

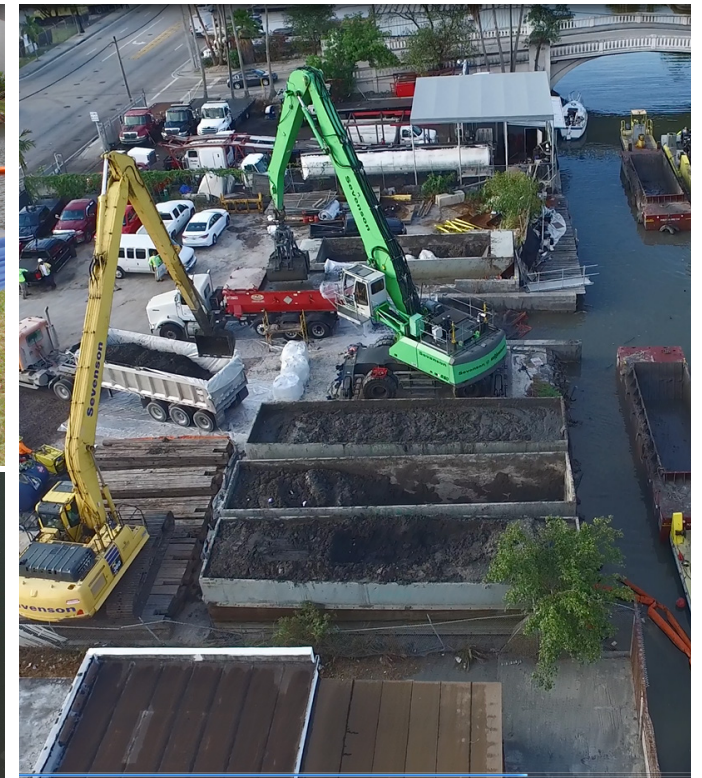
**2018 WEDA ENVIRONMENTAL EXCELLENCE AWARDS**  
Environmental Dredging Award Application

# WAGNER CREEK AND SEYBOLD CANAL RESTORATION PROJECT

City of Miami Project Number: B-50643

Submitted by  
Sevenson Environmental Services, Inc.  
and  
AECOM

May 4, 2018



**2018 WEDA 2018 WEDA ENVIRONMENTAL EXCELLENCE AWARDS**  
**Environmental Dredging Award Application**  
WAGNER CREEK AND SEYBOLD CANAL RESTORATION PROJECT  
City of Miami Project Number: B-50643

May 4, 2018

Western Dredging Association  
Attn: Craig Vogt, Chair, Environmental Commission

via email: Craig@CraigVogt.com

**RE: 2018 WEDA ENVIRONMENTAL EXCELLENCE AWARDS**  
Environmental Dredging Award Application

Dear Mr. Vogt,

Attached please find the Severson/AECOM application for the 2018 WEDA Environmental Excellence Awards in the category of **Environmental Dredging** for the dredging and restoration of Wagner Creek and Seybold Canal (designated as Outstanding Florida Water), in the City of Miami, Miami-Dade County, Florida. These waterways drain directly into to the Miami River, which discharges into the Biscayne Bay Aquatic Preserve and nearby Manatee Protection Zones. Wagner Creek was deemed Florida's most polluted waterbody. Due to the protracted history of dioxin contamination in Wagner Creek, sediment build up in these waterways, and location in one of Miami's most populated urban areas, created numerous logistical challenges that prevented the removal of these sediments for decades.

The project is eligible for the Environmental Dredging Award due to the numerous logistical challenges and rigorous permitting requirements for dredging contaminated sediments in a densely populated area and the effective execution of the Severson /AECOM dredge plan that allowed for these historic and vital waterways to finally be restored. An innovative approach was needed to allow for a mechanical dredge solution to comply with the strict environmental, logistical, and time constraint requirements for this project. Dredging activities were required in manatee habitats and the utmost protection and preventive measures were needed to prevent any injury or adverse impact to these threatened marine species. The dredge work was also performed without causing adverse impacts to the 156-aging seawall and revetment structures that are in various forms of disrepair and are vulnerable to collapse at any time. A healthy and safe work environment was maintained without incidents (60,000 safe man-hours). Associated public outreach activities successfully promoted communication between the project team, boat owners, civic groups, businesses, residents and regulatory agencies. Public meetings stimulated meaningful discussions and a deep understanding of environmental issues affecting the surrounding neighborhoods and a mixed-use urban zone known as the Health District.

The environmental restoration of Wagner Creek and Seybold Canal stimulated new and innovative solutions for protecting marine, residential and industrial communities that can be utilized for future dredging work in other densely populated urban areas. The project team's commitment to the success of the environmental cleanup of this urban waterway cannot be understated. Thank you for your time and consideration.

Sincerely,

Mike Crystal  
Vice President, Severson



Daniel J. Levy, P.G.  
Vice President, AECOM

## I. PROJECT SUMMARY

### PROJECT DESCRIPTION

Sevenson Environmental Services (SES; Dredge Contractor), in conjunction with AECOM (Engineer/Designer), provided Design-Build services to the City of Miami to remove contaminated (dioxin) sediment from Wagner Creek. The total project costs were \$18.4M. These waterways drain directly into the Miami River and are considered the most contaminated waterways in the state of Florida. The sediments in Wagner Creek contained elevated levels of dioxins; and dredging was needed to remove the contaminated sediments and to restore this aquatic habitat and manatee refuge area, as well as restore the drainage features of these waterways, which are designated as an Outstanding Florida Water (OFW).

Wagner Creek, located in one of the most densely populated sections of Miami, presented numerous logistical challenges that prevented the removal of contaminated sediments for decades. Due to the sensitive ecological habitat, dense urban setting, and limited time constraints of the City's sediment dredging grant funding sources, a dredging solution was needed that could be permitted within 90 days from contract award. Hydraulic dredging was deemed too costly and non-permittable by the regulatory agencies (Miami-Dade Department of Environmental Resources Management; DERM), Florida Department of Environmental Protection (FDEP), and the U.S. Army Corps of Engineers (USACE). Placement of a long-term Confined Disposal Facility (CDF) for dewatering of the contaminated dredge material and the large dewatering volumes required with hydraulic dredging presented an elevated risk to the surrounding school children that reside in the area. Therefore, an innovative

approach was needed to allow for a mechanical dredge solution to comply with the strict environmental, logistical, and time constraints requirements for this project.

To solve this problem, SES/AECOM (the Team) collaborated and developed an innovative solution that provided compliance with these rigorous constraints, which included working adjacent to Jackson Memorial Hospital (Level 1 Trauma Center), Veterans Affairs (VA) Hospital, residential areas, and multiple government and commercial buildings. The Team was also tasked with developing a manatee protection plan to prevent impacts to this threatened species. The permits issued for this project had major emphasis on providing the utmost manatee protection to prevent even the remote possibility of a manatee injury. The Team employed over seven qualified manatee observers to perform this critical task. The Team also performed a structural assessment of the affronting seawalls and revetments along this 1.6-mile waterway. The inspection identified 156 structures in various forms of disrepair that were vulnerable to collapse at any time.

An innovative dredging approach, using custom-built dredge equipment that would minimize impact to the surrounding residential neighborhoods and traverse the limited upland access points was needed to restore highly polluted waterways (Wagner Creek). Associated public outreach activities successfully promoted communication between the project team, property/boat owners, civic groups, residents, and agencies. Public meetings stimulated meaningful discussions and a deep understanding of environmental issues affecting the surrounding neighborhoods and a mixed-use urban zone known as the Health District.

### PROJECT GOALS

The project's primary objectives were to remove dioxin-contaminated sediments and restore the stormwater capacity to combat the flooding impacts from sea level rise, hurricanes, etc., and reduce the risk from spreading contamination in this densely populated historic neighborhood and improve vessel navigation. To focus on protecting public safety and the natural environment of this urban waterway, it was divided into six unique operational sections (OSs), which allowed for the economy of this thriving mixed-use area along the Miami River District to be maintained during the dredging operations.

### CRITICAL SUCCESSES

Funded by the City of Miami, the Florida Inland Navigation District, and the FDEP, and in partnership with the City's Capital Improvements Office, the Miami River Commission, the Nature Conservancy, and various civic organizations, the Team successfully and efficiently completed the restoration of the waterway on budget, on schedule, and in compliance with applicable permits. Under our specialized manatee observer team's supervision, dredging was completed without a single manatee injury. Along with the numerous logistical issues listed above observing manatees during the nighttime posed another challenge, which was handled by specialized equipment. As these water bodies are tidally influenced, special equipment was used to handle the King Tides and several episodes of tidal variations. The project team conducted a unified community outreach effort by working in close cooperation with all the stakeholders. This cohesive effort successfully promoted a clear understanding of environmental issues associated with restoring the six OSs, resulting in a functional waterway for the benefit of the community at large.

**Accomplishments include:**

- Restored the most contaminated waterway in Florida
- Developed a cost-effective dredging solution for a problem that remained unresolvable for decades
- Designed and built customized dredging equipment
- Maintained control of the sediments from cradle to grave (removal, transport, and final disposal)
- Successfully dredged the sediments without causing adverse impacts to the 156 failing seawall and revetment structures identified along these canals
- Preserved a healthy and safe work environment without incidents (almost 60,000 safe man-hours)
- Maintained regular and effective communications with the agencies and the community
- Received public acknowledgement during the "Miami River Day" Festival



**II. PROJECT TEAM**

**Project Owner:**

City of Miami Capital Improvements Office



**Nominating Entity:**

Sevenson/AECOM



**WEDA Membership Status:**

Active, Mike Crystal  
 Active, Dan Levy, PG



Key Team Members	Role	Organization
Jose Lago	Project Manager	City of Miami
Robert Fenton	Construction Project Manager	City of Miami
Alicia Alvarez	Public Information Officer	City of Miami
Mike Crystal	Vice President	SES
Martin Folan	Project Manager	SES
Tim Donegan	Engineering Manager	SES
Dan Levy	Project Manager	AECOM
Babu Madabhushi	Deputy Project Manager	AECOM
Jim Collins	Senior Technical Advisor	AECOM
Mike Giovannozzi	Design Engineer	AECOM
Jenn King	Public Information Officer	AECOM
Amparo Vargas	Deputy Public Information Officer	AECOM

### III. ENVIRONMENTAL BENEFITS

#### 1. What are the environmental benefits?

Considering the contamination and the logistical challenges with this project, the environmental benefits of the Wagner Creek project are enormously significant to the state of Florida and the 2.8 million residents that call Miami home. The removal of the contaminated sediments containing, but not limited, to dioxins, lead, and fecal coliform restored one of Miami's critical aquatic habitats and improved critical stormwater drainage to combat the effects of sea level rise, and created a safer, cleaner, and more navigable waterway for the millions of people and tourists that live in or visit this tropical paradise. Biodiversity and wildlife will increase as project improvements create healthier habitats, improved drainage, and flood protection, and restore the area to a good ecological state. During one of our public meetings, the residents from the northern sections of the project area were ecstatic that they have not experienced flooding, even after a major rain event, due to the increased capacity (post dredging) of Wagner Creek. Also noted was an improvement in water clarity.

#### 2. What unique environmental challenges were addressed?

Work was conducted in proximity to the Biscayne Bay Aquatic Preserve; the Miami River, which is designated by the USEPA as an OFW; and a Manatee Sanctuary; and Wagner Creek traverses through residential/commercial areas. Access to numerous sections of the project was severely limited by roads and structures. Dredging operations were conducted in constrained

areas within a highly urban space. Work zones adjacent to a noise-sensitive Health District; work zones adjacent to a well-utilized urban park; a hyperactive and catastrophic hurricane season, including a Category 4 Hurricane Irma that directly impacted the dredging operations; unstable atmospheric conditions, high humidity, intense solar radiation, and frequent thunderstorms accompanied by strong wind gusts; lightning, and intense rainfall; heavy flood zones; unexpected turbidity control issues due to tidal influence (King Tides); work zones that fell within the Spring Garden Historic District; and presence of one Endangered marine animal, West Indian manatee. The dioxin-contaminated sediments had to be surgically removed, as they were required to be handled separately and disposed of at an out-of-state hazardous waste landfill. The team's water quality protection measures successfully met the project's zero (0) NTU discharge standard. These sediments had to be transported in watertight containers to an off-site staging area for dewatering and stabilization/solidification prior to transportation and disposal.

#### 3. Were any mitigation measures adopted? If so, list out the measures.

Yes, the Team implemented several mitigation measures to address the numerous challenges described earlier. These mitigation measures are as follows:

1. Site-specific dredge offsets were established for each of the six OSs (OS-1 through OS-6) to prevent impacts to the 156 failing structures and to prevent collapse or catastrophic failure of these structures, which included the delaminated and failing sheet pile surrounding

Jackson Memorial Hospital, a key component of the City's critical infrastructure.

2. Use of aqua dams and sheet piles to contain and seal off the active dredge area. Aqua dams were designed to:
  - a. Neutralize the tidal effects and mitigate the impacts of flooding from the seasonal King Tides.
  - b. Prevent manatees from entering the work zones and not hurt them even with a contact.
  - c. Control turbidity and prevent contaminant transport downstream to OFW of Miami River.
  - d. Maintain a higher than average water level to create additional draft for the dredge equipment to access shallow areas of the creek (some of which were less than 5 inches deep during low tide).
  - e. Reduce flooding impacts. The aqua dam was engineered and installed so as to be removed immediately in case of a severe storm event and/or hurricane (both of which occurred during the dredging operations).
3. Manatee barriers were installed downstream of the dredge area to prevent manatee interaction with the dredge operations, yet allow other marine life to travel freely.
4. Manatee Observers were strategically placed throughout the project to monitor and track manatee movements. A pod of over 15 manatees was observed downstream at the manatee barrier during one of the dredging events.

5. SES/AECOM relocated the City's previously designated on-site neighborhood staging areas to **several** off-site staging areas in an industrial park to reduce the adverse impacts to local residents.
6. Site-specific Maintenance of Traffic plans (MOTs) were prepared to address the traffic and entrance/egress to Jackson Memorial Hospital (in OS-3) and commercial buildings and minimize impacts to surrounding neighborhoods. The hospital serves as the Level 1 Trauma Center for Miami and would be impacted by road closures and heavy equipment in the immediate area. Site-specific MOTs were prepared to limit dredge operations to daylight hours for OS-1, OS-2, OS-5, and OS-6 to minimize noise impacts. The dredging was completed in OS-3 without a single issue affecting Hospital Operations.
7. Dredge operation was limited to nighttime hours (7 pm – 5 am) for OS-3 and OS-4 to minimize impacts to the City's critical infrastructure. The impacts of Hurricane Irma (Category 4 Hurricane) resulted in additional stresses on the City's Level 1 Trauma Center and special measures were implemented to prevent additional impacts from the dredge operations.
8. Specialized balloon lights and drones were utilized to assist in monitoring the movement of manatees.
9. Custom-built scows were designed and built to fit within the narrow constraints of the waterway (10-foot width); and specialized equipment, such as clam buckets and watertight containers for transport, stabilization/solidification, and handling were utilized during the disposal process.
10. Public Outreach consisting of extensive public notification and coordination was conducted to effectively connect with each of the property owners along the project area.
11. Site-specific dredge offsets were developed for the entire 1.6-mile dredge waterway to prevent impacts to the existing failing structures. Preliminary assessments identified 156 vulnerable failing structures that could be impacted by removal of the contaminated sediments. For example, the sheet pile surrounding Jackson Memorial Hospital was significantly delaminated and the removal of sediment had the potential to impact the passive load pressure on the sheet pile. An impact to the sheet pile would have created catastrophic impacts to the hospital buildings.
4. **Did the project incorporate the principles within the approaches of working with nature or Engineering with nature?**

Yes. Wagner Creek and Seybold Canal flow directly into the Miami River and subsequently into Biscayne Bay, both of which are classified as OFW. Both Wagner Creek and Seybold Canal serve as a manatee sanctuary. Manatee exclusion measures included a manatee barrier and air curtains that were utilized to prevent manatee intrusions into the dredge areas. Additionally, manatee observers were present at all times during dredging activities. There was also collaboration with The Nature Conservancy to further the City's Master Plan for greenspaces within the area.

## IV. INNOVATION

### 5. How does this project show leadership and take steps beyond "traditional" environmental protection efforts?

The project employed extensive coordination with multiple regulatory agencies such as the FDEP, DERM, USACE, US Fish and Wildlife Service (FWS), and Florida Fish and Wildlife Conservation Commission, as well as close partnerships with numerous stakeholders who have interests in the City's highly dense urban Health District and participation in The Nature Conservancy's Visioning Workshop for the Wagner Creek Greenspace Project, in conjunction with faculty and students from the University of Miami's School of Architecture and Public Health and graduates from the Miller School of Medicine. The goal was to collaborate on creating new public greenspace along the banks of Wagner Creek that will provide the 100,000 people who live and work in the Health District a place to connect with nature. The Wagner Creek restoration project adds momentum to the County's Parks and Open Spaces Master Plan, which seeks to link neighborhoods with lush bluedways and greenways in Miami's urban areas. Specialized custom-built equipment was used to safely dredge and dispose of both the contaminated and non-contaminated sediments. Coordination with owners of pleasure craft and small fishing vessels moored in Seybold Canal was also required.

## **6. Did the project “break new ground” in addressing the environmental challenges?**

Yes. An example is the team’s approach to the safe disposal of sediments using custom, in-house-built, site-specific equipment in a tightly constrained area deep within an urban zone. Aqua dams, manatee barriers, sheet piling, and air curtains were used for manatee exclusion activities and manatee observers were present during dredging operations. The use of a custom-designed environmental clam bucket prevented potential cross-contamination and exposure to contaminated sediments; and strategic placement of turbidity curtains and the utilization of water depth-specific equipment during tidal fluctuations that produced significant flow velocities and current levels were instrumental in mitigating turbidity-related problems.

## **7. What methods, technologies, or approaches (including partnerships) were used?**

Use of specialized site-specific equipment prevented sediments from touching the ground after dredging until they arrived at the final disposal site; land and water-side mechanical dredging with a clam bucket or environmental bucket minimized the need to return to the dredge areas for further removal/handling and provided maximum protection to the workers, the public, and the environment. Trimble machine control software with an accuracy of 2” was utilized to provide precise placement of the each clam bucket location. Community outreach and education activities included extensive and

targeted communications with residents and stakeholders for each operational segment as dredging progressed and partnerships with The Nature Conservancy, City of Miami, the Florida Inland Navigation District, regulatory agencies, and other stakeholders, such as the Miami River Commission, University of Miami, Florida International University, and a very active Spring Garden Civic Association. Our design team developed a custom-designed manatee protection approach for nighttime dredging, which was approved by the agencies, the FWS and FWC. A Permit Modification was approved by the applicable agencies. Property access agreements were made with several property owners, such as the VA Hospital, Jackson Memorial Hospital, and the Miami-Dade Water and Sewer Department to better coordinate our efforts to minimize the impacts to their operations. Custom-built equipment was designed to fit into the unique spaces of Wagner Creek and Seybold Canal. An estimated 43,000 cubic yards of sediment was safely removed and mixed with Portland cement for stabilization and solidification prior to being transported to the landfill.

## **8. What sustainable approaches were applied?**

Strategic use of aqua dams filled with canal water, allowed the water column to be increased in low draft areas, which eliminated the impacts from tidal influences and prevented flooding. Dual offloading accelerated the handling of contaminated sediments; and a custom-designed environmental clam bucket prevented potential exposure to contaminated sediments.

## **V. ECONOMIC BENEFITS**

### **9. Explain implementation of cost-effective methods, procedures, or practices in terms of environmental protection efforts. Were there project efficiencies? Were there any specific cost-saving or economic enhancement components of the project?**

By providing the site-specific equipment and design, the potential for damages to site features such as the seawall and natural canal bottom was mitigated and expensive rehabilitation was avoided. The original plan to transfer the sediment from Seybold Canal included the use of Spring Garden Park, which could have resulted in tree removal and transport of sediment through the Park and residential communities. Our team had agreements with a few property owners and used their vacant properties as temporary staging areas, which averted the need for use of a public park and minimized the disturbance of residential areas. This also reduced the total projects cost by almost \$2M for the City of Miami. The use of innovative aqua dams resulted in reducing the problems associated with insufficient water depth and turbidity, which could have resulted in frequent shutdowns of work and additional costs of almost \$30,000 per day for standby time.

**10. What are the socio-economic aspects of the project, e.g., positive impacts to the quality of life to stakeholders?**

The project contributes to the quality of life of the community, local economy, and waterway network as a whole by providing free, accessible, and safe recreation opportunities for local families and business owners; renewed appreciation for the natural environment surrounding the Miami River; continued participation by civic and volunteer groups that brings various communities together; distribution of information about the river's natural habitat, protection of the Manatee Sanctuary, and the need to reduce impacts on the environment; reduced flood zones that improved accessibility to homes and businesses; and reduced traffic congestion.

**11. How does the project contribute to the economy?**

The project paves the way for the City of Miami to move forward with the \$1B redevelopment effort to restore the Miami River area and proceed with construction of the new David Beckham Soccer Stadium. It also creates improved economic outcomes for commercial fishing businesses that use the waterway.

**VI. TRANSFERABILITY**

**12. Are the project characteristics and lessons learned transferable and can they be used by others addressing similar environmental issues?**

The project's innovative approaches to safely dredging contaminated sediments within constricted OFW waterways by using custom-built and specialized equipment are transferable to future environmental restoration activities in similarly constrained waterways. The innovative use of aqua dams to maintain the draft in the canals during dredge work would aid in tidally influenced water projects. The creative use of air curtains to protect manatees is transferrable to a variety of waterway restoration efforts that potentially impact endangered marine species and habitats. Public outreach, community education and collaboration with civic and business groups are transferable activities that benefit the community at large by providing opportunities to engage, interact, and participate in the restoration efforts. The use of turbidity curtains and specialty equipment allowed for mitigation of the effects of flooding caused by seasonal King Tides.

**VII. OUTREACH AND EDUCATION**

**13. What education and/or outreach activities were undertaken?**

Six separate public meetings were held throughout the duration of the project, including

a public kickoff meeting with elected officials and the City of Miami; informational meetings and workshops were conducted to educate residents and boat owners about workable solutions during dredging operations; bilingual meeting notifications were published in local newspapers; and continuous project updates were provided to civic organizations, boat owners, and residents. The team also collaborated with faculty and students from the University of Miami's School of Architecture and Public Health and graduates from the Miller School of Medicine.

**14. What mechanisms were used to involve the broad array of stakeholders?**

The mechanisms used included a door-to-door public outreach program, bilingual staff, bilingual flyers, bilingual newspaper ads, a website, social media platforms, boat owner questionnaire, FAQs, phone calls, mailers, and one-on-one meetings in the field on an ongoing basis throughout the life of the project. Project updates were posted on social media platforms; notifications were delivered via US mail, door-to-door visits, email, and phone; and collaboration was conducted with The Nature Conservancy, Florida International University, the University of Miami, the City of Miami, the Miami River Commission, and the Spring Garden Civic Association. Target audiences included commercial and recreational boat owners, single-family and multi-family housing and businesses along Wagner Creek and Seybold Canal, and local Neighborhood Enhancement (NET) offices.



**Table 1- Dredging Operations**



Manatee Exclusion Aqua Dam in Wagner Creek



Manatee Exclusion Gates and Aqua Dam in Wagner Creek



Environmental Clamshell and Sennebogen Dredging in Wagner Creek



Environmental Clamshell Sennebogen and Sediment Scows



Environmental Clamshell



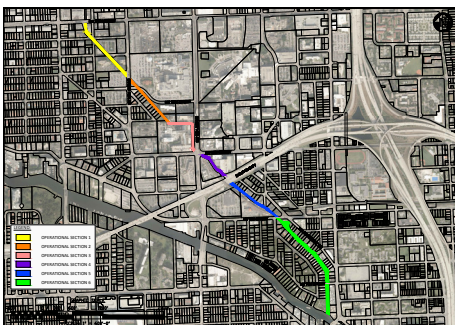
Manatee at the Gates in Wagner Creek



Sennebogen Removing Debris and Dredging in Wagner Creek



Wagner Creek Manatee Gates and Turbidity Curtain



Wagner Creek and Seybold Canal Operational Sections 1-6



Environmental Clamshell Turbidity Barrier and Aqua Sam in Wagner Creek



Scow and Hopper in Wagner Creek



Sediment Scows Dredging in Wagner Creek

### Table 2 – Operational Sections 1-6



Wagner Creek Behind Residential Housing



Wagner Creek Near the Miami River



Wagner Creek Near Hospital Complex



Wagner Creek Near Hospital Complex



Seybold Canal and Wagner Creek Seawall



Seybold Canal Recreational and Commercial Boats



Seybold Canal Seawall



Seybold Canal Seawall at Spring Garden Park



Wagner Creek Near Residential Housing



Spring Garden Park at Seybold Canal and the Miami River



Commercial Fishing Boats at Seybold Canal and the Miami River



Seybold Canal Residential Seawall

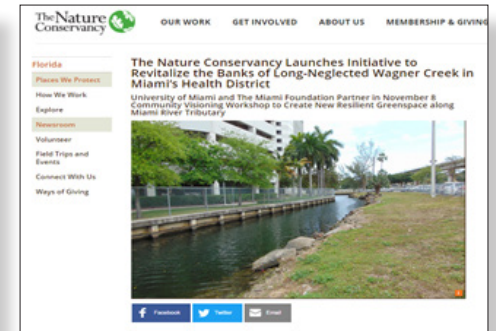
### Table 3- Public Outreach and Education



Groundbreaking Ceremony



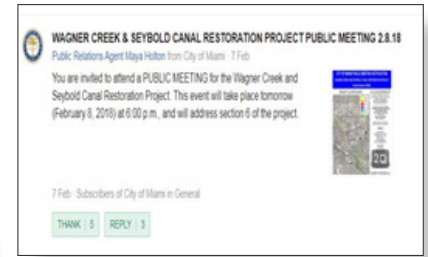
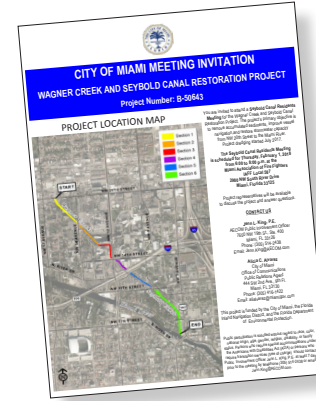
Mayor Regalado at the Groundbreaking Event



Project Kickoff Event



Project Kickoff Media Coverage



Wagner Creek Public Meeting

**WAGNER CREEK AND SEYBOLD CANAL RESTORATION PROJECT**  
**PROYECTO DE RESTAURACION DE WAGNER CREEK Y EL CANAL SEYBOLD**  
**PUBLIC MEETING - SECCION 3-4 / REUNION PUBLICA - SECCION 3-4**  
November 8, 2017 6:00 PM to 8:00 PM - Location: 2750 S.W. 28th Street, Suite 201, Coral Gables, FL 33134  
or 8450 N.W. 36th Avenue of the Legends, 2nd Floor, Suite 201, Coral Gables, FL 33134  
Phone: (305) 259-8200  
Email: [amw@fiu.edu](mailto:amw@fiu.edu)

**COMMENT SHEET/ HOJA DE COMENTARIOS**

Name: [Redacted]  
Address: [Redacted]  
Phone: [Redacted]  
Email/Contact Information: [Redacted] / [jma@fiu.edu](mailto:jma@fiu.edu)

Comments:

Please keep me updated via email. Glad to see there wasn't much, if any, flooding in Allapattah after Hurricane Irma. Keep up the great work! 😊

For more information please contact / Para mayor informacion, por favor comuniquese con:  
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## About AECOM

AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately \$18.2 billion during fiscal year 2017.

See how we deliver what others can only imagine at [aecom.com](http://aecom.com) and [@AECOM](https://twitter.com/AECOM).

## Contacts

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