as well as key measures for a high performing STA.

Flood Protection Level of Services for Basins C7, C8, C9: Identification and Mitigation of Sea Level Rise Impacts, SFWMD. *Lead Hydrologic/Hydraulic Modeler.* This project involved the development of sea level rise scenario evaluations using a modified version of the Miami-Dade County XP-SWMM models. The model scenarios included predicted sea level rise tidal boundaries developed by SFWMD methodologies and predicted groundwater changes by the USGS for three sea level rise projections and four design storm events. Numerous hydraulic performance measures were evaluated, including a GIS analysis of the subbasins Level of Service (LOS) under current conditions and future sea level rise

conditions. The model was used to evaluate various alternatives to mitigate the impact of sea level rise under design storm event conditions.

C139 FEB Conceptual Design Evaluation, SFWMD. *Hydrologic/Hydraulic Modeling Reviewer.* The proposed C-139 Flow Equalization Basin (FEB) is an approximately 11,000-acre-foot shallow impoundment located south of Deer Fence Canal and west of Stormwater Treatment Area (STA) 5/6 Flow Way 3 on the northern approximate 2,800 acres of the C-139 Annex. SFWMD intends for the C-139 FEB to attenuate peak runoff flows and temporarily store a portion of the stormwater runoff before conveying it to STA 5/6. The current project concept includes 690 cfs inflow pump station, an outflow structure, and seepage pump station. Interior design features include internal embankments designed to reduce wind fetch lengths and therefore the wind and wave runup. Internal embankments also increase the flow path and decreases the hydraulic efficiency between the inlet and the outlet. The H&H model review included a review of the interior works model and dam breach analysis, which were conducted using the 2D overland flow components of ICPR4.

Western Basins Water Resources Evaluation Project, SFWMD *Lead Hydrologic/Hydraulic/Water Quality Modeler.* The project evaluated potential hydrologic and water quality improvements for basins which discharge directly into the Everglades Protection Area without going through a stormwater treatment area. An integrated surface water and groundwater and a phosphorus model (MIKE SHE/MIKE 11/ECOLab) of the Western Basin was developed to evaluate improvement measures and the evaluation of the potential impacts of the measures. The study area is characterized by a complex hydrogeology of varying degrees of aquifer confinement, where intense irrigation for agriculture is extracted from the confined aquifer. The excess runoff from agricultural fields are routed to a system of above-ground impoundments controlled by local and regional operable structures.

STA-1W Expansion Area #1 Design Project, SFWMD. *Lead Hydrologic/Hydrologic Modeler.* Hydraulic modeling was conducted to determine the most effective flow patterns to maximize nutrient retention and design the infrastructure needed for the 4,227-acre Expansion Area #1. One-dimensional (MIKE 11) and 1D-2D model (MIKE FLOOD) for numerous climatic (low flow and high flow) conditions were developed. Long-term (41-year) and short-term (design storm) simulations were conducted to optimize the hydraulic infrastructure for nutrient treatment while ensuring that the system can withstand extreme weather conditions. Results generated by the model were used in the wind setup and wave run-up analyses to determine the cell embankment heights. In addition, a 2D model of the Expansion #1 was developed to simulate flow distribution in the new STA treatment cells and velocities near the designed infrastructure. Various types of model results and optimization techniques were utilized to place and size the canals and structures in the STA expansion area to comply with various design criteria parameters.

Kissimmee Watershed Hydrologic Assessment, Modeling, and Operations Planning, SFWMD. *Lead Hydraulic/Hydrologic Modeler.* The modeling effort for this project included the following phases of the project: development and calibration of a detailed integrated surface and groundwater model; adaptation of the calibrated model into a future conditions model (which include Kissimmee River restoration projects); development of numerous alternatives using a water budget model (developed in OASIS) to be used as a screening tool; development of selected alternatives in the surface water model; and development of the final alternatives in the integrated surface water and groundwater model (MIKE SHE/MIKE 11). The objective of the project was to assess how existing operating criteria for water control structures can be modified to achieve a more acceptable balance between flood control, irrigation demands, water supply, aquatic plant management, and the natural resource requirements in the watershed.

Picayune Strand Restoration Project, SFWMD. *Lead Hydrologic/Hydraulic Modeler.* An existing integrated surface water and groundwater model (MIKE SHE/MIKE11) of the Picayune Strand Area in Collier County, Florida was refined and updated. Improved topographic and hydrostratigraphic information was incorporated into the model and the model was recalibrated to provide results that could be reliably used to design three large pump stations and supporting infrastructure that will be used to restore Picayune Strand. A combination of design events and long-term simulations were used to assess the benefits of the restoration project on the hydrology of Picayune Strand and impacts to adjacent developed areas.

Janine M. Alexander, PE

Stormwater Design and Construction Standards

Ms. Alexander has more than 23 years of utility experience, including project management for stormwater design, new facility design, relocations of existing facilities, utility coordination, permitting, construction management and administration, inspections, and certifications for numerous public and private-sector projects. She has worked with the City of Hollywood on multiple projects for over 5 years. Ms. Alexandar has successful relationships with the City's staff and stakeholders and is very knowledgeable of the City's processes and goals for their projects while protecting the community.

EXPERIENCE

Stormwater Pump Stations and Control Structures Assessments and Rehabilitation of Pump Stations SW-01 to SW-10, City of Hollywood, FL. 2019 –Ongoing. Principal-in-Charge/Quality Manager for condition assessment and rehabilitation of the City's stormwater pump stations and upstream control structures, including backflow prevention valves. Mr. Caban will serve to deliver the City's expectations successfully on this project for condition assessment, design permitting, and construction. Pump Station SW-02, located on South Lake and within this project's area, will be rehabilitated and raised to coordinate with the latest seawall elevation recommendations, since the pump station's two discharge pipes currently pass above the existing seawall. Tetra Tech will assess the condition of the City's stormwater pump stations and develop a phased capital program, to include pump station rehabilitation and upstream improvements in the vicinity of the pump stations, including control structures and backflow prevention valves.

Flagler County Airport Master Stormwater System Design, Flagler County, FL. 2003–2004. Project Engineer. Master stormwater system design and SJRWMD Individual permit modification for a 513-acre site including conceptual plan for future industrial areas adjacent to airport runways, stormwater modeling, construction plans, environmental resource permitting for SJRWMD and ACOE. Project also included 8.0 acres of wetland and upland mitigation using the UMAM method, and coordination for the environmental assessment site report.

Sugarberry Ditch Drainage Improvements, City of Oviedo, Seminole County, FL. 2003. Project Engineer. Stormwater system design and analysis to eliminate erosion problems in a drainage system located in Alafaya Woods Subdivision, Phase XXI. Design included converting an open drainage system to a closed drainage system as well as replacing and modifying inlets. Project included coordination and data collection, sub-basin mapping and inventory, secondary system modeling and design, preliminary design and construction plans, meetings with City staff, final construction plans, cost estimates, coordination with the SFRWMD for permitting, bidding and construction administration services including shop drawing review, RPR inspections, pay application review and City coordination.

Pump Stations D10 and D11 Flow Analysis and Redesign Project, City of Ft. Lauderdale, FL. 2016–2019. Project Manager. Wastewater flow analysis due to increased land use densities from single family residential to condo and multifamily uses and evaluation of existing duplex pump stations (PS) and upstream influent manholes for rehabilitation or replacement for two city pump stations located adjacent to East Las Olas Boulevard on the Isle of Venice (PS

Education:

BS, Environmental Engineering, University of Central Florida, 1996

Registrations/Certifications:

Professional Engineer:
Florida, No. 59244, 2003
Texas, No. 133420, 2019

Transportation Security Administration Clearance, 2020

NPDES-Certified Inspector, 2005 and 2012

NASSCO's Pipeline Assessment Certification Program (PACP), Lateral Assessment Certification Program (LACP), and Manhole Assessment Certification Program (MACP) Certified, U-714-06021906, 2014-2020

NASSCO's ITC Program for CIPP, Certified ITC Inspector, CIPP-714-0201409, 2014

NASSCO's ITC Program for MH Rehabilitation, Certified ITC Inspector, MR-316-0100343, 2014

OSHA 30-Hour Training for Construction Safety and Health, No. 36-601193051, 2014

Dale Carnegie Effective Communication and Public Speaking, 12-week course

Dale Carnegie Sales Advantage, 8-week course

Dale Carnegie Leadership, 6-week course

Leadership Award Winner, 2012

Professional Affiliations:

Tau Beta Pi National Engineering Honor Society

Chi Epsilon National Civil Engineering Honor Society

Office:

Hollywood, Florida

Years of Experience:

23

Years with Tetra Tech:

(08/2014) 5

D10) and Hendricks Isle (PS D11). Preparation of preliminary design memorandum including findings and recommendations for rehabilitation and replacement and associated costs, and survey, design, permitting and construction administration services for the rehabilitation and removal and replacement of infrastructure. Pump stations have 6-inch FMs that discharge into a gravity sewer system on East Las Olas Boulevard. Second project phase included PS upgrades for D10 and D11 with new pumps and wetwell and valve vault piping, coating, new control panels and conduit, new upstream discharge piping and manhole(s) and CIPP lining with coordination with the City for gravity sewer mains to be lined. Permitting included Broward Co. DOH for each lift station, gravity sewer piping and manholes. Bidding and construction administration services were also provided including recommendation of award, reference checks, progress meetings, shop drawing reviews/approvals, RFIs, substantial and final certifications and punch lists, final clearances and record drawings.

Flagler County Administrative Complex, Flagler County, FL. 2004–2005. Project Engineer. Master stormwater system design including ICPR modeling, design drawings, construction plan preparation, environmental resource permitting for SJRWMD and ACOE.

Hollywood Boulevard JPA, N. 21st Ave. to City Hall, City of Hollywood, FL. 2016–2018. Senior Project Manager. Design, permitting, bidding, and construction administration of 335 feet of 20-inch DR-11 HDPE casing pipe with 14-inch DR-11 HDPE carrier pipe installed via HDD under the Florida East Coast (FEC) Railroad ROW and 3,000 feet of existing 8-inch water main piping upsized to 12-inch water main piping, new fire hydrants and existing hydrant reconnections, new water services and meter reconnections and abandoning the 8-inch water main and grouting it in place. Permitting includes Broward Co. Health/DOH, Broward Co. ROW Use permitting, Broward Co. Traffic Engineering permitting, coordination with FDOT due to stormwater, hardscape and roadway improvements as part of the JPA agreement process. Construction services include meetings, shop drawing reviews, RFIs, review and approval of change orders, field reviews, record drawings, obtaining clearances, and substantial and final completion inspections.

Water Main Replacement Program, City of Hollywood, FL. Senior Project Manager. Tetra Tech is providing surveying, geotechnical evaluations, design, permitting, and construction administration services on multiple projects concurrently. To date, Tetra Tech's program project comprises over 225,000 LF (42 miles) of water main replacement, over 1,000 service connections, new fire hydrants, conflict resolution for numerous underground and overhead utilities, permitting through multiple regulatory agencies, and construction within schedule and budget. The projects are also State Resolving Funded (SRF) projects, which included document control, payroll reviews, and compliance reviews for Davis Bacon, at American Iron and Steel (AIS), and other requirements.

Water Main Replacement Program: Hollywood Blvd. to Sheridan Street, N. Dixie Highway to Federal Highway (US1), City of Hollywood, FL. 2015–2020. Senior Project Manager. Design, permitting and construction administration services for replacement of 100,000 feet of 2- through 16-inch diameter PVC and DIP water mains, fire hydrants, and water service lines, including meter relocation for 157 lots in residential and commercial streets and alleyways. Project also includes three FEC railroad crossings Polk St., Johnson St., and Taft St. Pavement restoration, maintenance of traffic, and lane closure analyses were also included. Permitting includes Broward Co. right-of-way use for N. 21st Avenue, FEC railroad permitting, FDOT utility permit for US1, DOH water system permit, and City of Hollywood Bldg. Department permitting. Construction administration services included shop drawings, requests for additional information, review and approval of change orders, field observations, obtaining clearances, substantial and final completion punch list preparation and record drawing preparation.

Water Main Replacement Program: Federal Highway (US1) from Polk Street to Sheridan Street, City of Hollywood, FL. 2015–2018. Senior Project Engineer. Design, permitting, bidding, and construction administration services for the east side of Federal Highway (US1) including 7,400 feet of 12-inch water main, 100 feet of 16-inch water main, 14 new fire hydrants and reconnections to existing side streets varying from 2 to 16 inches in diameter. Permitting included FDOT utility permitting and a DOH general permit for the water system. Plans also contained pavement removal and replacement, marking/striping plans and MOT details. The 8-inch water main along the east side of US1 was grout filled and placed out of service. Construction administration services included progress meetings, review of shop drawings, RFIs, field observations, obtaining clearances, substantial and final completion punch list preparation and record drawing preparation.

Roderick K. Cashe, PE, CDT, LEED™ AP

Capital Improvements Program

General Introduction

Mr. Cashe is a stormwater management expert with extensive experience serving both in the public and private sectors of civil and environmental engineering. He also serves as Tetra Tech's Civil Engineering Discipline Leader for the southeastern region and is responsible for staff in six offices in three states: Florida, Tennessee, and Kentucky.

Mr. Cashe has statewide experience, in over 45 counties, in the areas of civil/site engineering for public and private facilities; stormwater management planning and engineering design; hydrologic and hydraulic modeling for city-wide infrastructure and regional stormwater management facilities and best management practices; stormwater pump stations for flood control; design, permitting and construction administration of stormwater Capital Improvement Program (CIP) projects for water quality and flood control; infrastructure engineering for utilities, including force mains, water mains, gravity sewer, and sanitary lift stations; and commercial, institutional, residential, and multi-family site development. In addition, he has extensive experience with the Federal Emergency Management Agency (FEMA) map revision process for the management of floodplains. He has also served in prominent roles on projects in multiple states including Georgia, Alabama, Tennessee, Utah, Texas, and Ohio.

Education:

BS, Civil Engineering, University of Florida, 1987

Graduate Courses at the University of Central Florida

Registrations/Certifications:

Professional Engineer:
Florida, No. 45169, 1992
Georgia, PE037524, 2012

National Construction Documents Technologist (CDT)

FDEP Qualified Stormwater Management Inspector, No. 5366

Green Building Certification Institute LEED AP

Professional Affiliations:

American Society of Civil Engineers

Florida Engineering Society

Florida Stormwater Association

Office Location:

Orlando, Florida

Total Years of Experience:

(1987) 32

Years with Tetra Tech:

(08/1992) 27

Stormwater Management Experience Bio

Mr. Cashe has a comprehensive background in stormwater management. He understands and has obtained numerous permits from Florida's five water management districts. He has managed or served as lead technical professional for 19 stormwater master plans and served as Engineer of Record for two city-wide hydrologic and hydraulic models using AdICPR for one and InfoSWWM on the other. He is an expert in the design and permitting of conventional and innovative best management practices (BMPs) with experience supporting municipal clients in the evaluation of BMPs for meeting Best Management Action Plan (BMAP) requirements. In addition, Mr. Cashe has an extensive background in the implementation of municipal capital improvement projects including hydraulic and hydrologic modeling, preliminary design reports, design, permitting, bid support, and construction administration. He is proficient in the preparation of construction

EXPERIENCE

Stormwater

Stormwater Master Plan Update, City of Deltona, FL. 2008. Project Manager to update the City's adopted 1998 Stormwater Master Plan. The project included hydraulic and hydrologic modeling for select drainage basins to establish provisional base flood elevations that will be attached to the City's next FEMA Letter of Map Revision application. It also included updating the City's Capital Improvements Plan list and their rehabilitation and replacement projects to refine the stormwater budget. In addition, it included an update to a financial analysis of the City's stormwater management program to assess potential changes to their stormwater utility fee.

Stormwater Master Plan, Walton County, FL. 2002. Project Manager for the final plan completion. Project area encompassed the entire county and included data gathering and needs assessment; inventory and mapping; establishment of levels of service and prioritization criteria; O&M requirements and practices; water quantity and quality assessment; a Financial Resource Plan for funding future improvements; and recommendations for retrofit remediation of top projects.

Stormwater Master Plans. Project Manager. For the following clients: Fort Myers Beach (2017), New Smyrna Beach Islesboro Subdivision (2015), Village of Key Biscayne (2010), City of Deltona Stormwater Master Plan Updates (2003, 2008), City of Bonita Springs (2002), Flagler Beach (2002), City of Orange City (1994)

Stormwater Master Plans. Lead Technical Professional. For the following clients: Hendry County (2009), Walton County (2001), City of Flagler Beach (2002), City of Fernandina Beach (1995, 1998)

Stormwater Master Plans (total):

- Edgewater, FL. 1991. 22.2 square miles; 14,000 acres; 21 miles of canals
- Orange City, FL. 1994. 6.0 square miles; 3,800 acres
- Phase 1, Fernandina Beach, FL. 1995. 11.0 square miles; 7,000 acres; plus Phase 1 CIP Projects
- Palatka, FL. 1997. 7.0 square miles; 4,480 acres; focused on water quality retrofits
- Live Oak, FL. 1998. 14,000 acres; 40 landlocked basins
- Phase 2, Fernandina Beach, FL. 1998. 11.0 square miles; 7,000 acres; plus Phase 2 CIP Projects
- Walton County, FL. 2001. 1,058 square miles; 677,120 acres; 5 watersheds; 20 basins
- Bonita Springs, FL. 2002. 33.6 square miles; 21,500 acres; including canals and infrastructure
- Flagler Beach, FL. 2002. 3.7 square miles; 2,400 acres
- Phase 1, Deltona, FL. 2003. 32.0 square miles; 21,120 acres; 4 watersheds; over 220 sub-basins; 160 landlocked
- San Souci West, Jacksonville, FL. 2003. 1.7 square miles; 1,150 acres; box culverts, canals, and large diameter culverts)
- Minneola, FL. 2003. 3.2 square miles; 2,100 acres
- Naples, FL. 2007. 12 square miles; 11,800 acres
- Harsh Marsh Flood Study, LeHigh Acres, FL. 2007. 49 square miles; 32,340 acres
- Phase 2, Deltona, FL. 2008. 24.1 square miles; 15,000 acres; update for pumping and additional FEMA zones
- Hendry County, FL. 2009. 1.5 square miles; 1,000 acres
- Key Biscayne, FL. 2010. 1.3 square miles; 830 acres
- Islesboro Subdivision, New Smyrna Beach, FL. 2015. 1.0 square mile; 600 acres; 2D hydraulic and hydrologic using ICPR version 3
- Fort Myers Beach, FL. 2017. 8.0 square miles; 5,280 acres; 2D hydraulic and hydrologic using PCSWMM

Stormwater Management Procedures and Policies Manual. Gadsden County, the Cities of Edgewater and Orange City, Florida.

Stormwater Master Plan, City of Bonita Springs, FL. 2000. Project Manager for the preparation of a stormwater master plan for forty square miles of land within the City limits with a population of 60,000 during the peak season, occurring during winter. The plan prioritized flooding problems in the City and contained a preliminary AdICPR analysis of the top three problem areas. The top problem area involved modeling the hydraulic conditions for the Imperial River containing a watershed of over 55,000 acres. This section of the river flooded within the City and displaced over 120 residents from their homes and shut down an evacuation route.

TETRA TECH

Richard Czlapinski, PE, D.CE

Funding and Grant Management

Mr. Czlapinski is a registered professional engineer in several states and has 47 years of professional experience in civil and coastal engineering. He has extensive experience in project feasibility and design studies, hydrodynamic, hydrothermal and contaminant transport modeling, dredging and coastal sediment transport investigations and sea level rise vulnerability assessments. He is a coastal engineering diplomate with the Academy of Coastal, Ocean, Port, and Navigation Engineers (ACOPNE) and served as an Executive Committee member the of the ACOPNE Board of Trustees from 2009-2014 and its President for 2012-2013.

He has managed and served as engineer of record on award winning projects. These include The Fort Pierce City Marina Reconstruction project that project received the Industrial Fabrics Association International – International Achievement Award of Excellence – geotextile fabrics category 2014; the American Society of Civil Engineers – Project Excellence Award - large project category 2016; and the National Association of Environmental Professionals Excellence Award 2017; and the Manatee Pocket Dredging Program that received a Project Award for environmental enhancement from the Florida Association of Environmental Professionals in 2010.

TETRA TECH PROJECT EXPERIENCE

FEMA Grant Management, Scituate, MA (07/2019-ongoing) 100-RCE-T39737

Lead Coastal Engineer. Providing technical assistance in documenting damages, applying for FEMA public assistance and hazard damage mitigation grants and implementation of the repairs/replacement of coastal facilities. Scituate experienced 5 coastal disasters dating back to Hurricane Sandy in 2012 with some facilities being damaged by multiple storms. The project is assisting the Town in working through the FEMA grant processes that have been complicated by multiple storm events. To date several large revetment repair projects have received FEMA funding approval and are in bidding and construction phases.

Living Breakwater, New York Governor's Office for Storm Recovery, Staten Island, NY (03/2015-01/2019) 100-ATL-T34025

Independent Technical Reviewer. Provided ITR reviews of coastal engineering elements of the project throughout its design. The project includes field investigations, design and permitting of a large rubble mound living breakwater project to protect the southeast coast of Staten Island and to environmental enhance the offshore waters. HUD sponsored its Rebuild by Design competition to encourage Post-Sandy resilient reconstruction in an innovative and sustainable manner. The Living Breakwater project received $60 million in funding as a result of this competition.

Living Breakwater, Alabama Department of Conservation and Natural Resources, Point aux Pins, AL (04/2017-ongoing) 100-FFX-T36310

Project Manager, Engineer of Record and lead coastal engineer. Responsible for the design of a 4,200 ft-long living offshore segmented breakwater system to protect the eroding marsh shoreline at the site. Developed the design for an

EDUCATION

Post-Masters Professional Degree, OE Ocean Engineering, Massachusetts Institute of Technology (1975)

MS, Ocean Engineering, Massachusetts Institute of Technology (1975)

BCE, Civil Engineering, University of Detroit (1969)

REGISTRATION/CERTIFICATION

Professional Engineer, Civil: (issue/expire dates)

AL License No. 37717 (2018/2021)

FL License No. 42834 (1990/2021)

HI License No. 12608 (2007/2022)

LA License No. 33412 (2007/2022)

NC License No. 12157 (1984/2020)

NJ License No. 23886 (1977/2022)

NY License No. 99200 (2018/2021)

SC License No. 9712 (1983/2020)

PROFESSIONAL AFFILIATION

Diplomate, Coastal Engineering, Academy of Coastal, Ocean, Port and Navigation Engineers (President – 2012-2013)

American Society of Civil Engineers

Florida Association of Environmental Professionals

YEARS OF EXPERIENCE

47 Years

YEARS WITH TETRA TECH

19 Years

OFFICE LOCATION

Boynton Beach, FL

AREAS OF EXPERTISE

Coastal Structure Design

Coastal Processes Modeling

Hydrodynamic Modeling

Marina Design

Value Engineering

offshore segmented breakwater complex that is intended to reduce damaging wave energy on the existing marsh shoreline of Point aux Pins as well as to provide a breakwater substrate suitable for the recruitment of marine benthic species. The project includes field investigations, design, permitting, modeling of storm surge and waves, development of construction documents, bidding support, construction observation and post-construction environmental monitoring for 5 years. The project is currently in the bidding phase.

Fort Pierce Marina Reconstruction, City of Fort Pierce, Fort Pierce, FL (04/2005-05/2015) 100-ATL-T27981, 100-ATL-T28933
Project Manager. Led design and permitting of the replacement and expansion of the City Marina that was destroyed in the hurricanes of 2004. The project includes a complex of 13 breakwater islands to protect the marina. The project received the Industrial Fabrics Association International – International Achievement Award of Excellence – geotextile fabrics category 2014; the American Society of Civil Engineers – Project Excellence Award - 2016; and the National Association of Environmental Professionals Excellence Award - 2017.

Living with the Bay, New York Governor's Office for Storm Recovery, Long Island, NY (2017-ongoing) 100-RCE-T37773
Lead Coastal Engineer. Led the estuarine elements of a coastal and riverine flood protection design program consisting of several individual projects on Hewlett Bay and Mill River in Hempstead on Long Island. The largest project is a feasibility study to restore a 1,600 acre marsh system that is loosing area due to sea level rise and marsh edge erosion. Restoring the marsh could improve local community resilience to coastal flooding by attenuating storm surge and associated waves. Another project consists of the design of 2,100 ft of living shoreline to stabilize the banks of the Mill River at the upper end of its tidal range in conjunction with other flood mitigation measures. Analysis included 2D hydraulic modeling of the lower Mill River to demonstrate the proposed improvements would not have an adverse effect on flood water elevations in the floodplain.

Quillayute River Assessment, Quileute Tribe, La Push, WA (09/19 – ongoing) 100-RCE-T39977
Lead Coastal Engineer. Responsible for the hydrologic analysis of peak flows in the river basin and tidal conditions at the Pacific Ocean mouth. The effects of coastal storm surges, long term sea level rise and tsunami flooding were also considered. The project consists of an evaluation of flooding conditions on Tribal lands and the development of fish-friendly approaches to stabilize riverbanks and minimize flooding.

Coastal Revetment Design, Naval Facilities Engineering Command Northwest, NAS Whidbey Island, WA (2011- 2012, 2015-2016, and 2016-2018) 106-3578
Lead Coastal Engineer. Led design of a rock revetment to stabilize the Puget Sound shoreline of a naval air station in Washington. The project successfully weathered a severe winter storm estimated to be near 100-year conditions in intensity shortly after its completion. NAVFAC highlighted the coastal and environmental design aspects of the project in an article in its May 2013 edition of its Environmental Restoration News.

Pineda Causeway Failure, Florida Department of Transportation, Brevard County, FL (1999)
Technical Investigator and Expert Witness. Provided technical expertise for the failure of the four-mile long articulated concrete block revetment on Pineda Causeway in Brevard County, Florida, including design and cost estimates for repairs, and expert witness services on behalf of DOT in their case against the design-build contractor.

Carol L. Hufnagel, PE

Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development

Ms. Hufnagel is a recognized national expert in the planning and evaluation of drainage and sewerage systems impacted by wet weather flow. A major component of this planning effort has been the incorporation of stormwater management practices, or green stormwater infrastructure (GSI), into regional or City-wide master plans. These planning documents focus on community goals, specific local conditions and feasible institutional structures that help to determine which approaches are most beneficial and cost effective. Her background includes hydrologic and hydraulic analyses, selection and implementation of a wide variety of control technologies, regulatory and financial assessments and public and stakeholder outreach. Ms. Hufnagel has been engaged in GSI efforts in Detroit, Omaha, St. Louis and Pittsburgh. These widely varying institutional settings and economically positioned communities highlight the critical importance of tailoring green infrastructure to the community circumstances, priorities and opportunities. She also led the development of the WEF publication, "Green Infrastructure Implementation", with a primary focus on programmatic aspects of green infrastructure and how to implement it from an institutional perspective.

Education:

MS, Civil Engineering, University of Michigan, 1991

BS, Civil Engineering, University of Michigan, 1984

Registrations/Certifications:

Professional Engineer:
Michigan, No. 34561, 1989
Ohio, No. 65862, 2003
Georgia, No. PE036917, 2012
Kentucky, No. 26639, 2009
Missouri, No. PE-2008019730, 2008
Nebraska, No. E-13028, 2009
New York, No. 097630-1, 2017
Pennsylvania, No. PE075749, 2008
Texas, No. 111988, 2012

Professional Affiliations:

Water Environment Federation

American Society of Civil Engineers

Office:

Ann Arbor, Michigan

Years of Experience:

(1984) 35

Years of Experience:

(09/1984) 35

Green Infrastructure

Green Stormwater Infrastructure (GSI) Program Management, Detroit Water and Sewerage Department (DWSD), Detroit, MI. 2013–2019**.** Program Manager (2013–2017). Technical Advisor (2017–2019). Activities included: program management and administration; planning, evaluation, and selection of projects; coordination with institutional partners and agencies for implementation of those projects; project design; public outreach and stakeholder coordination; and project implementation. Additional activities include code and ordinance development, interdepartmental coordination and support for DWSD's drainage charge program. Planning work included a specialized prioritization framework that ranked locations for GSI based on the relative cost of traditional stormwater management projects, areas of localized flooding, potential to provide social benefit to the area, and other local factors. Project selection was enhanced with the application of the hydraulic model to define areas where practices could be most beneficial. The program defined three primary approaches to achieve project implementation. These were: municipally implemented projects; incentivized private retrofits (through drainage charge credits and grants); and privately required projects (through code and ordinance development). Throughout the work, emphasis on managing a maximum amount of area (whether public or privately owned) through distributed or regional practices was included. Maintenance concerns were also considered in planning through an emphasis on regional public practices and private responsibility to maintain site practices.

Green Infrastructure Plan, City of Omaha, NE. 2013–2018. Project Manager. Study and design phases of green infrastructure projects specifically intended to reduce stormwater entering the City's combined sewer overflow (CSO) control program. Evaluation included identification of a broad range of opportunities, and the development and assessment of green infrastructure projects that will maximize the amount of area managed for the least cost. The evaluation included identification of a broad range of opportunities, including review of the existing drainage system and determining the size and configuration of the projects. Evaluation criteria was developed that considered key aspects of the potential projects: feasibility (both technical and institutional), impact (amount of area managed through a single project), cost effectiveness, and additional benefits. Overall, five major neighborhood scale projects were selected for initial implementation, each managing between 50 and 200 acres of tributary area. Projects were

identified based on opportunities available in the existing system configuration, such as open space in proximity to larger stormwater conveyances.

Green Infrastructure Plan, St. Louis MSD, MO. 2015. Technical Advisor to St. Louis MSD staff who internally prepared their consent decree required green infrastructure plan. Ms. Hufnagel assisted in identification of strategies to implement green infrastructure for maximum benefit and regulatory compliance. St. Louis MSD was looking to maximize the benefit of a planned $100 million investment in GSI. Strategies included: coupling stormwater management with flood mitigation, regional practices, and grants to developers to increase stormwater management on parcels.

National Demonstration of Advanced Drainage Concepts Using Green Infrastructure for CSO Control, Kansas City, MO. 2008–2012. Co-investigator and author for report entitled "Prioritizing and Selecting Green Infrastructure in Combined Sewer Service Areas," a technical report which assessed best practices and application of green infrastructure to programs in 12 major cities. The report was prepared as a special product of the overall study and evaluated the extent to which green infrastructure was blended with traditional controls to achieve regulatory compliance. Best practices for opportunity identification, program implementation, and technical evaluations (GIS, modeling) were reviewed. Issues of regulatory acceptance, embodiment of green infrastructure into consent decrees and strategies to inter-jurisdictional issues that may result in barriers to implementation were included in the assessment. Work in Kansas City involved the performance assessment and evaluation of a 100-acre distributed system of green infrastructure practices to control CSO discharges. Acted as the technical advisor to the base project. Cost: $1.2M.

Green Infrastructure Assessment for CSO Control Plan, City of Defiance, OH. 2015. Technical Advisor. Supplemental green infrastructure assessment for the CSO Long Term Control Plan.

Green Infrastructure Planning and Citizen Tool, 3 Rivers Wet Weather, Pittsburgh, PA. 2012. Concept development/technical advisor. Development of a web-based system to provide municipal officials, engineers, and property owners in the ALCOSAN service area with a means for integrating green infrastructure into the region's wet weather plan in a way that is appropriate, cost-effective, and sustainable. Project evaluated the optimal locations for green infrastructure placement to reduce combined sewer overflows and generated a computerized placement tool that assesses hydrologic and physical characteristics in selected areas. Product included best management practice (BMP) response curves for unique combination of BMP type, soil type and slope in SWMM and SUSTAIN for use in the back end of a web-based BMP placement and performance assessment tool. Cost: $200K.

Publications

Green Infrastructure Implementation, a Special Publication. Served as Task Force Chair. Water Environment Federation Publication 2015. Lead author for introductory chapter and maintenance chapter.

Prioritizing Green Infrastructure in Detroit's Urban Landscape. Jamie Brescol, Carol Hufnagel, Tom Jackson, Palencia Mobley. WEFTEC 2017

Green Infrastructure in CSO Control Programs: The Dollars Must Make Sense. Carol Hufnagel. WEFTEC 2016. Subsequently published in *Water Environment and Technology Magazine (WET)* July 2017.

Implementing Cost Effective Green Infrastructure for CSO Control in Omaha. Carol L. Hufnagel, P.E., S. Struck, J. Theiler. WEFTEC 2014

Core Elements of Green Infrastructure Programs for CSO Control. Carol L. Hufnagel, Scott D. Struck. WEF Stormwater Conference 2012.

Prioritizing and Selecting Green Infrastructure in Combined Sewer System Service Areas. Scott D. Struck, Ph.D., Carol L. Hufnagel, P.E., Megan Monroe, Shannon Gray. For USEPA, Office of Research and Development. January 2012.

TETRA TECH

Sujoy B. Roy

Sustainable Infrastructure, Vulnerability Planning, and Design Criteria Development

EXPERIENCE SUMMARY

Over his 25-year career with Tetra Tech, Dr. Roy has led several major interdisciplinary water-sector and related infrastructure projects across the United States and internationally, with a particular focus on climate change and adaptation. Major completed studies include: evaluation of climate change impacts on water supplies from the Los Angeles Aqueduct and plans for adaptation; evaluation of sea level rise vulnerability and adaptation planning for a major federal facility on San Francisco Bay; a national study on the role of climate change on future water withdrawals; and a planning study on the adaptation of agriculture in San Joaquin Valley to potential climate change and other regulatory drivers. His work has involved guidance for climate risk assessment for new infrastructure funding for the Inter-American Development Bank, and guidance, a toolkit for greenhouse emissions planning for global water sector investments by the World Bank Group, and Stormwater Master Planning trends in extreme precipitation study.

Dr. Roy served on the Science Advisory Board of the US Environmental Protection Agency (2009-2015). He served on National Academy of Sciences panels on Missouri River Basin restoration and on Clean Water Act Implementation across the Mississippi Basin.

RELEVANT EXPERIENCE

Trends in Extreme Precipitation in Seattle for Stormwater Master Planning, Seattle Public Utilities

Updated intensity-duration-frequency curves for precipitation in Seattle in support of future designs for its combined sewer system, performed using a 5-minute precipitation record (1977-2019). Estimated extreme precipitation return frequencies (from 1-year to 1000-year return periods) and from 5-minute to 1-week durations. This dataset was also examined for trends in extreme precipitation over four decades, and showed statistically significant increases in intense rainfall in Seattle. This analysis supports incorporation of climate change in future design of sewer overflow infrastructure.

Project Completion Date: 2020

Construction Completion Date: N/A

Cost: $30,0000

Climate Impact Assessment in Orange County Integrated Regional Water Management Plan (Orange County, CA)

Developed analysis in support of the integrated regional water management plan to address both adaptation to the effects of climate change and mitigation of greenhouse gas emissions. Included consideration of impacts to water supply infrastructure and water demand, flooding risk to water and wastewater infrastructure, sea level rise, and impacts to aquatic habitat.

Project Completion Date: 2017

Construction Completion Date: N/A

Cost: $53,000

Salinity Trends in the California Delta as Related to Freshwater Flows, Metropolitan Water District of Southern California (San Francisco Bay-Delta, CA)

EDUCATION

Ph.D., Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, Pa, 1995

M.S., Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, Pa, 1992

B. Tech., Civil Engineering, Indian Institute of Technology, New Delhi, India, 1990

AREA OF EXPERTISE

Water supply and demand assessment

Climate change impact assessment

Water quality modeling in freshwater and estuarine systems

REGISTRATIONS/ AFFILIATIONS

American Water Resources Association

American Geophysical Union

YEARS OF EXPERIENCE

25

CONTACT

sujoy.roy@tetratech.com

The position of the low salinity zone in the San Francisco Bay-Delta, given its correlation with the abundance of several estuarine species, is used for water management in a system that supplies water to more than 20 million people and contains one of the most diverse ecosystems on the Pacific Coast. This work consolidated legacy and modern salinity data to develop a complete daily record spanning nine decades. The position of the low salinity zone reveals statistically significant trends consistent with increasing water demands and introduction of upstream reservoirs, e.g. increasing salinity trends in wet months and decreasing salinity trends in dry months. Reservoir effects are particularly apparent in drier years, with greater seasonal variability in the early part of the record before major reservoirs operated in the watershed.

Project Completion Date: 2016

Construction Completion Date: N/A

Cost: $ 220,000

Climate Change Adaptation Study for San Joaquin Valley, National Science Foundation (San Joaquin Valley, CA)

This project integrates water, agricultural and economic aspects into a modeling framework to examine scenarios that represent adaptation to climate pressures. The hydrologic response of the system is modeled in the mountain watersheds, largely deriving their supply from snowmelt; in the reservoirs through an operations model for California, CalSim; and through modeling of flows and diversions in the valley floor. Climate change will drive changes in upper elevation runoff quantity and timing, modulated through reservoir releases. Water demands in the valley floor will change with increasing temperature and affect water quality, which is already severely impaired in the basin. The overall goal is to identify pathways of change and adaptation for one of the most productive agricultural areas in the US.

Project Completion Date: 2019

Construction Completion Date: N/A

Cost: $ 720,000

Model for Assessing Greenhouse Gas Emissions for Water Sector Projects for World Bank Group (Washington, D.C.)

Developed a tool to evaluate the impacts on future World Bank lending for water sector projects including for water and wastewater treatment, desalination, new surface reservoir development, irrigation water supply and flood control. The goal is to provide an approach for computing the greenhouse gas emissions, applicable globally, that can allow the bank to estimate the net impacts of its funded projects.

Project Completion Date: 2018

Construction Completion Date: N/A

Cost: $123,000

Evaluation of Thermoelectric, Agricultural, and Municipal Water Consumption in a National Water Resources Framework. This study developed estimates of water consumption in the US for three major sectors: thermoelectric, agricultural, and municipal. Together, their withdrawals constitute nearly 90% of the total freshwater withdrawals. The work involved the development of a hydrologic modeling framework at the scale of 2,100 individual watersheds, supported by data compilation across many different sectors and uses. The goal of the analysis was to represent water availability, withdrawal, and consumption, at a level of mechanistic detail that can be explained by the national-scale data. This work provided a modeled estimate of crop water consumption, developed a consistent representation of water consumption at the power plant level nationally, and estimated municipal water consumption.

Project Completion Date: 2015

Construction Completion Date: N/A

Cost: $400,000

TMDL for Organic Carbon, Nutrients and Mercury in Suisun Marsh

Suisun Marsh is one of the largest brackish wetlands in western North America and currently listed on the Clean Water Act (CWA) 303 (d) list for impairment by metals, nutrients, organic enrichment/low dissolved oxygen and salinity/TDS/chlorides. We developed a conceptual model/impairment assessment (CMIA) report for Suisun marsh focusing on these constituents and a technical TMDL for the following constituents associated with impairment: dissolved oxygen, organic carbon, and mercury. The TMDL was adopted by the State Board and USEOA over 2018-2019.

Project Completion Date: 2017

Construction Completion Date: N/A

Cost: $ 320,000

Christopher Zavatsky, PE

Permitting/Regulatory; Stormwater Design and Construction Standards

Mr. Zavatsky has 13 years of planning and design experience on a wide range of civil engineering projects in both the public and private sectors. He has worked with the City of Hollywood on multiple projects and is committed to meeting the City's goals and objectives. His project experience encompasses stormwater design and management, environmental site assessments; soil and groundwater remediation; water treatment and wastewater pre-treatment systems; water and wastewater pump stations and transmission lines; site planning; earthwork; drainage systems; paving and grading; erosion control/stormwater pollution prevention; signing and pavement marking; and specifications. He performs QC reviews, construction engineering inspections, fieldwork activities for verification of construction installation prior to project certification. He has taken the lead on engineering design, permitting, construction inspections, contract administration and project closeout for roadway and site civil engineering projects in residential, commercial and industrial projects in Broward, Hendry, Hillsborough, Miami-Dade, Palm Beach and St. Lucie Counties. Having worked as a Project Manager and Task Leader, Mr. Zavatsky is well prepared to complete utility and site civil engineering projects successfully including coordination with clients, sub-consultants, permitting agencies, contractors and the supervision of design/production personnel and the implementation of an effective quality control/quality assurance plan (QA/QC).

He is also experienced with ArcGIS, AutoCAD Civil 3D, AutoTurn, Cascade, HydroCAD, ICPR, Microsoft Project, and StormCAD.

Education:
BS, Civil Engineering,
University of Miami, May 2007

BS, Architectural Engineering,
University of Miami, May 2007

Registrations/Certifications:
Professional Engineer,
Florida, No. 76885, 2014

Professional Affiliations:
American Society of Civil Engineers, No. 441937

American Water Works Association, No. 02930103

Office Location:
Miami, FL

Total Years of Experience:
(2007) 13

Years with Tetra Tech:
(11/2015) 4

EXPERIENCE

Stormwater Pump Stations and Control Structures Assessments and Rehabilitation of Pump Station SW-02, City of Hollywood, FL. 2019 – 2020. for condition assessment and rehabilitation of the City's stormwater pump stations and upstream control structures, including backflow prevention valves. Mr. Caban will serve to deliver the City's expectations successfully on this project for condition assessment, design permitting, and construction. Pump Station SW-02, located on South Lake and within this project's area, will be rehabilitated and raised to coordinate with the latest seawall elevation recommendations, since the pump station's two discharge pipes currently pass above the existing seawall. Tetra Tech will assess the condition of the City's stormwater pump stations and develop a phased capital program, to include pump station rehabilitation and upstream improvements in the vicinity of the pump stations, including control structures and backflow prevention valves.

MS4 Assessment Plan, Village of Key Biscayne, FL. Project Manager. The Village of Key Biscayne is a co-permittee to Cycle 4 of the Miami-Dade County (County) National Pollution Discharge Elimination System (NPDES) Phase I Municipal Separate Storm Sewer Systems (MS4) Permit. Mr. Zavatsky was responsible for developing and submitting an Assessment Program to the Florida Department of Environmental Protection (FDEP) for review and approval within 12 months of the permit issuance. The purpose of the Assessment Program is to outline a process for the permittee to determine the overall effectiveness of the permittee's Stormwater Management Program (SWMP) in reducing stormwater pollutant loadings from their MS4.

NPDES Annual Report, Village of Key Biscayne, FL. Project Engineer/Manager. Responsible for preparation of annual National Pollutant Discharge Elimination System (NPDES) reports, submittal to Miami-Dade County DRER and FDEP; reapplication assistance; and responding to comments from FDEP. The Village of Key Biscayne is a co-permittee with Miami-Dade County for their National Pollutant Discharge Elimination System (NPDES) Permit. This project involved coordination with Village staff in the Building, Zoning, and Planning Department and in the Public Works Department to prepare and submit the FDEP Annual Report Form for Individual NPDES Permits for Municipal Separate Storm Sewer Systems (MS4) joined with supporting documents on the Monitoring Program, Fiscal Analysis, and Evaluation of Effectiveness of the Stormwater Management Program for Load Reduction. This annual NPDES report for Year 7 of Permit Cycle 3 was then submitted to Miami-Dade County Department of Regulatory and Economic Resources (RER) and the Florida Department of Environmental Protection (FDEP). No comments were received.

Flood Control Stormwater Pump Stations Consent Decree, Commonwealth of Puerto Rico Department of Natural and Environmental Resources, San Juan, PR. 2016 – 2017. Senior Engineer. This project included support to the Commonwealth of Puerto Rico 11 Department of Natural and Environmental Resources (DNER) to address the requirements of consent decree between the DNER and the United States Environmental Protection Agency (EPA). The project included evaluation of the condition of three flood control stations in the municipality of San Juan, as well as recommendations to reduce discharges of contaminants to bodies of water to the United States.

Water Main Replacement Program: Pembroke to Hollywood Boulevard, City of Hollywood, FL. 2017 – 2018. Assistant Engineer. Supported the coordination and review of survey and geotechnical reports. Tetra Tech assisted the City of Hollywood in designing and permitting the replacement of aged water main infrastructure in the neighborhoods of Lawn Acres and Washington Park. Tetra Tech's scope of work included: water main confirmations and coordination, surveying, utilities verification, subsurface utility evaluations, geotechnical, final design, permitting, bidding assistance, and construction services. The City has an ongoing water main replacement program and has identified the area from Pembroke Road to Hollywood Boulevard between N. 52 and 56 Avenues and SR 441 as a project for Tetra Tech to design under the General Engineering Consulting Services contract. The water main improvements consist of approximately 70,000 feet of 2-inch, 4-inch, 6-inch, 8-inch, 12-inch, and 16-inch diameter water mains along local City streets and easements. These improvements involve upgrading 2-inch and 6-inch diameter water mains one nominal size and replacing 4-inch, 8-inch, 12-inch, and 16-inch diameter water mains with the same nominal size. The existing utilities were replaced with new PVC water mains, isolation valves, fire hydrants, and water services. Water meter and boxes remain within easements or street rights-of-ways. Easements were restored to preconstruction condition. The design did not cross the rights-of-way at Hollywood Boulevard or SR 441. The water main along Pembroke Road and the water main on the southern side of Hollywood Boulevard were replaced. The new water mains were connected to existing water mains on the east side of SR 441. The City owns and operates various water, wastewater and stormwater utility infrastructure within the project right-of-way. Other existing utilities that typically share the right-of-way include power, telephone, cable, gas utilities, and others.

Royal Poinciana Sewer Expansion, City of Hollywood, FL. 2017 –2019. Project Engineer for septic to sanitary conversion project from Sheridan Boulevard south to Taft Street and from Federal Highway (US1) to N. 21st Avenue. Project included three preliminary sanitary sewer system design layouts for addition of a new lift station location on Coolidge Street, evaluation of the existing E-22 lift station at the current location, and a split-flow plan for flows being directed to a lift station at both E-22 and Coolidge Street. Prepared a preliminary routing and flow evaluation technical memo for approval prior to the final design layout and lift station siting. Performed land use/flow calculations using Broward County flows for each land use type, the various land use densities, and proposed future development, when necessary. The project consisted of approximately 80,000 feet of new gravity sewer piping ranging from 8- to 12-inches in diameter, over 100 new manholes, laterals to each parcel for future connections and abandonment of the existing septic tanks, abandonment and placing out of service five existing private lift stations with associated tie-ins to the new gravity sewer system, abandonment and placing out of service existing force main piping ranging from 4- to 6-inches in diameter, conflict resolution and soft digs due to the heavily congested corridors with existing utilities and duct banks, and relocation of water mains where necessary. In addition, the project included lift station siting, new duplex lift station design to handle the area's wastewater flows, and new control panel and electrical, mechanical, and structural system design. Permitting includes Broward County Environmental Protection and Growth Management (EPGMD) and City of Hollywood Building Department permitting for the wastewater system and Broward County right-of-way use for facilities located on N. 21st Avenue. Services included bidding services and evaluations with recommendation of award and construction administration services including monthly progress meetings, field inspections, review and approval of shop drawings, requests for information responses, record drawing production, substantial and final completions and certifications.

5-Year Environmental Resource Permit (ERP) Recertification, Broward County, TX. Assistant Project Engineer. Performed field visits to 20+ educational facilities for the School Board of Broward County's (SBBC) to inspect all drainage structures to create a punch list of maintenance items to be addressed by a contractor, then verified that the work was completed and recertified the drainage system.

Outfall O-13, Village of Key Biscayne, FL. NPDES Coordinator. Tetra Tech assisted the Village of Key Biscayne in preparing a design and drainage easement for the relocation of Outfall O-13 located on Harbor Point, a private roadway with easements for utilities and roadway. Mr. Zavatsky coordinated with Miami-Dade County Department of Regulatory and Economic Resources (RER) verifying the construction measures necessary to comply with NPDES requirements for construction on and adjacent to a waterbody directly connected to Biscayne Bay, an impaired waterway as designated by the South Florida Water Management District.

Tobon Engineering

Engineering and Utility Management

Maurice Tobon, PE, PMP

Capital Improvements Program

Education

M.E. – Civil Engineering, University of Florida (92)

B.S. – Civil Engineering, University of Florida (90)

Registration

Professional Engineer: Florida (License No. 49373)

Project Management Professional (PMP)

President of ***Tobon Engineering*** and a professional water engineer with over 30 years of experience in water, wastewater, stormwater, reclaimed water engineering, climate change and utilities management in south Florida and internationally. Served for over fifteen years at the highest management levels of two of the largest water utilities in south Florida **(Palm Beach County and City of Fort Lauderdale)** and was responsible for nearly $ 1 billion in program management capital improvements. Unique experience and insight from being in government for many years and understands the issues faced by water and wastewater utilities. Responsible for formulating sustainable infrastructure solutions in line with strategic visions and key intended outcomes and missions as defined by the Executive Administration.

Professional History

2016 to present *Tobon Engineering*, **President**

2007 to 2016 *Palm Beach County Water Utilities Department*, **Director of Engineering/Program Manager**

1997 to 2007 *City of Fort Lauderdale,* **Engineering Design Manager/Assistant Program Manager**

1990 to 1997 *Camp Dresser & McKee Inc.,* **Project Manager**

STORMWATER

Environmental Services Manager Division Manager, City of Fort Lauderdale Public Services, Florida. Promoted to division manager with the responsibility of the Environmental Services Division. The division was responsible for storm water maintenance, inspection and capital planning, enforcement of pre-treatment ordinance and permitting.

Engineering Design Manager, Stormwater Management Analysis River Oaks and Edgewood Communities, City of Fort Lauderdale Public Services, Florida. The project was for the development of options to deal with repetitive flooding on these two neighborhoods. The recommendations produced by the consultant in this report for these areas was included with the gravity sewer extension project into these areas. Mr. Tobon was actively involved as technical review and responsibility to include the improvements into the *Waterworks 2011* Program.

Project Engineering, NW Industrial Area Sanitary and Stormwater Improvements, City of Fort Lauderdale Public Services, Florida. Project manager for a multimillion-dollar Special Assessment project to extend sanitary sewer and stormwater to an area east of Executive Airport. The stormwater was composed of french drains, swales and positive drainage. The project was designed by a consultant with Mr. Tobon being responsible for managing the

design and construction for the City. Also Mr. Tobon was responsible for the Special Assessment including public hearings.

Project Engineering, Prospect Lake Stormwater Interconnect, City of Fort Lauderdale Public Services, Florida. Project manager for a project to interconnect Prospect Lake to the regional canal system. The completion of this project allowed the City to capture excess stormwater discharges to the regional system and divert them into Prospect Lake. Prospect Lake recharged raw water wells that supplied the Fiveash WTP. Mr. Tobon was responsible for managing the consultant and construction.

MASTERPLANS

Consultant, Reclaimed Water Master Plan, Palm Beach County Water Utilities Department, ongoing. Mr. Tobon is responsible for reclaimed water system data analysis including historical and projected yearly, monthly, daily and hourly demands. Development of the reclaimed water hydraulic model which was integrated with the Broward County reclaimed model. The integrated hydraulic model is being used to determine pipe sizing, booster station location, storage requirements, and extent of reclaimed water availability.

Consultant, Town of Davie Water and Wastewater Master Plan, ongoing, Town of Davie Utilities Department. Mr. Tobon is responsible for water and wastewater system data analysis including historical and projected water yearly, monthly, daily and hourly flows from the treatment plants into the distribution and collection systems. Data analyses includes rainfall variations and their impact on wastewater flows. Serve as a technical advisor for the development of a 20-year capital improvement program.

Director of Engineering, 2012 Water and Wastewater Masterplan, Palm Beach County Water Utilities Department. This project was for the development of the 2012 Water and Wastewater Masterplan for Palm Beach County Water Utilities Department. Both masterplans recommended over 500 million dollars in capital projects which served as the basis for ongoing Capital Improvement Program. The masterplans were developed by consultants under the direction and supervision of Mr. Tobon.

Director of Engineering, 2014 Glades Region Water and Wastewater Masterplan, Palm Beach County Water Utilities. This project provided the creation of the first Water and Wastewater Masterplan for the municipalities of South Bay, Belle Glade and Pahokee. The masterplan summarized the existing conditions of the water and wastewater systems, created hydraulic models for water and wastewater collection systems and prioritized improvements including treatment systems. The masterplans were developed by consultants under the direction and supervision of Mr. Tobon.

Engineering Design Manager, 2007 Water and Wastewater Masterplan, City of Fort Lauderdale Public Services, Florida. Both master plans developed over 550 million dollars in capital projects, which served as the basis for *Waterwork 2011 Program Management*. Consultants under the guidance, direction and supervision of Mr. Tobon developed the Masterplans.

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