MIAMIBEACH
City of Miami Beach, 1700 Convention Center Drive, Miami Beach, FL 33139, www.miamibeachfl.gov

MEMORANDUM

To: Joseph Centorino, Inspector General

From: Eric Carpenter, Assistant City Manager EC

David Martinez, Capital Improvement Projects Director

Roy Coley, Public Works Director Roy Coley

Date: January 21, 2021

Subject: Response to Office of Inspector General (OIG) Draft Report 20-07

In addition to this collective report, each of the individuals above prepared their own response, which is also attached to this report for a complete response. In order to respond to this report, which looks back nearly eight years, the Administration of the City of Miami Beach (City), represented by those signatures above, believes that it is important to begin by providing some context.

The City is a low elevation barrier island surrounded by tidal waters; in most cases within a few feet of the existing ground elevation. As such, we find ourselves at the forefront of the battle against climate change and sea level rise. Through many years of study it has been determined that not only do the waters surrounding the island respond to the tides, but also the groundwater elevations mirror the surrounding tidal elevations. As a result the City is not only susceptible to the heavy rainfall and flash flood events that plague all of South Florida but also vulnerable to the problem of "sunny day" or tidal flooding.

Historically the City has relied upon gravity based drainage systems that only function when the coastal waters are lower in elevation than the water in the stormwater collection system. Unfortunately as tidal elevations have increased over the years, the existing gravity based systems became less and less effective at times of high tides; to the point that they experience reverse flow where groundwater or baywater flow backwards through the system and flood the streets and low lying yards. This situation has gotten progressively worse over time, as evidenced by not only the scientific data, but also resident surveys (such as the 2016 Citywide Resident survey by ETC Institute, where 76% of the residents have observed coastal water level increases).

The frequency of flooding events and the existential concerns surrounding them began to draw the attention of national media as well as the insurance industry. While media outlets like Rolling Stone were screaming out "Goodbye Miami" discussions were taking place in Washington DC surrounding the National Flood Insurance Program (NFIP) and the legislation (Biggert/Waters Act) that required a more risk based approach to rate setting, and which may significantly impact the ability of property owners to obtain flood insurance and, consequently,

federally backed mortgages. It became very clear that ignoring the issues and concerns was not a reasonable option.

The City began to take into account the clear changes in the stormwater/tide water dynamics by studying sea level rise in conjunction with the Southeast Florida Climate Compact, South Florida Water Management District, several universities, and our expert consultants. The findings were incorporated into all of our planning efforts, including adoption of the unified sea level rise projections (Attached as Exhibit 1).

Despite significant efforts to learn from other hydraulically challenged areas (sending a team to the Netherlands to find out how the Dutch have learned to live with water; studying the impacts of hurricane Katrina on the New Orleans area), it became clear that the speed with which water can move within the porous limestone subsurface in Miami Beach created a need to find a new approach. As a result, we began to look at other solutions beyond dykes and levees.

The City is an interesting situation as much of what is known today as Miami Beach was filled in with dredge spoils from the bay bottom or sand/limerock that was imported from areas of inland Miami. The island was literally elevated out of the sea in the early 1900s. As Miami Beach approached its 100th birthday, it was becoming increasingly evident that the only way it would still be around in another 100 years, was if it continued to elevate ahead of the sea levels through new, alternative, and soundly engineered solutions.

As a result of many discussions with outside experts, community stakeholders and City officials the legislative direction began to evolve with a sense of urgency, commensurate with a world class City; one that is home to $40 Billion worth of real estate that was at risk of losing significant value due to the advancing seas. The City took bold and necessary steps that changed the approach of many communities in how they planned and implemented the inevitable adaptation to sea level rise. The significant changes in approach created many challenges, including but not limited to, the areas of engineering, public perception and regulatory compliance. This is to be expected with the development and evolution of any transformational change.

The City took great effort to bring the many different stakeholders along on the journey of creating a new playbook for vulnerable communities. As with all change, this was difficult and created situations where those that did not share the same level of concern, or were uncertain that the changes might not be worth the difficult transition, became frustrated and responded negatively. Please see an example of the level of public engagement, as described in the presentation for the Joint Workshop of the Neighborhood and Community Affairs Committee and Mayor's Blue Ribbon Panel on Sea Level Rise and Flooding (Exhibit 2).

The City enlisted the best available science and outside expertise, utilizing two of the top three global design firms (as ranked by Engineering News Record for the past seven years), AECOM and Jacobs Engineering, as the lead consultants during the evolution and reevaluation of this program. The City also solicited the services of a diversity of volunteer experts through the Urban Land Institute to evaluate the City's actions and provide critical feedback on what could be done better. The collective of these nationally and internationally renowned experts all concluded that the approach of the City was prudent and necessary (See attached AECOM, ULI and Jacobs study results attached as Exhibits 3, 4, and 5 respectively).

Potentially the greatest challenge of breaking out of the status quo was demonstrating to the regulatory agencies that the same approach that had continued to become less and less

effective due to changing conditions was not sufficient to overcome the evolving threat of sea level rise. This was further exacerbated by a prior employee of the City that significantly undervalued the role of the regulatory community and ultimately was removed from his position due to his cavalier approach to the need of following the requirements of those agencies. This difficult evolution created situations that allowed for individuals with political motivations to plant seeds of distrust in the minds of the regulatory agencies toward the City. Despite efforts at all levels of the City Administration (including monthly meetings beginning in October of 2016, to open the lines of communication with the regulatory agencies), the City was still unable to overcome the distrust that had been growing as a result of the efforts of those that intended to undermine the program.

The evolution of the stormwater program included the gradual increase in understanding of the impacts to those properties that had historically relied on the flow of water from private to public property. The building code of Florida is clear that private properties are responsible for managing all water that falls upon their property. That perspective did not address the moral obligation to leave all properties in a better position after completion of the work than before. The City underwent this evolution of thought that contemplated the entire City, both public and private. The understanding that both must raise to keep pace with the rising tides is a challenge, particularly during the transition period where one or the other of these processes may get ahead. As a result, and with the full transparency and direction of the City's Blue Ribbon Panel on Flooding and Sea Level Rise and City Commission, the scope of these projects included additional requirements, concepts such as maximum flood stages below the finished floor elevations of homes and the inclusion of private property drainage connections to facilitate the transition period.

The incorporation of the secondary drainage system on Palm and Hibiscus evolved as well. The initial modification was only the inclusion of stub out pipes from the existing primary drainage system that remained unchanged. Since these stub outs were not connected to anything there was no additional water entering the system. Subsequently the Design/Build team used some of these stub outs as temporary construction drains within the right of way during the construction activities (see attached photos Exhibit 6) and more recently properties went through a separate permitting process and received private property drains that will remain until these low lying properties redevelop and are required to elevate out of the floodplain. The impacts of this real time development of solutions created modifications to the Palm and Hibiscus Island Neighborhood Improvement project that could have been handled better, had there been unlimited time to evaluate. The City Administration acknowledged these shortcomings in it's presentation in the Commission Workshop on Resilience held January 27, 2020. A copy of the presentation is attached for clarity (Exhibit 7).

Interestingly, although the City acknowledged many of the findings of this report in a Commission workshop on January 27, 2020, it took nearly another 12 months for the Office of the Inspector General (OIG) to prepare a draft report which echoes the same thoughts. Notwithstanding, the OIG's report includes, in our opinion, a significant amount of innuendo and editorializing which, in our opinion, serves no purpose other than insinuate wrongdoing where none has occurred. Furthermore, after over a year spent on generating this report, despite several requests from the Administration for extensions beyond the 30 business day response time, which happened to fall during the holidays and a global pandemic, those requests were rejected by the OIG. Why are the facts from staff that were involved from the beginning less

important than the conjecture of those who are trying to decipher a very complex issue after the fact?

Finally, the real truth is that there were many decisions made that created an evolution of the Palm and Hibiscus Neighborhood Improvement project. All of those decisions were made with the best interest of the City, and with the clear direction and approval of the appropriate authorities within the City. There were decisions made by the contracted Design/Build firm that are now being questioned by the regulatory authorities, that are open to debate. However, there was no ill intent, nor any intentional omissions, as can be demonstrated by the lack of clear evidence to the contrary; despite a year of investigation.

Furthermore, there was a level of communication at both the macro and micro levels with the regulators, including documentation via letter from Wade Trim on May 10, 2018 (attached as Exhibit 8), clearly identifying the modifications of the project over time. Even though the importance of this letter was brought up in an email from City Manager Jimmy Morales (attached as Exhibit 9) it was limited to an excerpt from the letter buried on page 99 of the OIG's report and glossed over preferring to continue to use words like deception and misrepresentation. This letter, along with the signed application submitted by the City via email on May 15, 2018 was before the response from DERM, stating that it needed a certification from the Engineer of Record stating there were no changes, and well before the September 19, 2018 email from the alleged whistleblower.

There was no information hidden from the regulators, it was provided to them in writing prior to permit renewal being applied for in May 2018 including the reference to the secondary drainage system connections. Furthermore, it has recently been confirmed by the South Florida Water Management District that the introduction of the secondary drainage system will not require any additional documentation or a permit modification.

It appears that individuals from the Design/Build firm, after being intimidated by the approach and the actions of the OIG, (which were extremely aggressive and led to an overall feeling of persecution and degradation of morale for all involved) may have made statements that they thought would insulate them from any responsibility but they are not based in fact, merely opinion.

The reality is the project is nearly complete, the systems in place function as intended, as can be seen by the attached before and after photos of the Coconut Lanes (Exhibit 10), and the regulatory agencies have at this point agreed and permitted almost all of the proposed connections. Those that do not receive permits will not be connected as was originally contemplated.

This entire exercise felt from the start that it was determined to find some issue where none exists, other than what was acknowledged already a year ago. This begs the question of what is the real motivation and intent here? In the end, the OIG's draft report has clearly omitted or manipulated facts to substantiate some objective that we are not privy to, but which, in our opinion, is intended to be punitive and not instructive.

Below please see the responses to the individual findings. The City Administration hopes that the information included herein can help to clarify some if not all of the misguided conclusions in the report.

***Response to Finding # 1**. The City and Lanzo, having failed to disclose to DERM and SFWMD the plans they intended to use to build the drainage system, obtained two permits from the regulatory agencies based on false and misleading information.*

This finding speculates, and erroneously concludes, that the City and Lanzo conspired to obtain a permit from DERM and SFWMD utilizing false and misleading information. This finding demonstrates a fundamental misunderstanding of the standard procedures and practices surrounding drainage permits. Unlike a typical building permit process, which requires progressive inspections by State certified inspectors, drainage permits issued by DERM do not follow that procedure. DERM reviews engineered drawings and calculations, and issues permits based on those documents. Once the project is completed, the engineer of record submits signed and sealed as-built drawings, certifies the installation, and requests closure of the permit. At the time of permit closure, changes to the plans, whether resulting from unforeseen field conditions, design changes or owner directed changes, are recorded and documented. It is common and customary for close-out documents to "clean-up" those discrepancies between the permit drawings and the as-built conditions.

When comparing the two plans referenced in this finding, it is evident that the primary differences equate to the proposed roadway elevations and the addition of underground stub outs. The stub-outs, implemented in a proactive response to the evolving strategies to mitigate sea level rise, were included to provide the opportunity for future private projects to have a connection point. As a result, future private projects, which would be required to obtain their own permits, would be able to complete their installation without having to interfere with the main trunk lines or damage above ground installations.

The documents prepared by Wade Trim did not add inlets. This is not a material change, nor does it make the permit documents false or misleading. The DCP and early meetings with DERM clearly established the tributary area of the stormwater collection system for this project to include the entire right-of-way, the entire private, non-waterfront lots, and ½ the private waterfront lots. This did not change between the two sets of documents; is not a material change to the permit; and does not make the permit documents "false or misleading." Simply stated, the Wade Trim drawings did not alter the functionality, effectiveness, or ability of the project to protect the Bay, and comply with Code. This finding attempts to equate normal and common project evolution to the nefarious presentation of false or misleading permit plans.

In the management of a majority of City projects, the City relies heavily on the experience and expertise of its professional consultants and State certified general contractors, to meet and comply with all regulatory requirements. Under the design-build delivery model for this contract, the design-builder, Lanzo, is responsible for the project development and permit management. This includes, through their sub-consultant(s), not only the preparation of permit drawings, but the management of permit revisions, renewals and closures. This is not limited to the pursuit of a drainage permit from DERM, but includes the design and permitting of water main replacement, sanitary sewer rehabilitation/lining, replacement of street lighting, landscape improvements, paving, signage and striping, and utility undergrounding. In short, this project is much more than a drainage project; it is a neighborhood enhancement project.

Given the above (and the importance of this project), the City, through its procurement processes, endeavored to obtain the services of the most qualified, experienced and capable professionals. Those efforts resulted in the engagement of Stantec, as the City's design criteria

professional and resident project representative, and Lanzo, as the design-builder. Stantec, formerly known as Corzo, Costello, Carballo, Thompson and Salman (C3TS), was selected through the procurement process to serve as the City's design criteria professional and resident project representative. At the time of selection, as indicated in their response to the Request for Qualifications, C3TS was a local firm that had provided a broad array of services throughout South Florida for more than 24 years. The procurement process for design-builders endeavors to evaluate proposers and select the most qualified team. As evidenced in the response to the Request for Qualifications, Lanzo and Wade Trim, at that time, had more than 20 years of experience working together. In addition, both firms provided proof of meeting all of the Miami-Dade County pre-qualification requirements in the RFQ and accompanying addenda. Wade Trim, founded in 1926, demonstrated experience with design-build projects, and touted the benefits of a regional firm with local offices. In combination, the qualifications, experience, professionalism and contractual requirements for these firms establishes a balance and creates redundant measures to ensure proper project development and compliance with the contract.

In addition to the contractual oversight measures established for the project, the City also relies on State regulations which detail the responsibilities of professional engineers and general contractors. In addition to licensing and statutory requirements, the City's contracts explicitly also require compliance with regulatory agencies.

***Response to Finding #2**. The City awarded Lanzo a contract for the project's pre-construction design phase without a finished DCP.*

As defined in Florida Statutes 287.055 "Acquisition of professional architectural, engineering, landscape architectural or mapping services", the purpose of a design criteria package is to furnish sufficient information to permit design-build firms to prepare a bid or an agency's request for proposal or to permit an agency to enter into a negotiated design-build contract. The scope of services for the development of the Palm & Hibiscus Project DCP included landscaping /irrigation, street lighting, replacement of existing watermain infrastructure, improved storm water drainage collection and disposal infrastructure , including swale restoration , curb and gutter, lining of the existing sewer system and other facilities; street resurfacing /pavement markings, repair and/or extension of existing sidewalks to comply with ADA requirements; incorporation of traffic calming features, consistent with community preferences; and the incorporation and coordination of the undergrounding of franchise utilities on Hibiscus Island.

The Design-Builder was selected using the progressive design-build methodology, where the Design-Builder was to initiate the design period, encompassing the completion of the design to the level needed to define the actual construction costs and begin construction activities in the field. This included collaboration with the City during the design process to ensure that design solutions reflected the most efficient construction means and methods, and that the project was to meet the schedule, quality, permitting, and safety requirements; and procurement of long-lead items, conduct field investigations, and early release construction packages. Once the Design-Builder advanced the design to a sufficient level of detail necessary to produce a reliable estimate with well-understood risks and contingencies, the process would culminate in the submittal of a cost of construction (Guaranteed Maximum Price Proposal), to be approved by the City Commission, and fully executed GMP amendment.

Design Build Contracts transfer certain risks from the City to the Design-Builder. The D-B is responsible for data collection, utility coordination, regulatory permitting and compliance, development of construction documents which meet the requirements of the DCP, responsible for design errors and omissions, and ultimately responsible for the full coordination during the design and construction of the project.

The Design Criteria Package and the design completed by the D-B, which was the basis of the GMP included all the components in the scope of work; which, as stated, included more than just the drainage system. The project also included, but was not limited to, water main replacement, sanitary sewer rehabilitation/lining, replacement of street lighting, landscape improvement, paving, signage and striping, and utility undergrounding.

The DCP was completed and provided to the D-B with the best information available at that time and a GMP contract was awarded to Lanzo for all the scope of work included in the project. Concurrently, the City's Storm Water Master Plan was being reviewed and updated to ensure a greater level of service for the residents. The City is steward to community desires and Commission direction. Subsequently, at the beginning of 2014, the City embarked to address sea level rise in order to reduce flooding associated with storms and seasonal king tides and to counter the effects of climate change. It is not uncommon for City projects to introduce changes in direction and policy during the entire development of a project.

***Response to Finding #3**. The City overrode the role of the project's Design Criteria Professional and adopted a DCP that did not provide Lanzo with clear guidance for raising road elevations on west Palm Island.*

The original Design Criteria Package (DCP) for the Palm and Hibiscus Islands Neighborhood Improvement project did not take into account the rapidly advancing science surrounding climate change and sea level rise. The original DCP for this project was actually created contemporaneously with the completion in 2012 of the very first Stormwater Master Plan that even took into account the existence of sea level rise. As the King Tide events unfolded during the early stages of the project, it became abundantly clear that the construction activities proposed would not solve even the flooding concerns at the time, not to mention the 30 year planning horizon worth of sea level rise that this project was to mitigate.

The legislative decision to change the tailwater elevation criteria to 2.7 feet NAVD, in February of 2014, would have meant that the roadway elevation of 2.2 feet NAVD, originally proposed for Palm and Hibiscus, would be regularly flooded within the useful life of the improvements. Additionally, the legislative direction to raise streets in February of 2015, gave direction to the Administration to update the goals of the project. Furthermore, the King Tides of September and October of 2015 resulted in significant flooding of the project area and the elevation of the tides (approximately 2.1 feet NAVD) made it clear that the project was being under designed on the sea level rise mitigation component.

It is worth noting that the DCP has many other elements including water, sewer, lighting, landscaping, striping, signage and overhead to underground utility conversion. The stormwater component is just a portion of the overall DCP. In addition, the OIG report clearly identifies that the Final DCP was issued by Stantec on November 5, 2014, with requirements regarding inlet elevations and maximum flood stages, which are clearly measurable criteria for success of the stormwater system consistent with statutory requirements of a Design/Build contractual

mechanism. Any future modifications of the scope once the final DCP is issued can be accomplished by change order as was utilized in this project.

***Response to Finding #4**. After deciding to change the project's elevation criteria, the City failed to provide sufficient time and resources for Wade Trim to prepare construction plans for a drainage system designed to connect to private-side yard drains and verify its expected performance.*

It is important to understand the basic premise and genesis of the direction to raise roads. Numerous examples of sunny day flooding throughout the City demonstrated the urgency to address both the short term and long-term effects of climate change and sea-level rise. This was not a matter of nuisance ponding, but a matter of life safety and protection of property. The City needed to take action and the Commission, rightly so, tasked the Administration with developing a solution. This direction put the City on the front line of the battle against climate change and sea-level rise, and garnered world-wide acclaim. Unfortunately, there is no simple solution to this challenge, and in the early stages of the project there were no precedents to follow or case studies to review. The approach to mitigating sea level rise was an evolving process, and resulted in the Palm and Hibiscus project's evolution. Every decision and strategy required innovative, "outside the box," thinking, including changes to policies and ordinances. Everything was on the table. Arguably the single most important and impactful strategy to adapt to sea level rise was raising the roads, and eventually private properties, above the level where tidal changes cause flooding. Raising private properties is a long-term strategy and is being addressed through City legislation requiring new developments to build at higher elevations.

Roadways were/are a different matter that required a more immediate solution. In order to ensure that roads remained accessible to residents, and even more importantly, to emergency vehicles, they needed to be raised. The longer the City delayed the implementation of these mitigation strategies, the greater the risk to life and property. Delays, at a minimum, would impact basic City services and the quality of life of our residents. Recognizing the challenges and urgency, the City Commission took steps to implement the mitigation strategies. Between January of 2013 and July of 2020, the City Commission has heard/discussed more than 200 items related to storm drainage and sea-level rise. It is not insignificant to consider that the Commission's decision to change policy and allow private properties to connect to the public drainage system contradicts countless years of standard practice throughout the County, requiring all projects to manage drainage within their property limits. This was groundbreaking and recognized, as early as June of 2015, that the City would have to make some accommodations for those low-lying properties that had historically shed their rainfall onto the right-of-way. It is worth noting, that this policy establishes the parameters under which a private property is allowed to connect. Over time, as properties develop or re-develop at higher elevations, they will no longer meet those conditions, and the connections will be removed, returning to the long-established policy that each property will be responsible for their own storm water management.

The City approaches all changes to projects in the same manner: determine and verify the validity of the claim for additional compensation and time, and only then evaluate the fairness and equity to the City. It is not uncommon to receive requests for change orders, only to determine that the scope of the requested change falls within the contract requirements,

resulting in a rejection of the request. In this particular case, it is apparent that the project team did not support additional design fees. The rejection was not refuted by the design builder.

While the direction to raise roads represented a change to the design-build contract, it was not a material change to the design and construction of the stormwater collection, treatment and pumping systems. The original DCP established the tributary area of the stormwater collection system and included the entire right-of-way, the entire private, non-waterfront lots, and ½ the private waterfront lots. This criteria did not change with the elevation of the roadway. The system was still required to collect and process the same exact volume of rainfall.

***Response to Finding #5**. The City awarded Lanzo a $38.5 million contract for the build or construction phase of the project without finished construction plans for the stormwater and hardscape sections of the project and no reliable basis for estimating costs.*

In order to understand how a contract could be awarded "without finished construction plans," the OIG must first understand the project delivery model. As stated previously, the Palm and Hibiscus Islands Project is a ***design-build*** project, where the awarded firm is responsible for the design of the project, among other things. In the design-build delivery model, construction plans are usually incomplete and, with no known exception, never fully completed prior to execution of the contract for construction (GMP). In fact, there are many examples where design-build contracts are awarded for "turn-key" delivery, including all phases of project development and construction, utilizing only a design criteria and concept. Despite the complexity of this project, Design-Build contractors are well versed in this delivery method, and adept at preparing cost estimates and project schedules with limited information.

Again, it is important to emphasize that this project is not a stormwater project, but a multi-faceted neighborhood enhancement project. In addition to stormwater collection, treatment and pumping systems, the project drawings and scope included, watermain replacement, sanitary sewer rehabilitation, streetlight upgrades and replacement, undergrounding of overhead utilities, new roadway curbs, paving, signage and striping. One of the key advantages of the design-build delivery model is the compressed project delivery and acceleration of the timing of the project, with some construction activities taking place prior to the construction plans being completed. For example, in this case the contractor was able to commence water and sanitary sewer scope while the stormwater drawings and permitting were being completed. This is a significant timesaving strategy employed by most design-build firms, reducing overall project duration. The OIG's assumption that construction plans must first be completed prior to award completely negates this benefit and demonstrates the office's unfamiliarity with the delivery model.

In contrast to a conventional design-bid-build contract, where the owner is responsible for the design and engineering documents, design-build transfers a great deal of risk from the owner to the design build firm. The transferred risk includes constructability, design development, and permitting, among other items. The design builder knowingly and willingly accepts these risks, based on their level of comfort, experience and ability to estimate the construction costs. In this case, the design-builder obviously felt it had enough information to provide a cost estimate and schedule, or it would not have assumed those risks by providing a GMP proposal. The OIG's report, again, fails to understand the nuances of this project delivery model.

It is also apparent that the OIG does not fully understand the processes or efforts employed by the City in the pursuit of fulfilling the fiduciary responsibility entrusted by the residents and City Commission. Again, the City establishes redundant measures to inform and guide the project. In the case of this project, the City relied on two different sources to verify the fairness and equity of the design builder's GMP proposal. Concurrent to the contractor's preparation of the GMP, the City contracted US Cost, Inc., a third-party cost estimating consultant, to prepare an estimate using the exact same documents available to the design builder. US Cost was engaged through the City's RFQ 30-10/11, Constructability, Cost and Value Engineering Review Services contract. US Cost, in their response to the RFQ, demonstrated 28 years of worldwide experience providing estimating and construction management services. At no time did the design builder or US Cost indicate that the information available was insufficient to provide a reliable cost proposal.

As a second source of verification, the City's design criteria professional, after reviewing both cost estimates, prepared its professional recommendation. Following the receipt of the GMP, the estimate from US Cost and the DCP's recommendation, the City presented the GMP to the City Commission, which authorized the City to negotiate with the design builder. As with all projects, the City endeavors to ensure the best possible negotiations including contractual terms for the City and its residents. The same is true here, as the design-builder's initial GMP proposal exceeded $43M. Utilizing the estimate from US Cost and the professional recommendation of the DCP, $34.9M and $34.5M respectively, the City negotiated a $38.5M construction cost, inclusive of owner's project contingency.

As a result of following the proper protocols, the City was able to ensure that negotiations were conducted in the best interest of the City and its residents. The GMP was a negotiated proposal, under the authorization of the City Commission, based on best information available.

***Response to Finding #6**. The City used CAS Engineer of Record Rubio and his 100% Final Design plans to obtain permits from SFWMD and DERM after deciding to discard those plans; after the permits were issued, the City used a distinctly different set of construction plans prepared by former Wade Trim Vice President Holly Kremers to build the stormwater drainage system on west Palm Island.*

Through the award of a design-build contract, the City transfers certain responsibilities and risk from the City and its consultants to the design-builder. Among those are design development and permit management. Through the City's procurement process, the City entered into a design-build contract with Lanzo Construction. Articles of the Agreement read as follows:

> *Article 1.9- The design builder will be responsible for the professional services, design, supply, provision, construction, installation and performance of all equipment, materials and systems offered, and shall in no way be relieved of the responsibility for the performance of the project*
>
> *Article 2.1- The Design-Builder shall perform the design and construction of the Project, as defined in the City's Request for Qualifications No. 251-2013TC including, without limitation, the Design Criteria Package...In summary, the Services include, but are not limited to, providing all resources and professional services to perform the design and construction of the Project such as planning,*

technical investigations, engineering, design, permitting...testing and commissioning..."

Article 2.3- The Project includes furnishing all planning, engineering, design and permitting services... It will be the sole responsibility of the Design-Builder to secure all permits not provided by the City, and to provide signed and sealed design documents for construction and installation which comply with all regulatory requirements, Applicable Laws, and the Contract Documents.

As a result of the Agreement, Lanzo entered into a contract with Wade Trim. The City has no contractual relationship with Wade Trim or any of Lanzo's sub-consultants or sub-contractors. How Lanzo proceeded to get this project designed, permitted and completed is entirely a means and methods concern. As long as they meet the requirements of the RFP and the DCP, they are in compliance with the contract. This includes the preparation and pursuit of permits.

Given that the City is not in contractual privity with Lanzo's subconsultants or subcontractors, it is erroneous to conclude that the City had the ability to dictate permit strategy or manage Lanzo's consultants, nor was it the City's responsibility to do so. The undeniable truth is that design-builders and engineers alike are in business to earn a living and make a profit. At the end of the day, their ability to cover their overhead and sustain their operation is a management concern, and how they do that is not a condition of the contract. In this case, it appears that Lanzo's prime consultant, Wade Trim, felt that it was necessary to reduce the overhead of an evolving and developing project by employing their own internal forces rather than continuing to pay additional fees to their sub-consultant. The City did not, at any point, ***decide*** to discard the Rubio plans. This was simply a change of sub-consultant by Lanzo and Wade Trim. For this project, in their capacity as the Prime Professional exercised and managed their option to sub-consult portions of their work to a Delegated Engineer. Under the Florida Administrative Code, 61G15-30, it is the Prime Professional's responsibility to retain and coordinate the services of such other professionals as needed to complete the services contracted for the project.

Further, this finding assumes that construction projects of this nature occur in a vacuum, where changes in an evolving sea-rise mitigation strategy do not impact ongoing project activities. If that were the case, all project activities would stop while strategies and policies are developed and finalized. The reality of construction projects, for a variety of reasons, is that projects are often fluid, changing and evolving. The project owner's priorities and parameters, as occurred in the Palm and Hibiscus project, often change during the design development phase. The City's contract clearly places the responsibility of design development, permit management, and code compliance on the design-builder.

To that end, the City relies heavily on the experience and expertise of the professional consultants involved in the project. The City, through its procurement processes, endeavored to obtain the services of the most qualified, experienced and capable professionals. Those efforts resulted in the engagement of Stantec, as the City's design criteria professional and resident project representative, and Lanzo, as the design-builder. In combination, with a combined experience of more than 150 years, the qualifications, experience, professionalism and contractual requirements for these firms establishes a balance and creates redundant measures to ensure proper project development and compliance with the contract.

***Response to Finding #7**. The April 2017 resolution authorizing the City staff to develop an "engineering solution" and policy allowing the connection of private-side yard drains to the public drainage system was developed by the responsible City officials to provide after-the-fact legal justification for construction of a drainage system with unpermitted right-of-way drainpipes that were intended to provide future connections for privately owned drains.*

City Resolution R-2017-29840, approved on April 26, 2017 was not the first legislative direction that addresses a private stormwater connection. The first direction was at the June 10, 2015 City Commission meeting (Agenda Item R7Q) allowing the connection of the private stormwater system for the Marriott Residence Inn at 17th Street and West Ave, to the City stormwater system along 17th Street. The direction during this meeting was to provide a private stormwater connection for a single property and, as quoted from the City Commission Meeting "After Action Report"; "Until The City Approves Code Modifications To A Citywide Storm Water Connection Fee Program". This, combined with the direction to size the stormwater systems to account for all of the inland lots and half of the waterfront lots, clearly demonstrates the direction if not the intent of the City Commission to include private properties in the adaptation plans, and not as an after the fact approval of modifications to the program. This is also refuted by the language in Resolution R-2017-29840 that it was intended to be a reaffirmation of the direction previously provided by the Commission.

***Response to Finding #8**. The City began the large scale installation of private-side yard drains on west Palm Island and decided not to disclose the new phase of construction to the SFWMD and DERM, turn over an updated version of the Kremers plans, or obtain modification of the existing Class II permit to install private-side yard drains.*

First and foremost, this finding is demonstrably prejudice, stretching facts to achieve the needed confirmation bias for this report. There was no "large scale installation of private-side yard drains". In fact, there were only eight building permits authorized for drainage connections from private properties. To provide perspective, this was eight connections out of approximately 300 properties in the Palm and Hibiscus project – less than 3% of the properties received private-side yard drains.

Assuming that the report was referring to all temporary construction drains, the finding essentially makes one fundamental claim – that the construction of the drains was purposely concealed from regulators. Setting aside, for a moment, all other issues, this finding exemplifies the most fundamental flaw in the OIG report – the finding is patently speculative.

The OIG cannot substantiate a claim that any error in judgment was deliberate, or to use the OIG's own words: "knowing, considered, and intentional". Not only can this claim not be substantiated, but it is unfounded.

The report fails to mention that immaterial project changes are ordinarily reconciled through permit modifications at project close out. While the significance of the yard drains may be arguable, the professionals working on the project clearly arrived at the consensus that these drains were immaterial.

The total project cost is $40,956,000. The permanent right of way drains and private side inlets, including associated harmonization, were $1,615,000 or less than 5% of the total project cost. Any large public infrastructure project as complex as Palm and Hibiscus incurs a 5% change in scope.

Moreover, Palm and Hibiscus was a design build project, where, by definition, the plans were not fully developed. It is not only reasonable, but expected, that a professional would deem a 5% change immaterial.

The temporary construction inlets were part of the contractors means and methods. Contractor means or methods are within the discretion of the contractor to implement in order to achieve a contract objective. Using the Palm and Hibiscus project as an example, the contractor could not adversely impact the level of service of the stormwater system while working on the system. The contractor decided that the best way to ensure that properties did not flood during construction was to construct temporary construction inlets. Means and methods are not dictated by the owner of a project and doing so could expose the owner to undue liability. In fact, as noted in the summary judgment of Juno Indus. v. Heery Int'l, 646 So. 2d 818, 822 (Fla. 5th DCA 1994), "The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for all safety precautions and programs, in connection with the Work as well as for coordinating all portions of the Work."

From a technical perspective, the original permit application, and the plans enclosed therein, defined the tributary area. An example of the tributary area is shown in Exhibit 11. The addition of the yard drains did not change the tributary area. Thus, not only was the change immaterial it was nonexistent from a runoff perspective. **The same amount of water was being captured by the system – if the original plans collected a drop of water, so would the revised set.**

It therefore stands to reason that the lack of permit revisions are not indicative of willful deception, but rather representative of ordinary project management decisions.

Perhaps more important is the myriad testimony from City Staff, the Engineer of Record, and the Licensed Contractor that the drains were considered a temporary condition.

In Mr. Carpenter's own words:

"As we were going through the process, we realized that raising the roads up could potentially put some of these properties in a little bit different situation during construction activity. So we installed approximately 88 temporary construction drains while we were out there."

In the OIG's own words:

Referring to Mr. Carpenter – "On August 5, 2019, he signed a letter to Spadafina that said the 85 unpermitted right-of-way drain connections were temporary construction drains that were never intended to be part of the drainage system"

In the Engineer of Records (Kremer's) own words:

"88 drains that you've been hearing about, these are temporary construction drains, there was one installed in the right-of-way in front of each property on North and South Coconut."

These are just a few of numerous examples provided by OIG

Whether these drains should have been permitted or not is another issue. However, it is evident that all parties believed these drains to immaterial or temporary and therefore not need a permit.

In addition to the above, should this finding be discussing the eight yard drains that were placed on private property, these drains did not receive a City permit for the construction of stormwater drainage systems. Instead, building permits were issued for the construction occurring on private property.

Over the course of normal business, Public Works reviews building permits that affect its infrastructure. Approval was granted to construct piping on private property, which falls under the purview of the Building Department, and to connect to the City's stormwater system in a manner acceptable by the systems owner – in this case, a system that is wholly owned by the City of Miami Beach.

This in no way eliminated the need for the owners to meet other regulatory requirements. In fact it is common practice for a utility to issue permits prior to obtaining DERM permits. For example Sanitary Sewer Permits are approved by the Owner prior to DERM issuing the Sanitary Sewer Extension Permit. The City and County regularly approve sanitary sewer plans ahead of DERM for private developers.

Therefore, independent of DERM's approval to construct a drainage system it is the City's sole right to allow connections to its public stormwater system. Without DERM's approval a drainage system cannot be constructed and without the City's approval, a connection cannot be established.

Statements that insinuate the contrary, such as the one below, are misleading and, if not intentionally malicious, exemplify the fundamental lack of understanding by the authors of the OIG report.

"No municipality in Miami-Dade County has the legal authority to issue permits for the construction of stormwater drainage systems, temporary or otherwise, that empty into a body of water such as Biscayne Bay.

Finally, to paraphrase the OIG, Lanzo neglected its contractual duty to obtain permits, Stantec neglected its contractual responsibility to monitor permits, Wade Trim neglected its responsibilities under Florida law and rules that apply to licensed professional engineers, former City Engineer Mowry exhibited a poor attitude toward permitting agencies, and engineers in DERM's Water Control Section failed to notice discrepancies in information they received from the City. These are all professional and licensed staff; no direction would supersede their requirement under State or County Code to properly permit their work. To imply that there was a coordinated conspiracy to the contrary is outlandish, lazy, and unbecoming of a professional tasked with improving the City of Miami Beach.

***Response to Finding #9**. In applying for a renewal of the Class II permit, the City again decided not to give DERM recently updated As-Built plans and new drainage studies. Instead, the City obtained a permit based on the serious misrepresentation that the City and Lanzo had used Rubio's plans to build the drainage system and that no significant changes had been made since 2016.*

This finding misrepresents the contractual relationships and responsibilities of the project team and does not appear to consider the ordinary drainage permitting and installation protocols.

The City did not ***decide,*** as the finding indicates, "not to give DERM recently updated As-Built plans and new drainage studies." The truth is that the permit management activities and regulatory compliance lie with the design-builder and their engineer of record. Both of which have considerable experience in designing, permitting and constructing drainage systems. In its capacity as the engineer of record, and given their extensive experience, Wade Trim served as the project's "code and regulatory expert."

The Class II permit renewal application package was prepared and submitted by the project's engineer of record, Wade Trim. The OIG's report cites that submittal as a "serious misrepresentation," or, as speculated in other sections, a "knowing, considered and intentional" attempt to conceal project information from regulators. The glaring omission in this finding, and indeed the report, is that it fails to consider that immaterial changes are ordinarily reconciled through permit modifications at project close-out. Most notably, this finding relies on the Wade Trim letter, dated May 17, 2018, indicating that no significant changes had taken place. However, it fails to provide even a cursory examination of the second paragraph of that same letter, which reads:

> *The City of Miami Beach has recently revised the project's stormwater design criteria, which we are currently evaluating. Should the new criteria result in any significant changes, as they relate to the original signed and sealed plans and drainage calculations, they will be reflected in the project permit certification documents.*

This paragraph clearly indicates an evolving project, in response to the City's efforts to combat sea-level rise. More importantly, this letter openly indicates the engineer of record's estimation that changes incurred to date were immaterial to the permit, as well as their intention to reconcile any changes as part of the project close out. DERM took no exception with the stated intent and issued the permit because, as indicated previously, this approach is part of the ordinary protocol for drainage system design, permitting, and close-out.

Irresponsibly, the author of the Report decided to omit additional communication between the engineer of record and DERM, related to the issuance of this permit, and in fact uses the term "misconduct," to describe the application for this permit as an act of "commission and omission." The reality, omitted by this report for unknown reasons, is that the permit application to DERM included a letter dated May 10, 2018, from the engineer of record, providing a narrative whose purpose was to assist DERM in their review of the permit. The EOR's third paragraph reads:

> *City provided a change in directive requiring installation of private-side yard drains for properties that have finished floor elevations below the adjacent crown of road. The original stormwater design criteria required that the drainage area be sized to account for and reflect the actual contributory area at a minimum all road rights-of-way, 100% of interior (landlocked) lots and 50% of waterfront lots. Thusly there is enough capacity in the system to account for this additional stormwater load, particularly in light of the fact that few of the properties fall within this new City criteria.*
>
> *Additional City-directed changes will be submitted via revised plans for Palm Island and Hibiscus Islands during permit certification submittals; these mainly relate to change of pipe alignments to reduce impact to existing vegetation, addition of a secondary drainage system to reduce potential flooding in isolated*

areas, and lowering of proposed elevation of roads to reduce harmonization impacts to private properties.

Changes to the plans were disclosed, documented to be immaterial to the parameters of the permit, and proposed to be fully captured during permit certification submittals.

The OIG's report erroneously concludes that the installation of drainage inlets not reflected in the permit documents, is a significant and material change to the design. Further review and understanding of the project's evolution refute that conclusion. Former Wade Trim vice president Holly Kremers explained to the City Commission on October 30, 2019, that "88 drains...are temporary construction drains...installed in the right-of-way in front of each property on North and South Coconut Lane." Lanzo installed these additional inlets as a temporary and interim condition to manage water during construction activities, and before the system was placed into service. Given the complexity of the project, implementing these temporary measures was reasonable.

In an executive summary dated October 22, 2019, the Lanzo/Wade Trim team further explain:

One construction challenge was ensuring that properties were not made susceptible to increased flooding during construction of the elevated streets before the new drainage system was complete and placed into service. The design-build team's solution for this was to place a temporary construction drain within the ROW in front of each property on North and South Coconut Lane to convey stormwater away from the property as needed during construction. The drainage system was not connected to the pump station and in service during the period of intended use of these temporary construction drains, and each drain was intended to be abandoned in place prior to project completion. Though these temporary construction drains were not shown on the design drawings, it was not the intent of the City or the design-build team to deliberately violate any Class II permit agreements or policies, as the drains would have been removed prior to start-up of the pump station and conveyance of stormwater to the Bay

Again, it is apparent that the project's code expert did not consider these inlets to be a significant, material change to the design. The reason for that estimation is simple: these additional inlets did not alter the tributary area nor the volume of water to be collected and treated. From a technical perspective, there was no change. It should be noted that the report erroneously refers to additional inlets as **"private side yard drains." Additional inlets were installed within the right-of-way, and not on private property.**

As has been stated previously, City officials and the Commission were aware that as the City developed its policies to combat sea-level rise, some accommodations would have to be made to protect low-lying properties. What was not certain, and remains under discussion even to this day, is the exact manner in which those accommodations would take form. An examination of the project's evolution shows the progressive responses to the developing stormwater drainage criteria; from proactive installation of underground connection points, to additional inlets within the right-of-way, to the eventual design and permitting of inlets within private property.

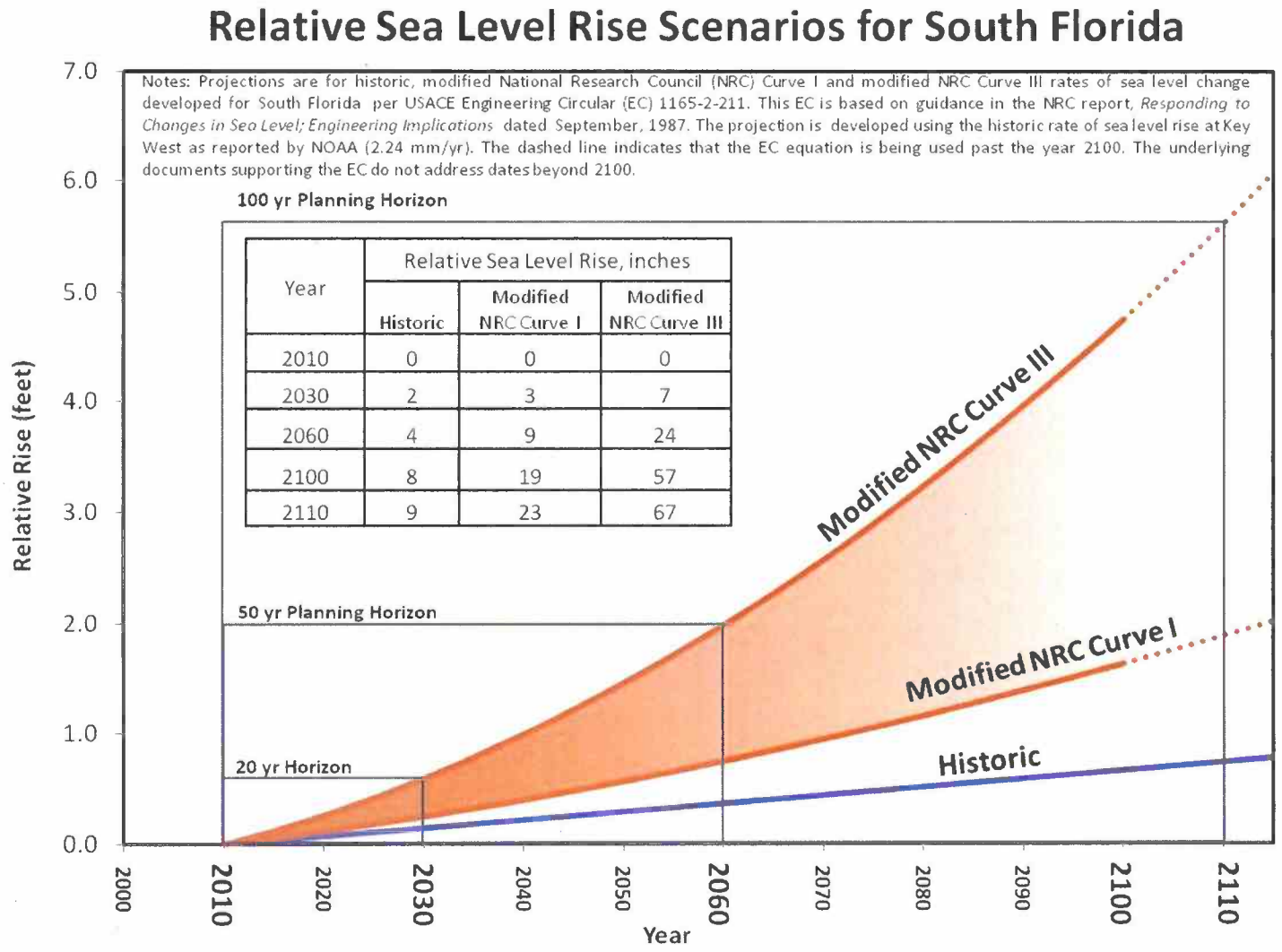
As was always intended, following ordinary and customary protocols, the project has commenced the process of closing the drainage permit. As of the date of this writing, January 8, 2021, the Engineer of Record has submitted the permit closure for Hibiscus Island, which has

been reviewed, inspected and accepted by DERM. Permit modification for Palm Island has also been submitted and is currently under review by DERM. Once the permit modification is accepted, the permit closure will follow, and the City's public stormwater drainage system will be complete.

Following the direction received from the City Commission, the project team has evaluated 112 properties and determined that 85 properties qualify for connection to the City's drainage system, 23 of which have declined the installation of an inlet. The engineer of record has completed the design for 62 additional inlets; 11 within the right-of-way and 51 on private property. Of these, DERM has issued permits for 59. Following the receipt of permits, Lanzo commenced the installation of those inlets, and as of this date, has completed the installation of 45 inlets, and has abandoned/removed 24 of the temporary inlets.

Exhibit 1

Figure 3. USACE Sea Level Rise Projection for the South Florida Region through 2110. Unlike the SE FL unified sea level rise projection developed by the Work Group shown in Figure 2, this graphic is developed directly according to the USACE Guidance document and illustrates the projection beyond 2100. With time, the projection increasingly diverges from the historic rate of rise.



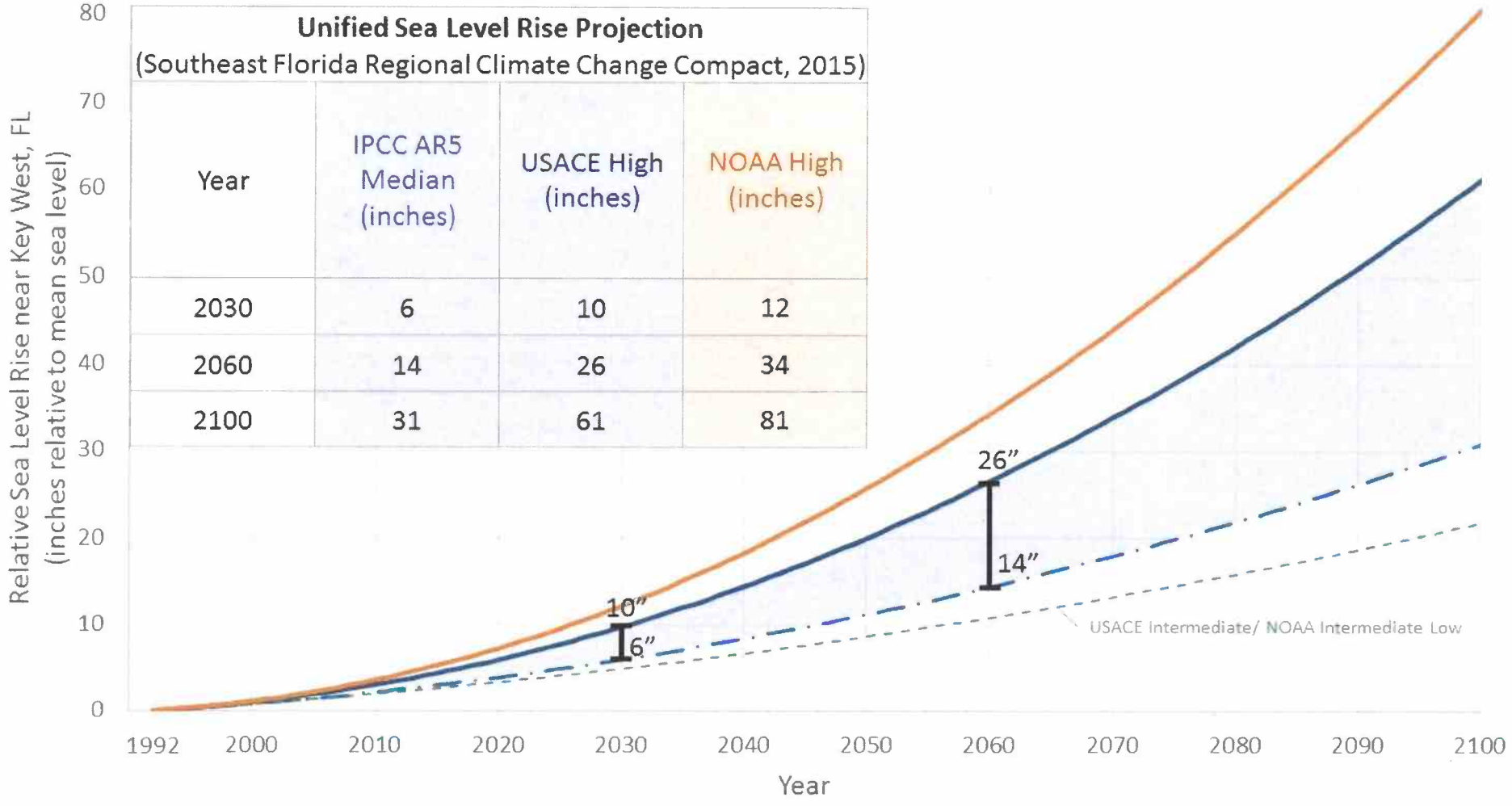


Figure 1: Unified Sea Level Rise Projection. These projections are referenced to mean sea level at the Key West tide gauge. The projection includes three global curves adapted for regional application: the median of the IPCC AR5 RCP8.5 scenario as the lowest boundary (blue dashed curve), the USACE High curve as the upper boundary for the short term for use until 2060 (solid blue line), and the NOAA High curve as the uppermost boundary for medium and long term use (orange solid curve). The incorporated table lists the projection values at years 2030, 2060 and 2100. The USACE Intermediate or NOAA Intermediate Low curve is displayed on the figure for reference (green dashed curve). This scenario would require significant reductions in greenhouse gas emissions in order to be plausible and does not reflect current emissions trends.

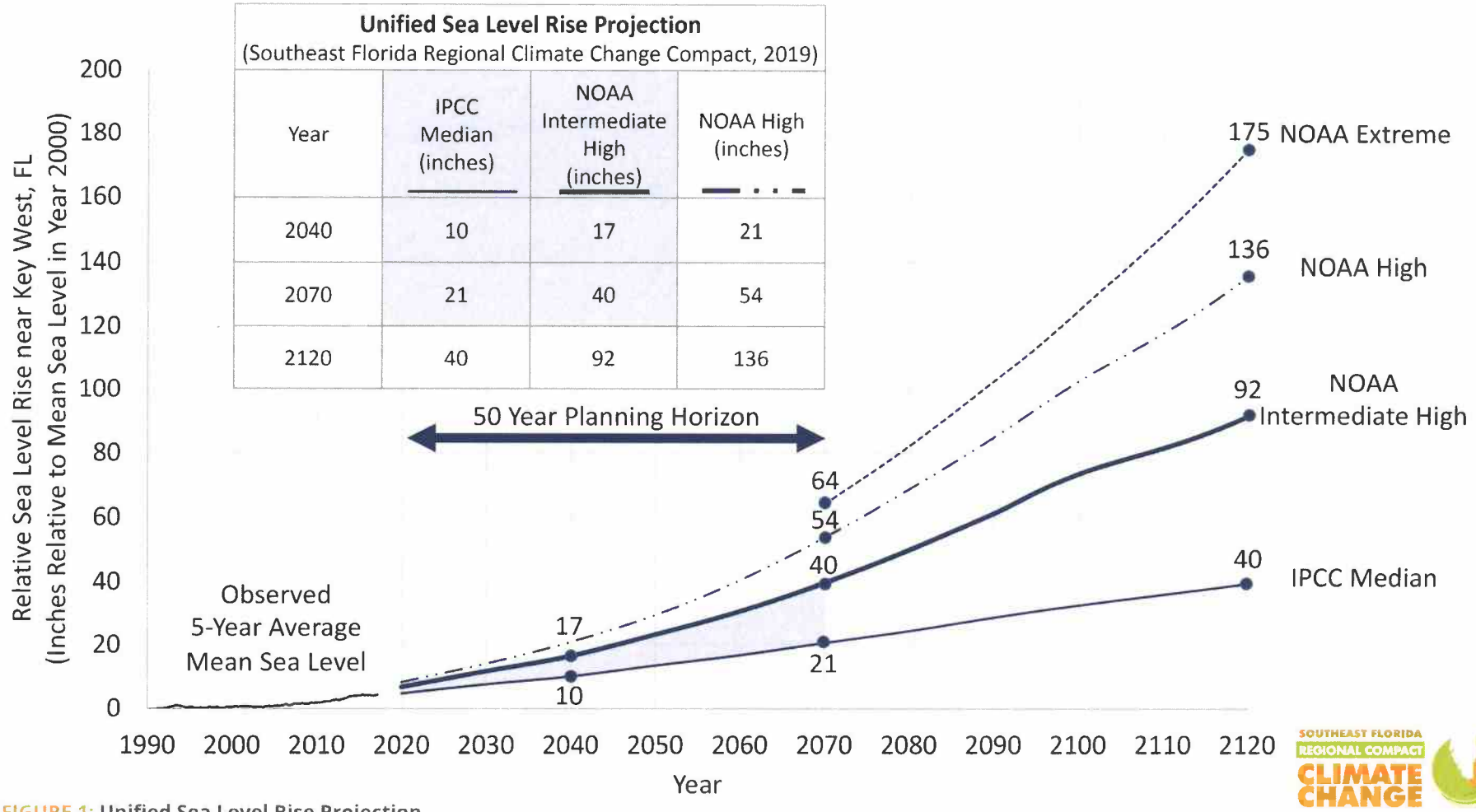


FIGURE 1: **Unified Sea Level Rise Projection**

These projections start from zero in year 2000 and are referenced to mean sea level at the Key West tide gauge. Based on the 5-year average of mean sea level, approximately 3.9 inches of sea level rise has occurred from 2000 to 2017 (see historic sea level section of guidance document). The projection includes global curves adapted for regional application: the median of the IPCC AR5 RCP 8.5 scenario (Growing Emissions Scenario) as the lowest boundary (solid thin curve), the NOAA Intermediate High curve as the upper boundary for short-term use until 2070 (solid thick line), the NOAA High curve as the upper boundary for medium and long-term use (dash dot curve). The shaded zone between the IPCC AR5 RCP 8.5 median curve and the NOAA Intermediate High is recommended to be generally applied to most projects within a short-term planning horizon. Beyond 2070, the adaptability, interdependencies, and costs of the infrastructure should be weighed to select a projection value between the IPCC Median and the NOAA High curves. The NOAA Extreme curve (dash curve) brackets the published upper range of possible sea level rise under an accelerated ice melt scenario. Emissions reductions could reduce the rate of sea level rise significantly.

Exhibit 2

JOINT WORKSHOP

{ NEIGHBORHOOD AND COMMUNITY AFFAIRS COMMITTEE AND BLUE RIBBON PANEL ON SEA LEVEL RISE AND FLOODING

CITYWIDE NEIGHBORHOOD IMPROVEMENTS AND STORMWATER PROGRAM

July 12, 2017

WORKSHOP OUTLINE

- RESIDENT PERCEPTION- OUTREACH AND ENGAGEMENT RESULTS
- FEEDBACK LOOP AND OUTREACH TOOLS
- FLOODING HISTORY
- STORMWATER PROGRAM TIMELINE
- PROJECT TIMING DISCUSSION

GOAL

To continue the stormwater, water, wastewater, and road infrastructure investments for flood risk reduction, climate adaptation, and overall improved services in a manner that ensures resident collaboration, mobility, livability, and quality of life for today and our resilient and sustainable future.

RESIDENT PERCEPTION

100 RESILIENT CITIES QUESTIONNAIRE- TOP 3 PRIORITIES

MIAMI BEACH 342 PARTICIPANTS
GREATER MIAMI AND THE BEACHES (GM&B) 2031 PARTICIPANTS

RESIDENT PERCEPTIONS
SEA LEVEL RISE AND FLOODING
STATISTICALLY VALID SURVEY

- OF RESIDENTS **SUPPORT USING TAX DOLLARS** TO ADDRESS RISING SEA LEVELS

89%

76%

- OF RESIDENTS HAVE OBSERVED **COASTAL WATER LEVEL INCREASES**

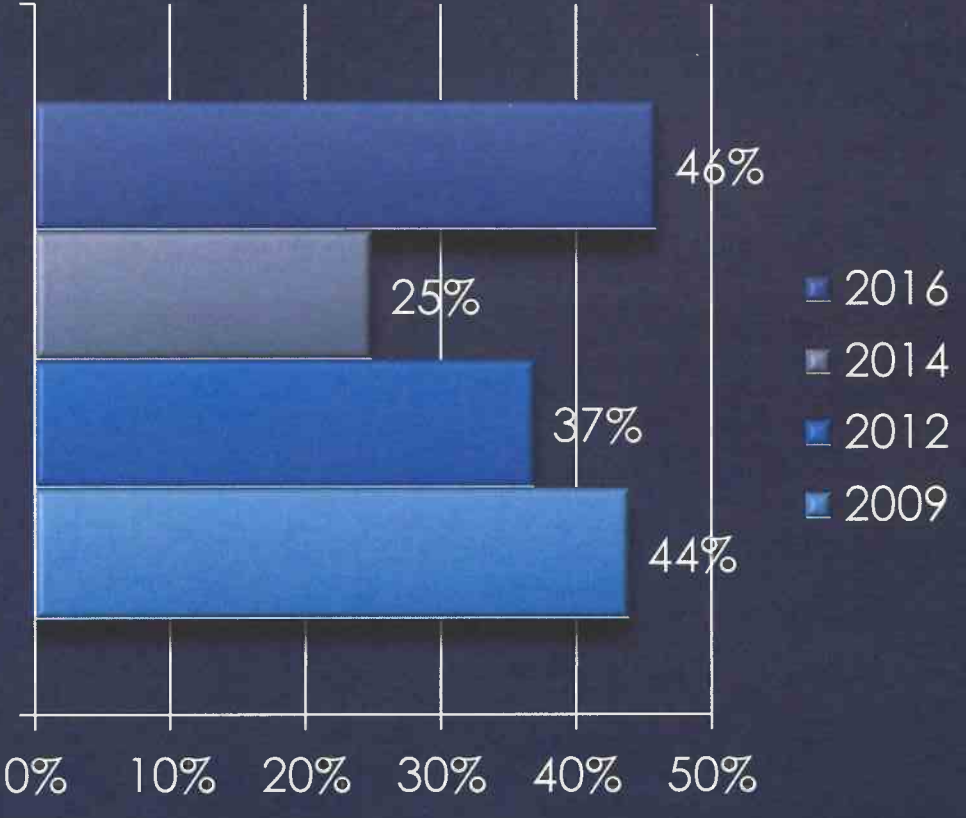
- OF RESIDENTS HAVE OBSERVED **INCREASED FLOODING**

74%

2016 CITY OF MIAMI BEACH RESIDENT SURVEY
ETC INSTITUTE

#1 STORMWATER AND DRAINAGE IS THE MOST IMPORTANT CAPITAL IMPROVEMENT PROJECT FOR RESIDENTS

RESIDENT SATISFACTION WITH EFFORTS TO MANAGE STORMWATER DRAINAGE/ FLOODING



2016 CITY OF MIAMI BEACH RESIDENT SURVEY
ETC INSTITUTE

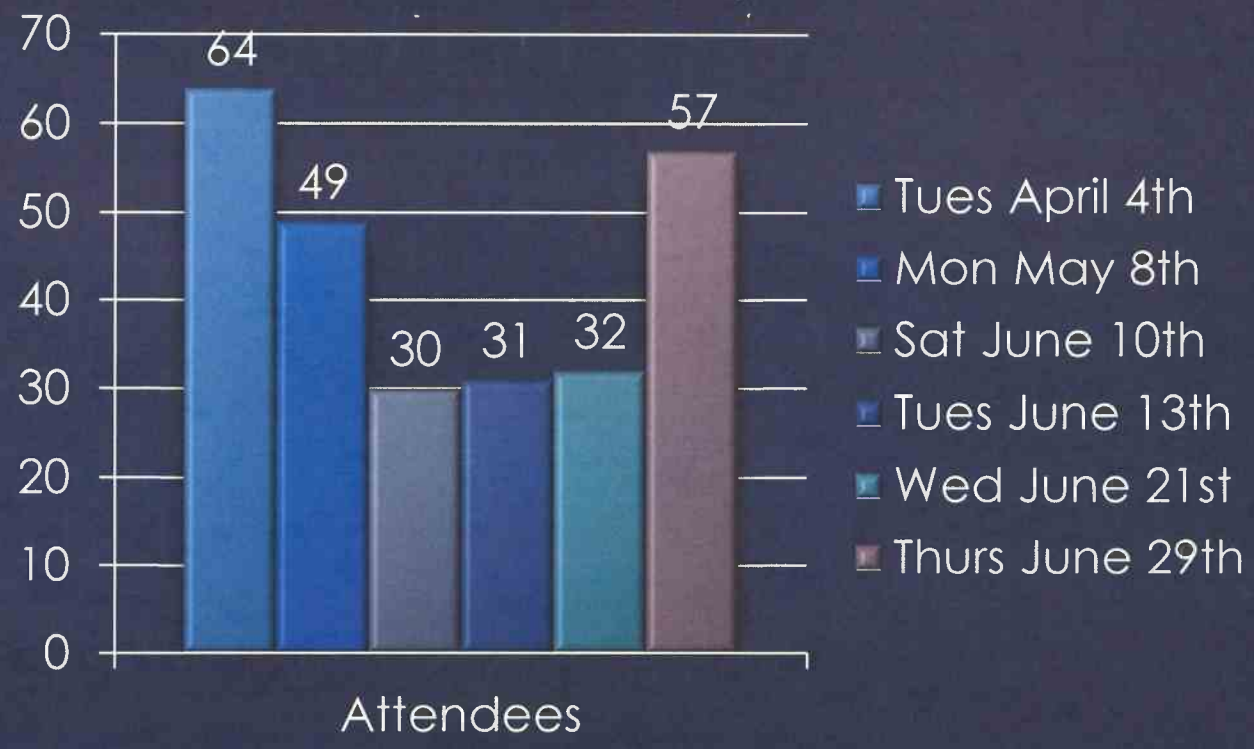
HIGHEST PRIORITIES FOR RESIDENTS

STATISTICALLY VALID SURVEY

1. THE JOB THE CITY IS DOING TO ADDRESS HOMELESSNESS
2. CLEANLINESS OF NEIGHBORHOOD STREETS
3. EFFORTS TO MANAGE STORMWATER DRAINAGE/ FLOODING
4. CLEANLINESS OF CANALS/ WATERWAYS
5. PERFORMANCE IN ADDRESSING NEEDS OF RESIDENTS
6. QUALITY OF POLICE SERVICES

2016 CITY OF MIAMI BEACH RESIDENT SURVEY
ETC INSTITUTE

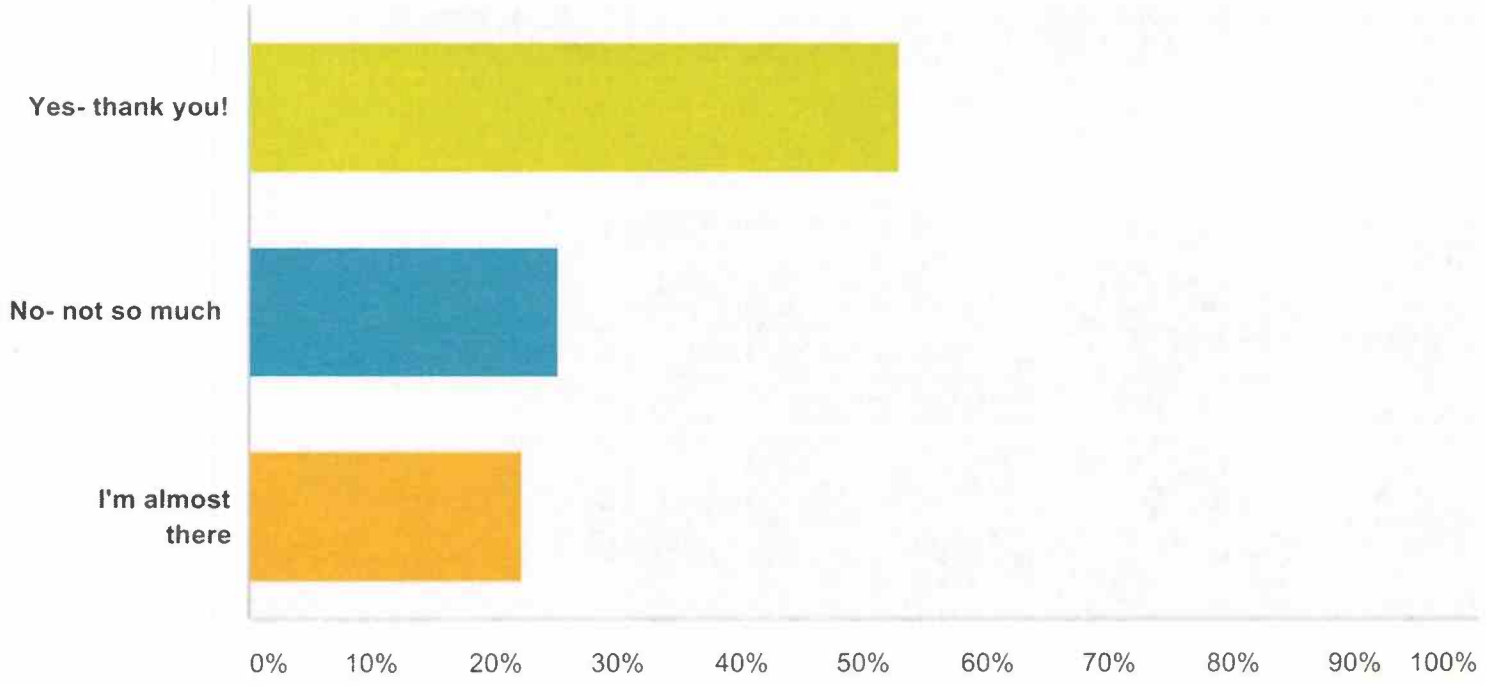
RESILIENCE OPEN HOUSE
263 ATTENDEES



Miami Beach Open House Exit Survey

Q1 Was enough information provided tonight for you? (select one)

Answered: 36 Skipped: 0

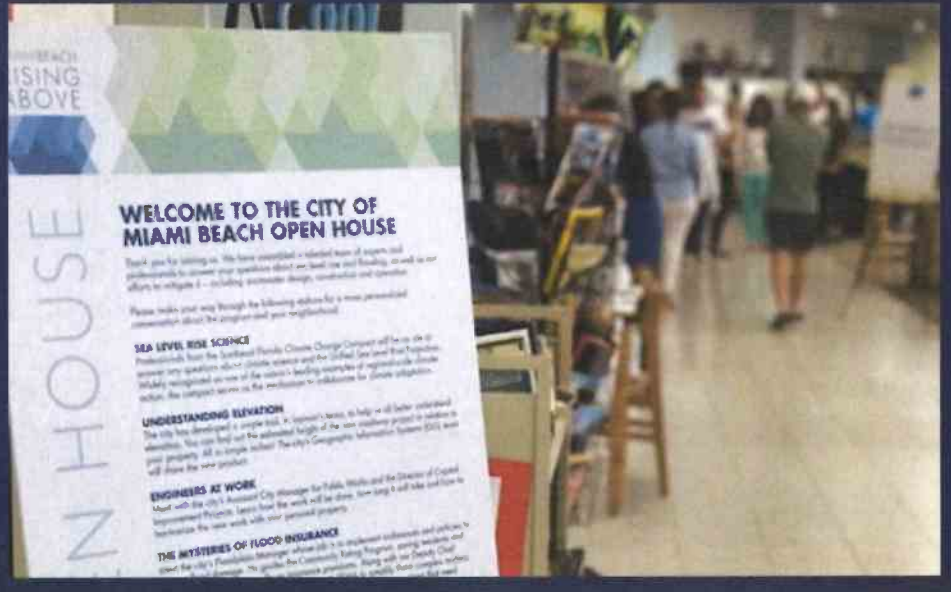


	RESIDENT QUESTIONS	STAFF ANALYSIS	ACTION
1	FLOOD INSURANCE IMPACT	FEMA CONTACT AND RESEARCH	FLOOD INSURANCE FACT SHEET CONGRESSIONAL HEARINGS
2	FLOODING IMPACT ON PRIVATE PROPERTY	ENGINEERING REVIEW	ADDITIONAL DRAINAGE INLET DESIGNED
3	ROADWAY ELEVATION	RESILIENCE & GIS PROJECT	ADAPTATION CALCULATOR

PUBLIC FEEDBACK LOOP

	RESIDENT QUESTIONS	STAFF ANALYSIS	ACTION
4	FLOODING IMPACT ON PRIVATE PROPERTY	ENGINEERING REVIEW	DRAINAGE CAPACITY FOR PRIVATE PROPERTY
5	FLOODING IMPACT ON PRIVATE PROPERTY	ENGINEERING REVIEW	COMMISSION RESOLUTION
6	INDIVIDUAL AND NEIGHBORHOOD CONCERNS	IMPROVE PUBLIC ENGAGEMENT METHODS	RESILIENCE OPEN HOUSES AND FAQs
7	HARMONIZATION WITH PRIVATE PROPERTY	INDIVIDUAL ON-SITE CONSULTATION	INDIVIDUAL HARMONIZATION DESIGN

PUBLIC FEEDBACK LOOP



NEW OUTREACH TOOLS

Sample 1

FEEDBACK LOOP OUTREACH TOOL EXAMPLE

Sample 2

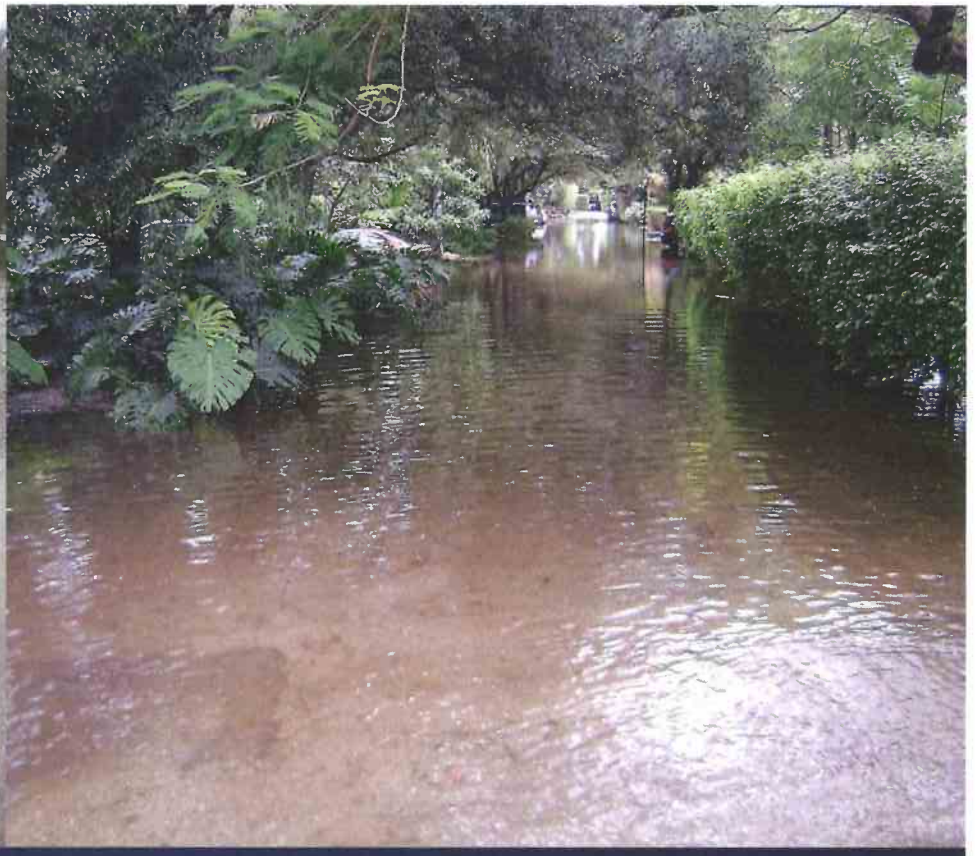
FEEDBACK LOOP OUTREACH TOOL EXAMPLE

ADAPTATION
CALCULATOR

FEEDBACK LOOP OUTREACH TOOL EXAMPLE

HISTORY OF FLOODING

PRIOR TO INFRASTRUCTURE UPGRADES

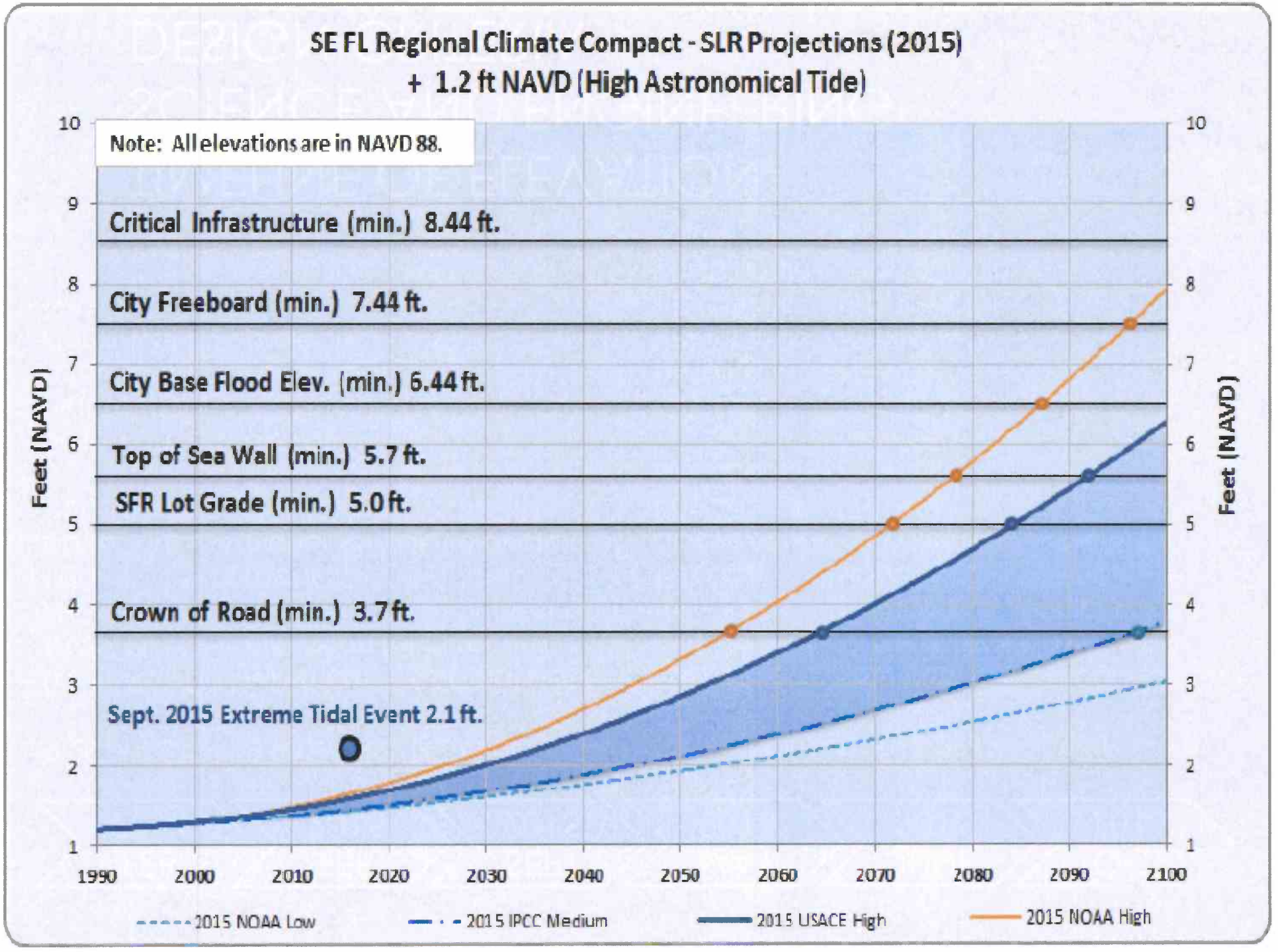


HISTORY OF FLOODING

PRIOR TO INFRASTRUCTURE UPGRADES

TIMELINE OF ELEVATION-SCIENCE AND ENGINEERING DESIGN CRITERIA

FEB 2014	FEB 2015	SEPT 2015	MAY 2016	JUNE 2016	OCT 2016
R 2014-28499 0.5 Ft-NAVD to 2.7 Ft-NAVD for all tidal boundary conditions. Based on highest tidal events non-storm 1.7 Ft-NAVD	R 2015-28921 Minimum elevation for crown of roads 1' higher (3.7 Ft-NAVD) than the tail water elevation of 2.7 Ft-NAVD For specific projects	Virginia Key Tidal station records highest king tide elevation of 2.07 Ft-NAVD	O 2016-4009 Establishes min 1Ft and max 5 Ft freeboard above FEMA Base Flood Elevation LDR for building height, min elevations yards single family	R 2016-29454 Future crown of road, back of sidewalk elevations 3.7 Ft-NAVD New seawalls min 5.7 Ft-NAVD, Replaced/ repaired seawalls min 4.0 Ft-NAVD	Virginia Key Tidal station records highest king tide elevation of 2.1 Ft-NAVD


SE FL Regional Climate Compact - SLR Projections (2015)
+ 1.2 ft NAVD (High Astronomical Tide)
Note: All elevations are in NAVD 88.
Critical Infrastructure (min.) 8.44 ft.
City Freeboard (min.) 7.44 ft.
City Base Flood Elev. (min.) 6.44 ft.
Top of Sea Wall (min.) 5.7 ft.
SFR Lot Grade (min.) 5.0 ft.
Crown of Road (min.) 3.7 ft.
Sept. 2015 Extreme Tidal Event 2.1 ft.
Feet (NAVD)
10
9
8
7
6
5
4
3
2
1
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2015 NOAA Low
2015 IPCC Medium
2015 USACE High
2015 NOAA High

ALL 4 COUNTIES
MORE THAN 1/3 CITIES

Have adopted the Southeast Florida Climate Change Compact Unified Sea Level Rise Projection for Planning

RESILIENCE PROJECTS BENEFITS

New Water Lines

- Reduced chances of water pipe breaks and lapses in water service
- Improved water pressure in your home
- Increased water flow for the Fire Department in case of an emergency

New Wastewater Infrastructure

- Increased protection of near-shore water quality with reduced likelihood of sewage overflows
- Energy savings from reduced inflows
- Lower maintenance costs
- Safeguarding homes and businesses from sewage backups

New Stormwater System

- Improved drainage in rain and high tide events
- Increased protection from hurricane storm surge and sea level rise
- Reduced risk of flood damage to property

New Roads and Sidewalks

- New and improved lighting
- Increased accessibility for emergency vehicles
- Enhanced neighborhood aesthetics with new roadways, sidewalks, and landscaping
- Improved safety for pedestrians

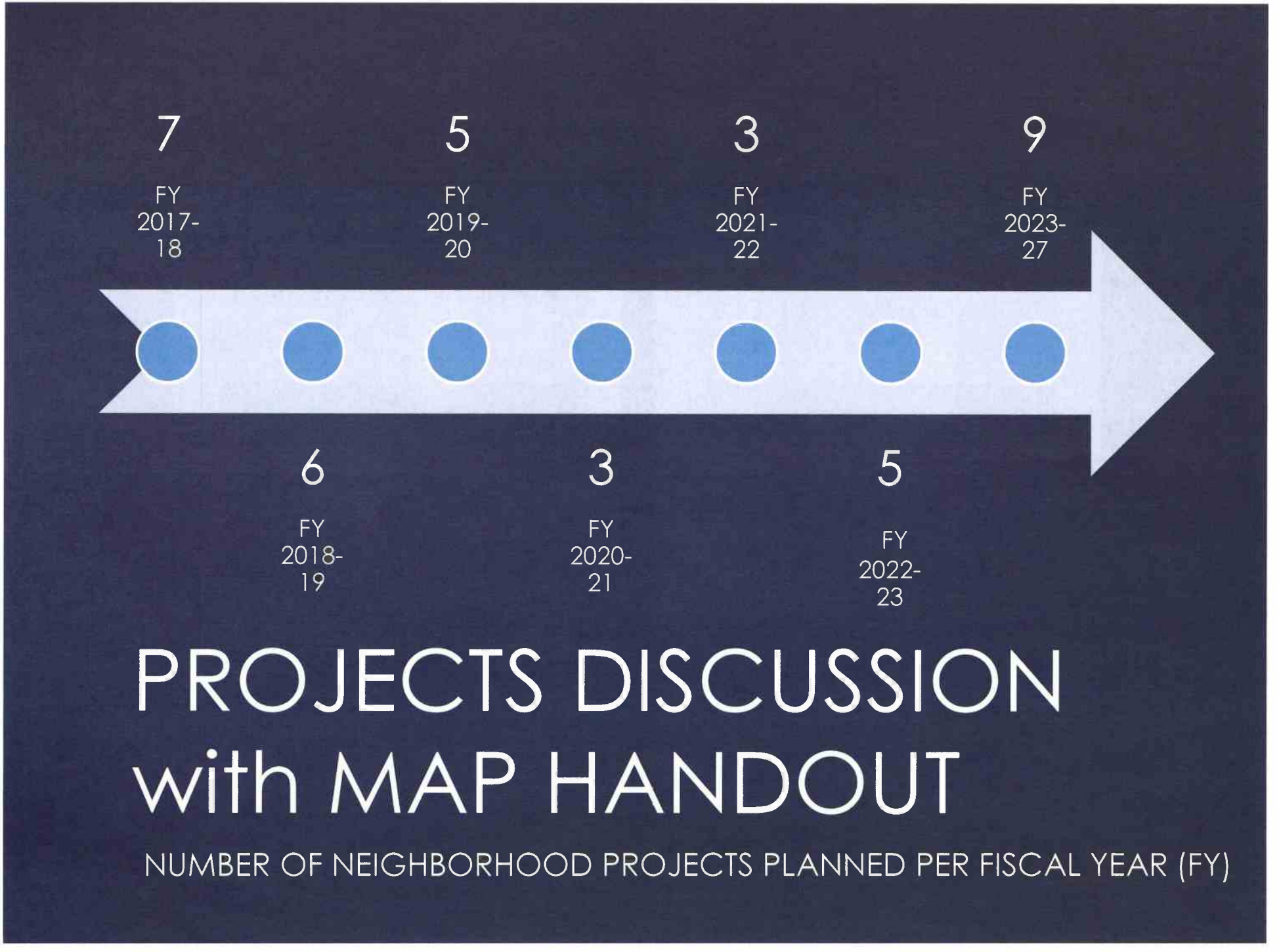
POLICY DECISIONS MADE

- TO INVEST IN AND REPLACE AGING INFRASTRUCTURE
  STORMWATER, WATER, WASTEWATER, ROAD
- TO USE CLIMATE CHANGE COMPACT SCIENCE
- TO ADAPT TO SEA LEVEL RISE

PENDING DECISIONS FEEDBACK NEEDED

- TIMING OF PROJECTS
- PRIVATE PROPERTY HARMONIZATION
- LOCALIZED AND INDIVIDUAL DESIGN

DISCUSSION & DECISIONS



PROJECTS DISCUSSION with MAP HANDOUT

NUMBER OF NEIGHBORHOOD PROJECTS PLANNED PER FISCAL YEAR (FY)

MIAMIBEACH
RISING
ABOVE

THANK YOU!

Exhibit 3

CITY OF MIAMI BEACH, FLORIDA

Engineer's Report for the Stormwater Revenue and Revenue Refunding Bonds, Series 2017

RISING ABOVE

MIAMIBEACH

November 29, 2017

FINAL

Prepared by

AECOM

800 Douglas Entrance
North Tower, 2nd Floor
Coral Gables, Florida 33134
Phone: (305) 592-4800
www.aecom.com

AECOM

Table of Contents

AECOM

List of Figures

AECOM
800 Douglas Entrance
North Tower, 2nd Floor
Coral Gables, Florida 33134

(305) 592-4800 tel
www.aecom.com

November 29, 2017

Mr. John Woodruff
Chief Financial Officer
City of Miami Beach, Florida
1700 Convention Center Drive
Miami Beach, Florida 33139

Subject: Engineer's Report for the City of Miami Beach, Florida
Stormwater Revenue and Revenue Refunding Bonds, Series 2017

Dear Mr. Woodruff,

AECOM has prepared this letter report to present pertinent engineering information for the Official Statement relating to the issuance by the City of Miami Beach, Florida (City) of its Stormwater Revenue and Revenue Refunding Bonds, Series 2017 (Series 2017 Bonds). The Series 2017 Bonds are being issued to finance continued construction of improvements to the stormwater systems throughout the City as begun with proceeds from the City's Stormwater Revenue Bonds, Series 2000 (Series 2000 Bonds), Stormwater Revenue Bonds, Series 2011A (Series 2011 Bonds), and Stormwater Revenue Bonds, Series 2015 (Series 2015 Bonds).

This Engineer's Report contains information prepared by AECOM relative to the City's stormwater system as developed and proposed in part by the 2011 City of Miami Beach Citywide Comprehensive Stormwater Master Plan prepared by CDM Smith Inc. (2011 SWMP) and makes reference to both the 2011 SWMP and the 1997 Comprehensive Stormwater Management Program Master Plan prepared by CH2M Hill (1997 SWMP) in combination with various Basis of Design Reports developed by other engineering consultants and current basin studies being prepared by AECOM. Since 2014 AECOM has evaluated over 30 individual neighborhoods to determine the number and size of required pumping systems, and drainage improvements, and is in process of preparing an updated SWMP.

Subsequent to adoption of the 2011 SWMP, the City implemented policy changes related to flood mitigation, drainage and roadway Level of Service (LOS) to maintain flood protection while taking into account sea level rise, king tide events, and increased rainfall depth, intensity and distribution. AECOM evaluated the prior reports and studies and has updated the citywide master stormwater model to evaluate areas deficient in LOS. Based on this analysis, it was determined that the drainage designs contained within the 2011 SWMP were inadequate to serve the City's needs.

AECOM
800 Douglas Entrance
North Tower, 2nd Floor
Coral Gables, Florida 33134

(305) 592-4800 tel
www.aecom.com

In addition, as a result of the predicted increase in groundwater levels resulting from sea level rise, the City has implemented a working policy to (over time) reduce and/or eliminate the use of exfiltration trenches, gravity drainage wells and stormwater injection wells due to concerns over reliability and decreasing capacity, which further modified the 2011 SWMP drainage designs.

Various aspects of the City's stormwater system are included in this Engineer's Report in the following format:

- Introduction
- Public Works Department and Stormwater System Development
- Stormwater System, and
- Capital Improvements

It is the intent of this Engineer's Report to identify proposed projects that will provide comprehensive solutions for improving the City's stormwater management system performance for the next 50 years. Appropriate consideration has been given to water quality of the Biscayne Bay and Operation and Maintenance (O&M) of an expanded system. The presented capital improvements allow the City's stormwater systems to meet the increasing performance, permitting and regulatory demands while modernizing the existing system to meet the drainage and roadway LOS desired by the City of Miami Beach.

Respectfully submitted;

AECOM

Thomas F. McGowan, PE
Project Manager

Florida License #44742
FPBE & BPR #8115

SEAL

AECOM

1. Introduction

1.1 Background

The City of Miami Beach (the "City") has experienced tidal flooding for many years. The tidal flooding has been severe during higher than average tides experienced in the spring and the fall of each year. The fall high tides are the highest tides of the year, and are also known as the King Tides. Tidal flooding occurs when the Biscayne Bay water surface elevation rises sufficiently to backflow into the City's stormwater management system and up through the stormwater inlet grates, flooding the roadway curb and gutter. During some high tide events, the tidal flooding can overtop the roadway curb and gutter and sidewalks, filling the streets of the City with salt water. Tidal flooding poses a threat to public health and safety and inconveniences the public. The flooding has caused major damage to structures and killed lawns and landscaping. In addition, tidal flooding saturates the base structure of roadways, causing deterioration and failure of roadways prior to their expected useful design life.

AECOM has prepared this letter report to present pertinent engineering information for the Official Statement relating to the issuance by the City of its Stormwater Revenue and Revenue Refunding Bonds, Series 2017 (the "Series 2017 Bonds"). Proceeds of the Series 2017 Bonds will provide funds, together with other available funds, to (i) pay the costs of certain capital improvements to the Stormwater Utility as described in the Bond Resolution (the "Series 2017 Project"), (ii) refund a portion of the City's outstanding Stormwater Revenue Bonds, Series 2011A (the "Series 2011A Bonds") and the Stormwater Revenue Refunding Bonds, Series 2011B (the "Series 2011B Bonds" and together with the Series 2011A Bonds, the "Refunded Bonds"), and (iii) pay costs of issuance of the Series 2017 Bonds, and refunding of the Refunded Bonds.

The Series 2017 Bonds are being issued to finance continued construction of the improvements to the stormwater utility system owned and operated by the City together with any improvements and any Separate Systems (as defined in the hereinafter defined Resolution) consolidated with the Stormwater Utility pursuant to the Resolution (the "Stormwater Utility"), as begun with proceeds from the City's Stormwater Revenue Bonds, Series 2000 (the "Series 2000 Bonds"), Stormwater Revenue Bonds, Series 2011A (the "Series 2011 Bonds"), and Stormwater Revenue Bonds, Series 2015 (the "Series 2015 Bonds"). The City authorized AECOM to prepare an Engineer's Report in support of the City's planned issuance of approximately $300 million of Stormwater Revenue Bonds in order to complete the upgrades to the City's Stormwater Utility (the Stormwater Program). The Series 2017 Bonds will be issued to provide $100 million of proceeds for such a purpose to finance current fiscal year projects and those anticipated to be constructed over the next two (2) years.

In July 2008, CDM Smith Inc. (CDM Smith) was retained by the City to perform a Stormwater Rate Study projecting annual revenue requirements for Fiscal Years 2009 through 2014, including operating expenses, existing and prospective debt service, administrative fees, depreciation/renewal and replacement requirements, and capital expenditures.

In 2015, AECOM and City Staff reviewed and updated the Stormwater Rate Study and made recommendations to increase stormwater utility rates in support of the Series 2015 Bonds. The City's current stormwater utility rates are in effect based on recommendations from the 2015 updated Rate Study. The City recently retained Public Resource Management Group, Inc. (PRMG) to further update the Stormwater Rate Study. On October 1, 2016, the City raised the stormwater utility rates in anticipation of the issuance of the Series 2017 Bonds. No additional increase in rates is required, or anticipated to support the issuance of the Series 2017 Bonds. In addition, on October 18, 2017 the City passed Ordinance No. 2017-4145 indexing the stormwater utility rates to the Consumer Price Index, (CPI), effective for all billings after October 1, 2017 and adjusted at the beginning of each Fiscal Year.

This Engineer's Report presents the results of an updated analysis, and describes the organization and management of the City's Public Works Department and the specific responsibilities of the Stormwater Utility (as defined in City Resolution No. 2000-24127 adopted by the City on October 18, 2000, as amended and supplemented (the "Bond Resolution") authorizing issuance of stormwater revenue bonds). This report outlines the City's stormwater service areas, facilities, operations and Capital Improvement Program ("CIP").

In July 2014, the City retained AECOM to evaluate the Citywide Comprehensive Stormwater Management Master Plan prepared by CDM Smith (2011 SWMP) to analyze and update its stormwater management practices, infrastructure, funding, and regulatory policies. In this capacity, AECOM has analyzed, reviewed and assessed various aspects of the Stormwater Utility infrastructure, management, operations and finances.

This Engineer's Report contains information prepared by AECOM relative to the City's Stormwater Utility, as developed and proposed in part by the 2011 SWMP. This Engineer's Report makes reference to both the 2011 SWMP and the 1997 Comprehensive Stormwater Management Program Master Plan prepared by CH2M Hill, (1997 SWMP), in combination with various Basis of Design Reports developed by other engineering consultants and basin studies prepared by AECOM. In addition to AECOM's analysis and update, these previously developed reports and studies provide AECOM the means of assessing the technical merit for the issuance of the Series 2017 Bonds.

1.2 Study Assumptions

Information utilized in preparation of this report relies upon information provided by the City and other parties as well as basin studies prepared by AECOM. AECOM has not independently verified all of the supplied information. However, the information follows general trends of the City related to the management of its stormwater infrastructure. AECOM has no reason to believe the supplied information is not valid for this report, yet no assurances are made with respect thereto. Specific assumptions used in this report are presented throughout the course of this report and are provided to clarify the basis of analysis.

AECOM

2. Public Works Department and Stormwater System Development

2.1 Description of the Existing Stormwater System

The City is a highly urbanized coastal community located in southeast Florida and is a major economic resource to the region. The Stormwater Utility covers approximately 4,200 acres, as shown in **Figure 1,** and is bounded by the Atlantic Ocean and the environmentally sensitive Biscayne Bay Aquatic Preserve, which is also an Outstanding Florida Water ("OFW"),. The area has relatively low-lying topography that is bisected by intracoastal waterways, a subtropical climate with high intensity rainfall, significant tidal influence, limited soil storage for infiltration, high amounts of impervious area, and limited available surface storage. These factors have all contributed to historical, and have the potential to contribute to future, severe rainfall and tidal flooding.

Tidal events can cause both flooding and erosion. The City is comprised of a series of islands and has a perimeter of seawalls around the island system. Topographic elevations range from approximately 10 feet referenced to North American Vertical Datum of 1988 (feet-NAVD) to 0.0 feet-NAVD, and much of the City's stormwater infrastructure and roads lie at or below 6 feet-NAVD. Low street gutter elevations range as low as 0.5 feet-NAVD.

The City's Stormwater Utility is tidally influenced and consists of approximately 341 City maintained outfalls served by swales, inlets, storm drains, culverts, bridges, gravity and pumped recharge wells, exfiltration systems, channels, canals, pump stations, and retention/detention storage systems.

The City is one of 33 municipalities that entered into an Interlocal Agreement ("ILA") with Miami-Dade County in 1993, authorizing Miami-Dade County to be the lead permittee in submitting a National Pollutant Discharge Elimination System ("NPDES") Stormwater Permit Application. One condition of the ILA requires the City to develop a stormwater master plan that is consistent with Miami-Dade County's Master Plan.

The City's stormwater system currently operates under Florida Department of Environmental Protection ("FDEP") Municipal Separate Storm Sewer System (MS4) Permit No. FLS000003-003, which adheres to the federal NPDES requirements of the Clean Water Act. The MS4 Permit for the Stormwater Utility was scheduled to expire on June 20, 2016. An application to renew the permit was timely filed and the current permit remains in effect until the new permit is issued. A draft of the new permit has been issued, and is currently being advertised for public comment. It is expected that the new permit will be issued before the end of December 2017. As recorded in the City's stormwater Geographic Information System (GIS) database, the stormwater infrastructure in place includes approximately 4,852 stormwater inlets, 8,398 conduits (gravity pipes and force mains), 2,675 manholes, 35 pumping stations, and 341 stormwater outfalls.


SR 934
Collins Avenue
BISCAYNE BAY
Alton Road
I-195
Alton Road
Collins Avenue
ATLANTIC OCEAN
I-395
Legend
Miami Beach Boundary
Major Roads
Data Source: City of Miami Beach
City of Miami Beach Study Area Map
Figure 1
N
W
E
S
0 1,750 3,500 7,000 10,500
Feet
AECOM

In addition, the City has 11 pump stations under construction which are anticipated to be placed into operation in early 2018 and an additional 3 in final design or currently under contract to construct. Of the 35 pumping stations, 4 pump stations were constructed by the Florida Department of Transportation ("FDOT"), but are operated and maintained by the City. This does not include the several private, County, and State owned pump stations and outfalls within the City limits.

2.2 Administration and Staffing

The City is organized under the Commission-Manager form of government. The governing body of the City is the City Commission, which establishes policies for proper administration of the City. The City Commission is composed of seven members, including the Mayor. The Mayor and Commissioners are elected to their offices by an at-large vote of the citizens, and the Vice-Mayor is chosen by majority vote of all members of the City Commission. Six Commissioners serve staggered four year terms, and the Mayor serves a two year term. The City Commission appoints a City Manager to act as administrative head of the City. The City Manager serves at the pleasure of the City Commission, carries out its policies, directs the operations of the City and has the power to appoint or remove heads of all departments.

Figure 2 presents the organizational chart for the City's Public Works Department. The Public Works Department is responsible for the operation and maintenance of the facilities of the stormwater system. Eric T. Carpenter, PE is the Public Works Director/Assistant City Manager, and is assisted by two (2) Assistant Public Works Directors.

The Assistant Public Works Director and Director of the City's Infrastructure Division of the Public Works Department, Roy Coley, is responsible for the daily operations of the stormwater system. The Infrastructure Director oversees Operation and Maintenance ("O&M") and minor construction of the following:

- Sewer collection system
- Water distribution system
- Stormwater collection and disposal system
- Pump stations
- Water metering

The Infrastructure Director also oversees warehouse operations.

Other Public Works Department Divisions are overseen by the Assistant Public Works Director, Jay Fink, PE who reports to the Public Works Director. The City Engineer, Bruce Mowry, Ph.D., PE, is responsible for the daily operations of these divisions. These Department Divisions provide the following services:

- Planning and Engineering of the following:
    - Sewer collection system
    - Water distribution system
    - Water Metering
    - Stormwater collection and disposal system

  - Pump stations
- Right-of-Way permitting and enforcement
- Elevator Inspection
- Geographic Information Systems (GIS)

There are two (2) more divisions that fall under the Public Works Department and they are the Sanitation Division and the Greenspace Management Division. The Sanitation Division is managed by Al Zamora, and the Greenspace Management Division is managed by Rodney Knowles.

The Public Works Department is supported by other departments within the City. The City Manager's office provides managerial and administrative guidance. The Finance Department performs the utility billing function. The Procurement Department performs several functions including, among others: handling requests for payment of invoices received by the Public Works Department; advertising and awarding of all construction contracts; handling all requests for proposals for engineering consultants and contracts; and facilitating purchases of required equipment. The Office of Budget and Performance Improvements (OBPI) approves all spending requests and allocates funding for all water, wastewater and stormwater operations. The Fleet Maintenance and Property Management Department performs vehicle fleet maintenance and building maintenance, respectively. The Human Resources Department handles all personnel functions. The Capital Improvement Project Office provides planning, design review, fiscal and construction management services of major City capital projects.

The City bills monthly for water, wastewater, stormwater, and sanitation services on the same bill. There are four billing cycles each month. The prioritization of applying payments is first to stormwater, second to sanitation, third to wastewater, and last to water.

Payments are due within twenty one (21) days from the date of the bill. A one and one-half percent (1.5%) penalty is added to all charges on the bills if not paid within the twenty one (21) days.

Customers for whom a check has been returned by the bank are notified to replace their check with cash, cashier's check or money order within five days. For returned checks, the customer's account will be charged a minimum of $25.00 or five percent of the amount of the check, whichever is greater.

The charges for utility services constitute a lien against the premises and become effective and binding as such lien from the date upon which the account becomes due, unpaid and in arrears. Liens accrued as set out in the City Code are of the same dignity as liens acquired by virtue of the City Charter, whereby an interest rate of ten percent accrues to such delinquent accounts.

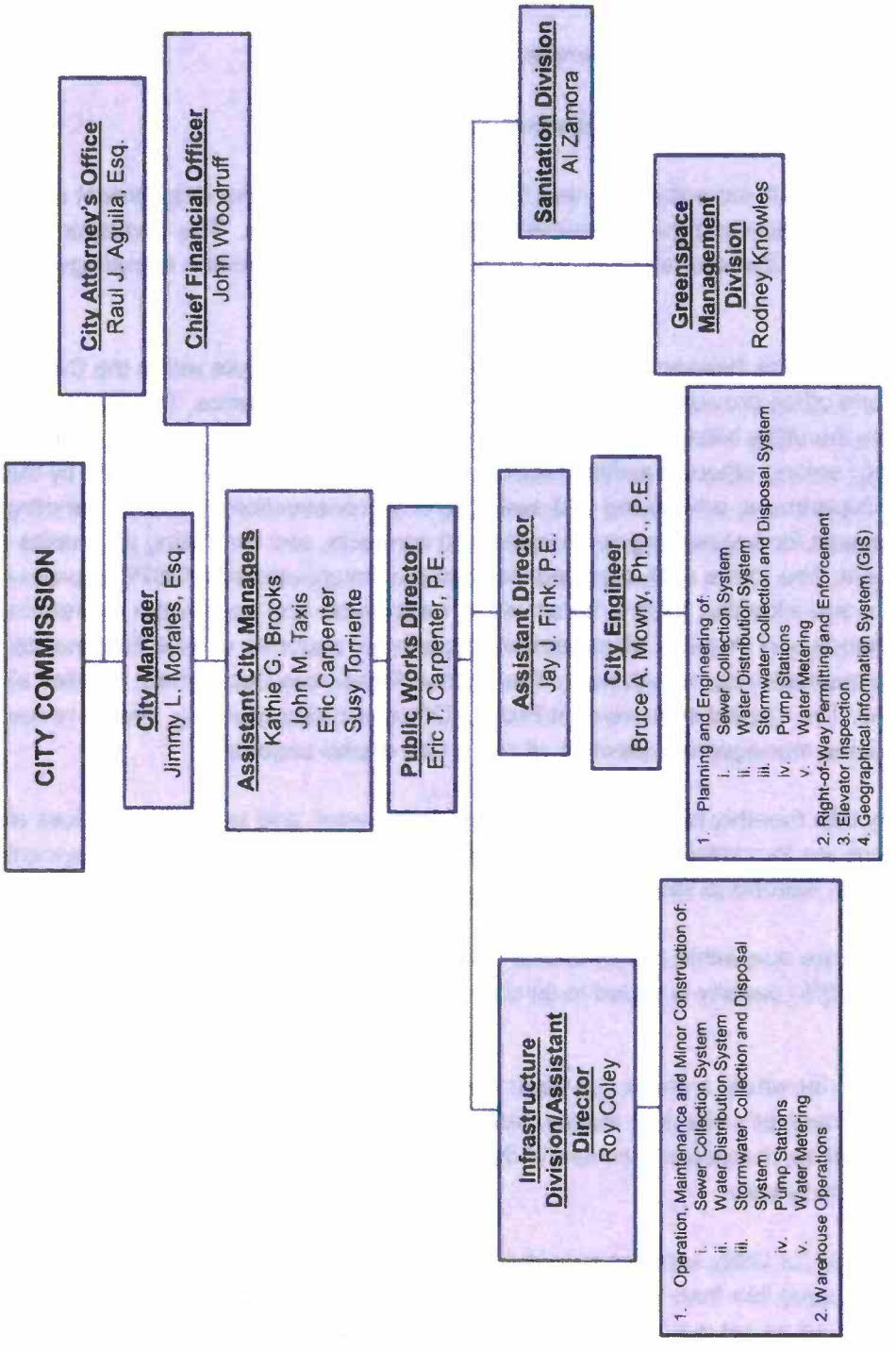


Figure 2

City of Miami Beach, Florida
Organizational Chart for City's Stormwater System

AECOM

3. Stormwater System

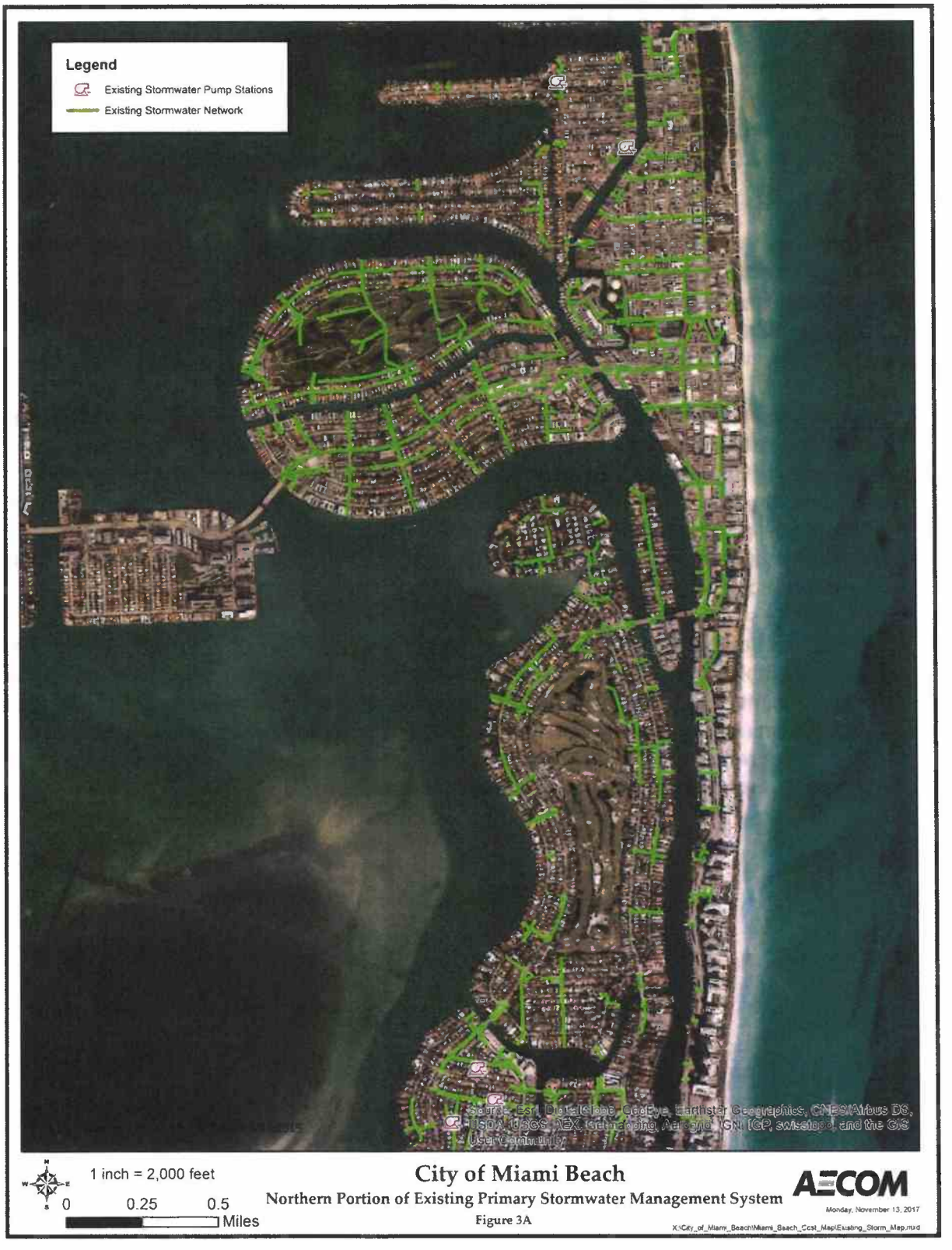
3.1 System Description

In 1903, the United States Army Corps of Engineers ("USACE") dredged the first opening to the Atlantic Ocean, cutting through mangrove swamps at the shipping channel known as Government Cut. The dredging project allowed for a safer, more direct access to the Port of Miami.

Through the 1900s, Miami Beach was dredged and built; the beach, on the east side, is the highest part of the City. The west side, along West Avenue, is the lowest. The majority of the storm drainage was constructed between the 1930s and 1960s during the City's initial population booms. Generally, the drainage system flows by gravity from east to west, where water drains into Biscayne Bay or one of its tributary waterways.

As development has expanded within the City and green areas have transitioned into developed land, some of the natural phenomena that occur in a tidally influenced community have been exacerbated. Under present day conditions, when the Bay is at high tide or groundwater conditions, the City experiences flooding. During storm events, flooding occurs due to excess runoff as well as the inundation of the stormwater network by tidal backflow, elevated groundwater and rainfall. **Figure 3** shows the general layout of the City's Primary Storm Water Management System ("PSMS") which was evaluated as part of the 2011 SWMP.

The existing Stormwater Utility facilities are inadequate in many areas of the City. In most areas, the existing Stormwater Utility is based on development patterns and groundwater and coastal conditions of the 1930s and 1960s, and has localized improvements to address flooding issues. Those systems constructed between the 1930s through 1960s have served their design life. Due to age, development, and updated regulatory requirements, the overall system requires upgrades to improve both stormwater quality and conveyance.


Legend
Existing Stormwater Pump Stations
Existing Stormwater Network
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
1 inch = 2,000 feet
0 0.25 0.5 Miles
City of Miami Beach
Northern Portion of Existing Primary Stormwater Management System
Figure 3A
AECOM
Monday, November 13, 2017
X:\City_of_Miami_Beach\Miami_Beach_Cost_Map\Existing_Storm_Map.mxd

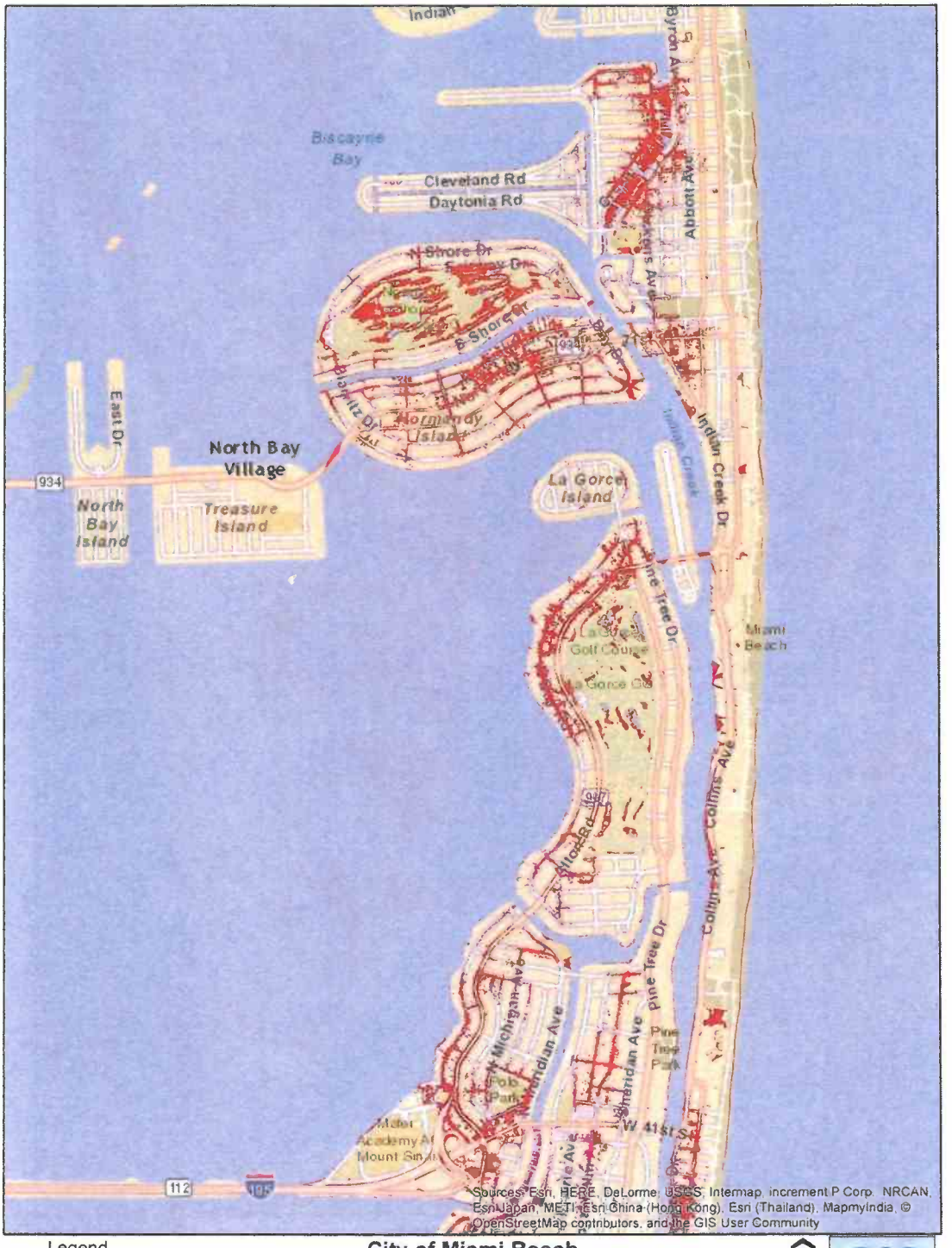

Legend
Existing Stormwater Pump Stations
Existing Stormwater Network
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
1 inch = 2,000 feet
0 0.25 0.5 Miles
City of Miami Beach
Southern Portion of Existing Primary Stormwater Management System
Figure 3B
AECOM
Monday, November 13, 2017
X:\City_of_Miami_Beach\Miami_Beach_Coast_Map\Existing_Storm_Map.mxd

The City's stormwater master plan is reviewed and evaluated approximately every five years, with portions of the plan updated as determined to be necessary during such review and evaluation. The City conducts a comprehensive analysis and update of its stormwater master plan approximately every ten to fifteen years to address any remaining deficiencies within the Stormwater Utility and any changes that have occurred, or are expected to occur, in permitting and regulatory requirements.

Capital improvement projects identified as part of the 1997 SWMP were funded from the proceeds of the Series 2000 Bonds and revenues from the Stormwater Enterprise Fund for the highest priority flooding areas. The completion of the capital improvements from the 1997 SWMP has improved the performance and operation of the Stormwater Utility in several areas. The 1997 SWMP identified 34 drainage basins as high priority basins. The Capital Improvement Program ("CIP") originally presented in the 1997 SWMP identified proposed projects by stormwater basin number. In the 2011 SWMP, these improvements were grouped together and reclassified as neighborhood projects or by general community. The purpose of these improvements is to provide a higher Level of Service (LOS) as defined by improved flood protection and control of pollutant loading in the Stormwater Utility.

Subsequent to the adoption of the 2011 SWMP, the City has implemented policy changes related to flood mitigation and drainage and roadway LOS to maintain flood protection while taking into account sea level rise, king tide events, and increased rainfall depth, intensity and distribution. On June 8, 2016 the City passed Resolution number 2016-59454 to amend the 2011 SWMP based on recommendations made by AECOM. As such, the existing drainage designs contained within the 2011 SWMP were determined to be inadequate to serve the City's needs. In addition, as a result of the predicted increase in groundwater levels resulting from sea level rise, the City has implemented a working policy to, over the next ten to fifteen years, reduce and/or eliminate the use of exfiltration trenches, gravity drainage wells and stormwater injection wells due to concerns over reliability and decreasing capacity. This condition warranted further modifications to the 2011 SWMP drainage designs. The City has undertaken an intensive review of its building and zoning codes to evaluate and develop solutions to these issues, and over the next year will continue its plan for phased implementation of the revised code.

As such, the drainage components of the neighborhood improvements contemplated in the 2011 SWMP have been re-evaluated based on Sea Level Rise and higher groundwater conditions. **Figures 4A** and **4B** depicts the areas of the City lying below an elevation of 2.2 feet-NAVD. These areas will be inundated during normal high tide with the adopted 50-Year Sea Level Rise of 1.50 feet. With a projected Mean High Water at 1.50 feet, NAVD and a normal high tide cycle of 0.70 feet, the water level in the Biscayne Bay would be at 2.20 feet, NAVD. At these elevated Bay and groundwater levels, gravity drainage systems and conventional best management practices will not function, thereby necessitating the changes to the 2011 SWMP drainage designs currently being developed by the City. Since 2014 AECOM has evaluated over 30 individual neighborhoods to determine the number and size of required pumping systems, and drainage improvements, and is in process of preparing an updated SWMP.



Legend

Ground elevations bellow 2.2 Ft. NAVD 88

0 - 2.2 Ft.

City of Miami Beach
Ground Elevations

N

0 0.4 0.8 1.6 Miles

Figure 4A

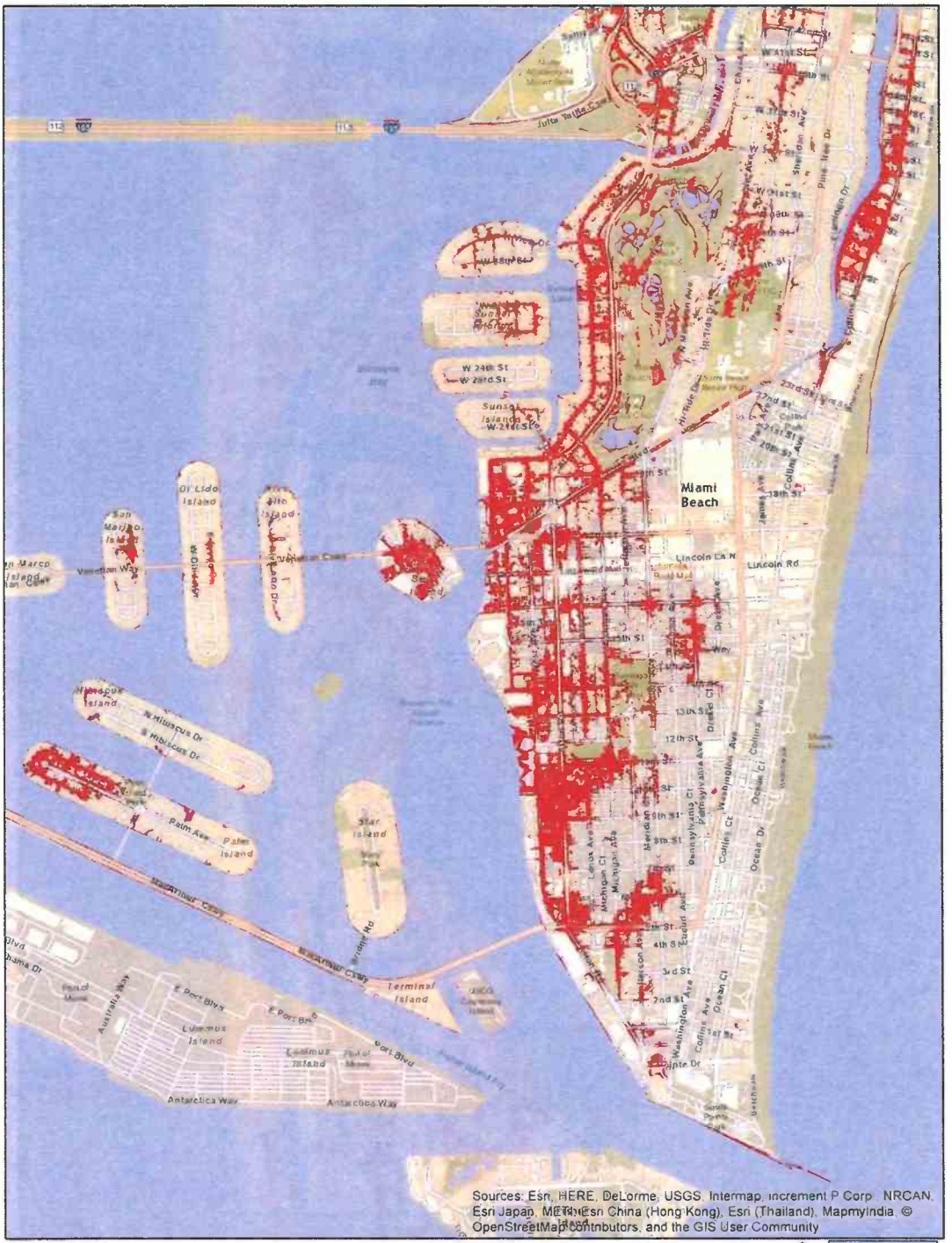

Miami Beach
Lincoln Rd
Terminal Island
Star Island
Palm Island
Hibiscus Island
Lummus Island
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Legend
Ground elevations bellow 2.2 Ft. NAVD 88
0 - 2.2 Ft.
City of Miami Beach
Ground Elevations
N
0
0.3
0.6
1.2 Miles
GIS
MIAMIBEACH

Figure 4B

3.2 Permitting Requirements

The City's Stormwater Utility is regulated by federal, state, and local agencies. Therefore, any modifications or improvements to the City's stormwater system need to be developed within the following regulatory and permitting framework.

3.2.1 Federal

The following is a summary of the federal agencies with which coordination either has been conducted, or will require coordination to implement the Stormwater Program.

3.2.1.1 United States Environmental Protection Agency (US EPA)

The US EPA was mandated by Congress through Section 405 of the Water Quality Act of 1987 to promulgate a National Pollutant Discharge Elimination System ("NPDES") permitting program for municipal stormwater discharge. The City is a co-permittee with Miami-Dade County and coordinates on this program for compliance.

The US EPA has delegated the NPDES permitting authority to the FDEP. During the development of the 2011 SWMP, the US EPA was in the process of updating the MS4 permit program, which is the permit program applicable to the Stormwater Utility. The new rule contained additional requirements for the Best Management Practices ("BMPs") and documentation on their performance. The 2011 SWMP included the potential future needs of those requirements and the pending numeric nutrient criteria ("NNC") for all discharges. Since then, FDEP has updated its rules for the MS4 permit program and has implemented the new rules to be followed and requirements to be met as each MS4 permit is updated. The MS4 Permit for the Stormwater Utility was scheduled to expire on June 20, 2016, but it has been extended until such time as a new permit is issued. A draft of the new permit has been issued, and is currently being advertised for public comment. It is expected that the new permit will be issued before the end of December 2017. The City is in the process of updating its permit compliance procedures and will have all requirements in place prior to the issuance of the MS4 permit.

3.2.1.2 Federal Emergency Management Agency (FEMA)

FEMA's mission is to support citizens and first responders to natural disasters to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988, amended the Disaster Relief Act of 1974, PL 93-288. This Act constitutes the statutory authority for most Federal disaster response activities. FEMA regulates riverine (stormwater) and coastal (tidal) floodplains and floodways under the National Flood Insurance Program. CDM Smith used tools developed by FEMA to identify and quantify flood risks, including Flood Insurance Studies, Flood Insurance Rate Maps, and the HAZUS Program (a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods and hurricanes) coupled with the models of the City's PSMS to estimate structural and economic damage costs from the 2- through 100-year design storm events. This information is contained within the 2011 SWMP.

Coordination with FEMA allows for the support of flood map revisions and communication of economic impacts in a manner recognized by the Federal government for cost-benefit comparisons. The improvements identified in the City's Stormwater Program and timing for their implementation are in accordance with (or are more comprehensive or aggressive than) what is currently required, or expected to be required under FEMA regulations.

3.2.1.3 United States Army Corps of Engineers (USACE)

The United States Army Corps of Engineers ("USACE") is the primary federal agency that develops guidance parameters for civil infrastructure design consideration for projects impacting environmentally sensitive water and OFW, like the Biscayne Bay.

A nationwide permit ("NWP") from the USACE is required when up to one-half acre of waters of the United States (e.g. Biscayne Bay or its tributary canals) are impacted, and the USACE requires that original grades are restored to the site after completion of construction. Under the NWP program a pre-construction notification ("PCN") submittal is required. The Regional Conditions and General Condition for NWP require that the PCN include the following information:

- A map of the entire corridor including a delineation of all wetlands and waters of the United States within the corridor.
- An alternative analysis which addresses the selection of an alternative which avoids and minimizes wetland impacts to the maximum extent practicable.
- For all submerged utility lines across navigable waters of the United States, a location map and cross-sectional view showing the utility line crossing from bank to bank is required. In addition, the location and depth of the Federal Project Channel shall be shown in relation to the proposed utility line. In general, all utility lines shall be buried at least 6 feet below the authorized bottom depth of the Federal project channel and at least 3 feet below the bottom depth in all subaqueous areas.
- A delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds). This work must be conducted between April 1 and September 30 due to the growth season of aquatic vegetation.

In general, permitting coordination with USACE is required when modifications to stormwater outfalls or seawalls result in impacts to OFW, as previously discussed. However, many of the projects to be funded under the Capital Improvement Program are exempt from Federal permitting. More localized impacts are permitted at the State and local level. These permits are typically obtained during the detailed design process for each project.

3.2.2 State

The following is a summary of the state agencies with which coordination was conducted in preparation of the 2011 SWMP.

3.2.2.1 South Florida Water Management District (SFWMD)

The SFWMD has responsibilities for stormwater management under F.A.C. Chapters 40E-4, 40E-40 and 40E-400 through issuance of an Environmental Resource Permit (ERP).

In 2013, the Statewide ERP Rule (Chapter 62-330, F.A.C.) was adopted, unifying the ERP rules for the State. The SFWMD regulates surface water management under F.A.C. Chapters 40E-40 and 40E-41. In addition, its responsibilities include regulation of dredge and fill activities. Since the SFWMD has jurisdiction, their criteria and standards will be used as guidelines for conceptual planning of both water quality and quantity improvements. These guidelines are provided in the South Florida Water Management District ERP Information Manual 2014.

3.2.2.2 Florida Department of Environmental Protection (FDEP).

The FDEP regulates environmental programs in the State of Florida and has been delegated NPDES MS4 permit authority; therefore, it is responsible for implementing the stormwater element of the Federal Municipal NPDES Program as part of the FDEP's Wastewater Facility and Activities Permitting program. The stormwater element of the NPDES program is mandated by the Clean Water Act (CWA) Section 402(p). Authorized by Section 403.0885, Florida Statutes (F.S.), the FDEP's federally approved NPDES stormwater program is set out in various provisions within Chapters 62-4, 62-620, 62-621 and 62-624 of the Florida Administrative Code (F.A.C.). Chapter 62-624, F.A.C. specifically addresses MS4 permit requirements.

The City is one of the 33 entities authorized for stormwater discharge under the comprehensive Miami-Dade County NPDES MS4 permit (Permit Number FLS000003-003), was scheduled to expire on June 20, 2016, but it has been extended until such time as a new permit is issued. A draft of the new permit has been issued, and is currently being advertised for public comment. It is expected that the new permit will be issued before the end of December 2017. The City is authorized to discharge to waters of the state per the approved Stormwater Management Program effluent limitations, monitoring requirements, and other provisions as set forth in this permit. The City has actively been fulfilling the requirements of the permit related to its existing outfalls. These efforts are documented in annual reports submitted by the City to the FDEP. The City is currently in compliance with these requirements.

The FDEP also regulates underground injection control permits for wells (gravity recharge wells and pumped injection wells).

3.2.3 Local – Miami Dade County Department of Regulatory and Economic Resources (DRER).

DRER regulates various environmental permitting for the construction or modification of stormwater-related infrastructure in Miami-Dade County such as coastal construction, dewatering, wetlands, wells, and stormwater. Specifically for stormwater management, DRER requires a Class II permit for related stormwater improvement projects and outfalls. The City has obtained the required permits for improvements to the Stormwater Utility that are under construction, or are already completed and expects the timely acquisition of additional permits required for the Series 2017 Project.

3.2.4 Pending Federal and State Regulations

Over the last few years, three significant related water quality and stormwater regulation issues have emerged that will likely impact the City in the near future. They are:

- The ongoing Total Maximum Daily Load (TMDL) program by FDEP.
- The Numeric Nutrient Criteria (NNC) Rule approved by FDEP.
- US EPA NPDES MS4 Rule revisions

3.2.4.1 FDEP TMDL Program

The TMDL program is required by the Clean Water Act to identify the maximum allowable loads for all sources to impaired waters and also identify the load reductions to achieve the designated use(s). The FDEP leads this effort working with local stakeholders, including water management districts, cities, counties, and private interests.

The TMDL program works to develop a scientifically sound database of information and calibrated and validated hydrology, hydraulic and water quality models to identify the TMDL, build on pollutant load reduction goals, support the load allocation and reduction process, and establish the foundation for evaluations of management practices to improve water quality. Based on these efforts, it is the most watershed-specific information for informed decisions for water quality and water environmental health. Enforcement would be through NPDES permitting for domestic wastewater, industrial wastewater and MS4 stormwater outfalls.

The draft of the TMDL program for the Biscayne Bay was originally planned for July 2010, but is currently on hold with no scheduled completion date. This program could ultimately lead to a Basin Management Action Plan (BMAP) that would require the City to complete retrofits to reduce nutrient loads to Biscayne Bay. These pending requirements for enhanced Best Management Practices (BMPs) to reduce flooding and protect and improve water quality are discussed in the 2011 SWMP.

The improvements comprising the Series 2017 Project are currently being designed to include BMPs to reduce flooding and improve water quality consistent with those that are likely to be required in the BMAP for the Biscayne Bay.

3.2.4.2 US EPA Numeric Nutrient Rule

In 1998, the US EPA produced the National Strategy for the Development of Regional Nutrient Criteria, requiring the US EPA to produce nutrient criteria guidance documents by 2000. It also required states that have narrative nutrient criteria to develop NNC.

The State of Florida Numeric Nutrient Criteria Development Plan (FDEP, March 2009), prepared by the FDEP describes Florida's plan for development of regional NNC via the use of a technical advisory committee ("TAC"). The TAC first met in January of 2001 and has met more than 25 times since its formation. Its membership consists of scientists and practitioners who have experience related to lake, river and/or estuarine water quality, members from local government, engineering and scientific consultants, university representatives and environmental interests. With the FDEP staff providing facilitation and technical resources, the TAC addressed lake and riverine nutrients initially and later turned to estuarine NNC in June of 2008.

Environmental interests in Florida filed a complaint in the U.S. District Court in July 2008 (amended in January 2009), alleging that the US EPA had failed to perform its "non-discretionary duty" to set NNC for Florida according to section 304(a) of the Clean Water Act.

In January 2009, the US EPA issued a statement that, for the State of Florida (and only Florida), new or revised nutrient criteria are necessary to meet the requirements of the Clean Water Act. In December 2009, the US EPA entered into a consent decree with the environmental plaintiffs, requiring the US EPA to issue draft NNC for flowing streams and lakes in Florida in January 2010 and for estuaries in January 2011.

On January 14, 2010, the US EPA proposed a rule entitled "Water Quality Standards for the State of Florida's Lakes and Flowing Waters." With this rule, the US EPA proposed water quality standards in the State of Florida that would set a series of numeric limits on the amount of phosphorus and nitrogen, also known as "nutrients," that would be allowed in Florida's lakes, rivers, streams, springs and canals.

After several public hearings, on April 22, 2011, the FDEP submitted a petition to the US EPA requesting the US EPA to withdraw its January 2009 determination that NNC are necessary in Florida, repeal Federal rulemaking completed in November 2010 to establish such criteria for inland lakes and streams, and refrain from proposing or promulgating any further NNC. The petition outlined the FDEP's plans to undertake its own rulemaking for nutrient criteria for state waters. The projected rulemaking schedule called for a Notice of Rule Development in June 2011, a rule development and public outreach process through the summer and early fall of 2011, and adoption of a final rule in January 2012, followed by a legislative ratification process under Florida law. The US EPA supported the FDEP's commitment to recommence its rulemaking efforts for both inland and estuarine waters. The US EPA recognized that states have the primary role in establishing and implementing water quality standards for their waters.

On September 29, 2011, the FDEP published a draft of the proposed rule in the Florida Administrative Code (F.A.C.), titled Chapter 62-302 regarding nutrient standards. The rule was then presented to the Florida Environmental Regulation Commission (ERC), the Florida Legislature, and the Governor, who signed House Bill (HB) 7051, ratifying the proposed rule. There was a challenge to the rule that was filed by the public interests environmental law organization, Earthjustice. However an administrative law judge upheld the state's proposed new water quality rules on June 7, 2012.

On November 30, 2012, the US EPA announced its approval of the FDEP's NNC. However, the US EPA also proposed additional regulations that would apply the US EPA's criteria to those waters not covered by the FDEP's NNC, such as urban storm water conveyances, open ocean waters, and many estuaries where the FDEP Total Maximum Daily Loads (TMDLs) have already been adopted. Since the US EPA developed NNC on waters not covered by the FDEP's NNC, the US EPA and the FDEP entered into an agreement on March 15, 2013, known as "Path Forward", to develop a plan for the FDEP to develop NNC for the remaining waterbodies before the US EPA's deadline of September 30, 2013.

Since the agreement, the FDEP adopted a NNC Implementation Document on April 23, 2013; adopted criteria for additional estuaries on June 20, 2013; and produced a report titled, "Status of Efforts to Establish Numeric Interpretations of the Narrative Nutrient Criterion for Florida Estuaries and Current Nutrient Conditions of Unimpaired Waters". This report was submitted to the Governor as required by the "Path Forward" agreement and Chapter 2013-71, Laws of Florida, on August 1, 2013.

On September 24, 2013, a hearing was held on the US EPA's motion to approve the Florida regulations. On January 7, 2014, the US District Court granted the US EPA's motion to modify the consent decree between the US EPA and various environmental organizations. The action allows the US EPA's approval of the FDEP's plan for NNC regulations in Florida to move ahead, and denies the environmental parties' motion to enforce the original consent decree. Earthjustice filed a motion on March 6, 2014 to appeal Judge Hinkles' order allowing the US EPA to modify the consent decree to conform it to the "Path Forward" agreement between the FDEP and the US EPA. On April 2, 2014, the US EPA filed to withdraw their proposed rule on NNC in Florida and on June 20, 2014, Earthjustice and other environmental groups filed their initial appeal of Judge Robert Hinkle's order allowing the US EPA to accept the FDEP's plan for NNC in Florida.

Neither the US EPA nor the FDEP have NNC for South Florida waterbodies, especially canals. The FDEP drafted the "South Florida Canal Aquatic Life Study" and presented the study to stakeholders on November 1, 2012. This study proposes to perform a comprehensive assessment of South Florida canals and the aquatic life associated with those canals. The objectives of the study are:

- Assess aquatic life in South Florida canals;
- Determine interrelationships between aquatic life in canals and other variables that affect aquatic life;
- Evaluate the differences in conditions for South Florida canals; and
- Collect information that can be used to guide management decisions.

Eventually, this study will be used to determine if NNC are necessary for these waterbodies. As of the Implementation of Florida's Numeric Nutrient Standards, April 2013 document, the South Florida region does not have a numeric nutrient threshold and will need to meet the narrative criterion as it applies in paragraph 62-302.530(47)(b), FAC.

There are many opinions on what the effect of the US EPA NNC will be on the State of Florida public stormwater discharges. At a minimum, additional BMPs will be needed to address nutrient removal from urban stormwater sources. The BMP treatment train concepts as presented in the 2011 SWMP are applicable to this water quality rule while also providing flood control and stormwater harvesting benefits. The improvements comprising the Series 2017 Project are currently being designed and permitted with water quality BMPs that meet or exceed existing regulatory requirements and anticipated additional requirements.

3.2.4.3 SFWMD and FDEP Unified Statewide Stormwater Treatment Rule

The SFWMD and the FDEP have been working with various groups in southwest Florida over the last ten years in the development of supplemental water quality criteria for Environmental Resource Permits ("ERPs") in order to better protect water quality. These supplemental criteria would give credit for additional non-traditional BMPs and encourage stormwater reuse while controlling the average annual volume of discharge and nutrients to historic (pre-development) levels.

The FDEP has been working to extend these criteria to a unified statewide rule that considers variations in hydrology and physical characteristics across Florida. If adopted as currently drafted, this rule would exempt retrofits for stormwater systems that provide some load reduction, such as stormwater master plan projects with water quality BMP features. The rule is currently on hold, and there is no way to determine with any reasonable degree of certainty when, or if, a unified statewide rule will be adopted, or if adopted, in what form the rule will be adopted.

3.2.4.4 US EPA NPDES MS4 Revisions

As discussed above, the US EPA has updated the MS4 permit program and the update contains additional requirements for BMPs and documentation on their performance and costs. The improvements comprising the Series 2017 Project are currently being designed and are expected to be permitted with water quality BMPs that meet or exceed existing regulatory requirements and the anticipated additional requirements.

3.3 Facility Evaluation

The 2011 SWMP identifies stormwater improvements for implementation in several high priority drainage basins, as defined by the 1997 SWMP. The design and construction of these improvements are already underway and many of them have been completed. Factors used in the prioritization of the drainage basins in the 1997 SWMP were pollutant loading, pollutant concentration, flooding potential, citizen complaints, and ranking by City staff. As part of the 2011 SWMP, surface water hydrologic and hydraulic modeling was performed using the US EPA Stormwater Management Model (SWMM) to estimate and evaluate flooding LOS and alternative solutions to meet LOS. The CDM Smith Watershed Management Model (WMM) was used to perform surface water quality and BMP evaluations. Both are public domain tools that are widely used for stormwater master planning applications.

Model parameter estimates were checked for validity during actual storm and tidal events throughout the year 2010, as practical. Investigations; including photo-archive retrievals, field visits, photography in combination with flood depth measurements and discussions with City staff were performed as part of the validation stage. Storm event rainfall data was retrieved from City rain gages and tidal data was retrieved from the National Oceanic and Atmospheric Administration.

AECOM was tasked in 2014 with revising the US EPA SWMM model to determine areas deficient in LOS under the City's current standards and to suggest modifications to the drainage designs contained within the 2011 SWMP to better achieve the current LOS standards. AECOM is responsible for confirming the necessity of the previously prosed projects as well as planned improvements and the degree by which the basin's LOS is being achieved, as defined by the current City LOS standards.

3.4 Utility Billing

A stormwater utility fee is assessed against each property in the City based on existing City utility accounts, application for service, and Miami-Dade County Tax Assessor property information or other ownership records.

Each account is assigned a number of equivalent residential units ("ERU") that are used to determine the stormwater fee. The ERU is the estimated average horizontal impervious area of residential developed property per dwelling unit. This estimated average is calculated by dividing the total estimated impervious area of four residential categories (single family, mobile home, multi-family and condominium) by the estimated total number of dwelling units. For the City, one ERU is equal to 791 square feet. For the purpose of the Stormwater Utility, the minimum number of ERUs per dwelling unit is one.

The City had maintained a steady ERU rate from 2003 to 2008 of $5.80 per month. In recent years the City has faced significant increases in expenditures for construction of projects, as well as operation and maintenance of current Stormwater Utility infrastructure. As a result, in 2008, CDM Smith provided recommendations to support proper funding to expand, operate and maintain the Stormwater Utility, make debt service payments and maintain coverage requirements. A series of Stormwater Utility rate adjustments were recommended, which resulted in an ERU rate of $9.06 per month until FY 2014. The City raised the ERU rate to $16.67 per month on October 1, 2014 to finance the issuance of the Series 2015 Bonds. On October 1, 2016, in anticipation of the issuance of the Series 2017 Bonds, the City raised the ERU rate to $22.67 per month. The fee is structured as a flat rate for all residential customers. In addition, on October 18, 2017 the City passed Ordinance No. 2017-4145 indexing the stormwater utility rates to the CPI effective for all billings after October 1, 2017. As a result, the ERU rate is expected to increase each Fiscal Year and, as of October 1, 2017, the rate increased from $22.67 to $23.30 per month.

To receive water, sewer, and stormwater services from the City, property owners fill out an application for water service at the City's Finance Department and pay a deposit according to an established schedule. The Finance Department is responsible for preparing and issuing one itemized bill for water, sewer, stormwater, and garbage disposal (except for commercial accounts) services provided by the City. Those services are billed on a monthly basis.

Stormwater Utility fees may be reduced by 50 percent for properties within the City that meet one of the following criteria:

- The property is subject to a valid NPDES permit.

- The property is served by a private disposal system meeting State, County, and City criteria.
- A portion of the property is served by a private disposal system meeting State, County, and City criteria. The fee reduction only applies to that portion of the property served by the system.

To date, no Stormwater Utility customer has requested, or has been granted such a reduction.

The fees collected by the City with respect to the Stormwater Utility, including investment earnings, are deposited in the Stormwater Enterprise Fund and used for planning, constructing, financing, and operating and maintaining the Stormwater Utility and the infrastructure of the stormwater management system. The Stormwater Enterprise Fund tracks the operations, capital expenditures, and revenues of the Stormwater Utility.

The City has streamlined and improved the system that was in place to capture ERU changes in the review and approval of construction plans. The resulting method enhances communication and coordination of the several City departments included in the Stormwater Utility billing process, such as Public Works, OBPI and Finance.

4. Capital Improvements

4.1 Planned Improvements

The 1997 SWMP identified 34 drainage basins as high priority basins. The CIP originally presented in the 1997 SWMP identified proposed projects by stormwater basin number. In the 2011 SWMP, improvements were reclassified and are now grouped together by the neighborhood or general community where the improvements will be made. The capital improvement projects listed below are a combination of active projects pre-defined by the 1997 SWMP, project-specific Basis of Design Reports, and projects identified as part of the 2011 SWMP. In addition, since 2014 AECOM has evaluated over 30 individual neighborhoods to determine the number and size of required pumping systems, and drainage improvements, and is in process of preparing an updated SWMP. At present, 57 additional pumping stations, including one additional redundant pump and power unit per pumping station are proposed.

In most instances, the stormwater improvements were coordinated with components of the City's Neighborhood Right-of-Way projects. Such projects included improvements to other neighborhood utilities, such as water, sewer, streetscape, and street lighting. Emphasis was given to avoid re-entering a neighborhood which had recently completed neighborhood improvements.

The purpose of these improvements is to provide a higher LOS defined as improved flood protection and control of pollutant loading in the stormwater system.

The amount of funding to be derived from the City's issuance of stormwater revenue bonds is calculated as the additional monies needed to construct additional water management features above and beyond those already included in the capital budget for the neighborhood projects.

The improvements consist of one or a combination of the following:

- Repair, replace, and/or install curbs and gutters,
- Reconstruct and/or raise streets and sidewalks,
- Repair, replace, and/or install collection systems, catch basins and manholes,
- Construct pumping stations and water quality treatment devices, and
- Repair or upgrade existing outfalls (inclusive of tidal backflow prevention devices).

The projects listed below will provide comprehensive solutions for improving the City's stormwater management system performance for the next 50 years. Appropriate consideration has been given to the water quality of Biscayne Bay and the operation and maintenance of an expanded stormwater management system. The presented capital improvements allow the Stormwater Utility systems to meet increasing performance, permitting and regulatory demands while modernizing the existing system to meet the LOS desired by the City.

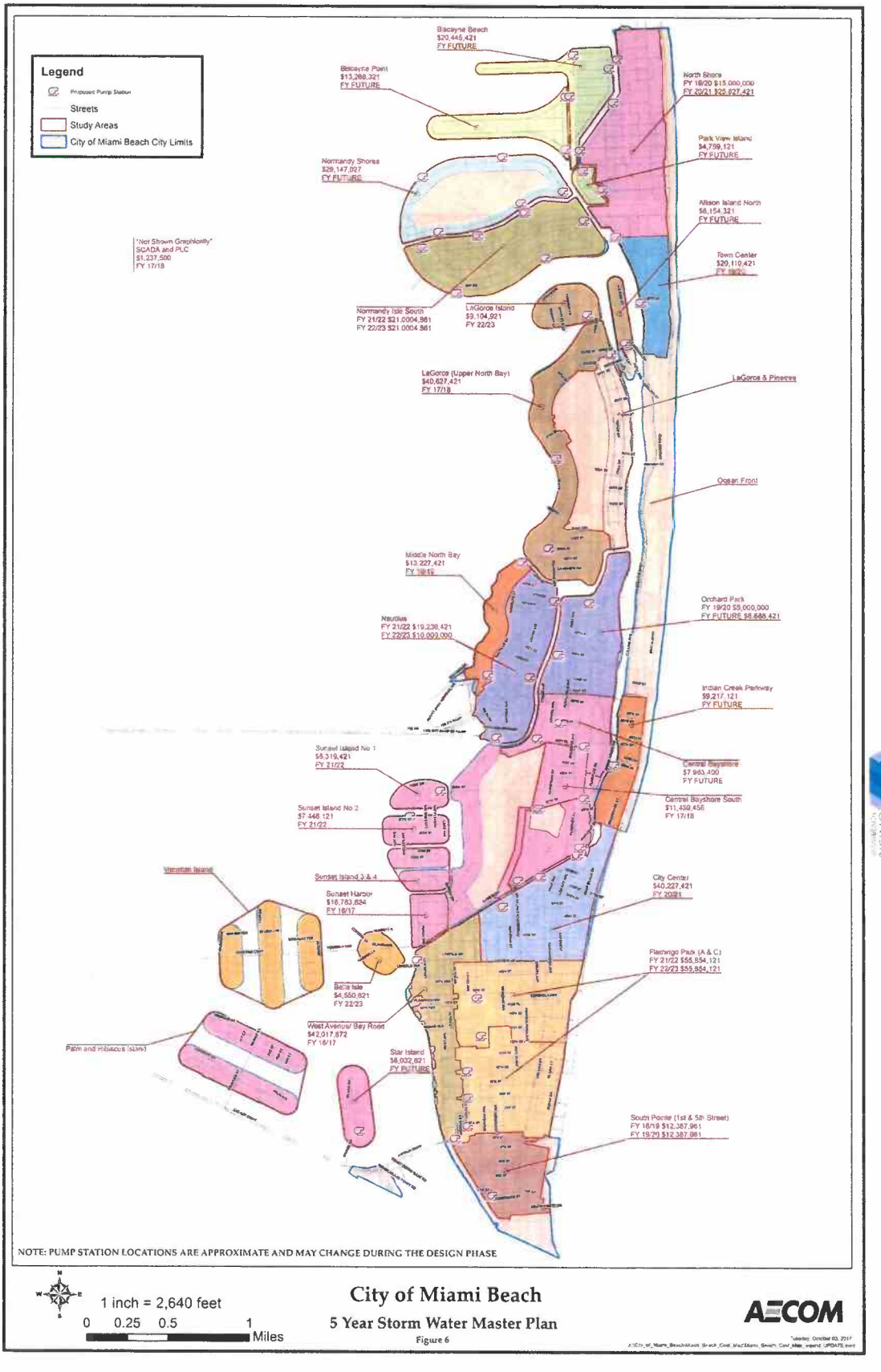
The projects listed below are identified for funding under the Stormwater Program. The total cost of the Stormwater Program is estimated to be $658,940,087. The unfunded portion of the Stormwater Program is estimated to be $500,882,768. It is expected that the proceeds from the Series 2017 Bonds will fund $100 million of these projects. Summaries of the estimated program cost by neighborhood are shown in tabular format in **Figure 5**, and graphically in **Figure 6**.

AECOM

Figure 5: Proposed Stormwater Bond Projects

Location Name	Engineer Projected Cost	Appropriated or Spent Fund	Funds Required	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22	Future	Sub-Total for Each Project
Allison Island North	$ 6,154,321	$ -	$ 6,154,321	$ -	$ -	$ -	$ -	$ -	$ 6,154,321	$ 6,154,321
Belle Isle	$ 4,550,621	$ -	$ 4,550,621	$ -	$ -	$ -	$ -	$ -	$ 4,550,621	$ 4,550,621
Biscayne Beach	$ 20,445,421	$ -	$ 20,445,421	$ -	$ -	$ -	$ -	$ -	$ 20,445,421	$ 20,445,421
Biscayne Point	$ 13,266,321	$ -	$ 13,266,321	$ -	$ -	$ -	$ -	$ -	$ 13,266,321	$ 13,266,321
Central Bayshore	$ 8,213,400	$ 250,000	$ 7,963,400	$ -	$ -	$ -	$ -	$ -	$ 7,963,400	$ 7,963,400
Central Bayshore South	$ 11,439,456	$ 11,439,456	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
City Center	$ 42,527,421	$ 2,300,000	$ 40,227,421	$ -	$ -	$ -	$ 40,227,421	$ -	$ -	$ 40,227,421
Middle North Bay	$ 13,227,421	$ -	$ 13,227,421		$ 13,227,421	$ -	$ -	$ -	$ -	$ 13,227,421
Nautilus	$ 29,236,421	$ -	$ 29,236,421	$ -	$ -	$ -	$ -	$ 19,236,421	$ 10,000,000	$ 29,236,421
Flamingo Park	$ 119,208,242	$ 7,500,000	$ 111,708,242	$ -	$ -	$ -	$ -	$ 55,854,121	$ 55,854,121	$ 111,708,242
Indian Creek Parkway	$ 14,717,121	$ 5,500,000	$ 9,217,121	$ -	$ -	$ -	$ -	$ -	$ 9,217,121	$ 9,217,121
La Gorce (Upper North Bay)	$ 40,627,421	$ -	$ 40,627,421	$ 40,627,421	$ -	$ -	$ -	$ -	$ -	$ 40,627,421
La Gorce Island	$ 9,104,921	$ -	$ 9,104,921	$ -	$ -	$ -	$ -	$ -	$ 9,104,921	$ 9,104,921
Orchard Park	$ 13,688,421	$ -	$ 13,688,421	$ -	$ -	$ 5,000,000	$ -	$ -	$ 8,688,421	$ 13,688,421
Normandy Isle South	$ 42,009,721	$ -	$ 42,009,721	$ -	$ -	$ -	$ -	$ 21,004,861	$ 21,004,861	$ 42,009,721
Normandy Shores	$ 29,147,027	$ -	$ 29,147,027	$ -	$ -	$ -	$ -	$ -	$ 29,147,027	$ 29,147,027
North Shore	$ 40,627,421	$ -	$ 40,627,421	$ -	$ -	$ 15,000,000	$ 25,627,421	$ -	$ -	$ 40,627,421
Park View Island	$ 4,759,121	$ -	$ 4,759,121	$ -	$ -	$ -	$ -	$ -	$ 4,759,121	$ 4,759,121
South Pointe (1st & 5th Street)	$ 25,249,121	$ 473,200	$ 24,775,921	$ -	$ 12,387,961	$ 12,387,961	$ -	$ -	$ -	$ 24,775,921
Star Island	$ 6,032,621	$ -	$ 6,032,621	$ -	$ -	$ -	$ -	$ -	$ 6,032,621	$ 6,032,621
Sunset Harbour	$ 16,783,824	$ 16,783,824	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sunset Island #1	$ 5,319,421	$ -	$ 5,319,421	$ -	$ -	$ -	$ -	$ 5,319,421	$ -	$ 5,319,421
Sunset Island #2	$ 7,446,121	$ -	$ 7,446,121	$ -	$ -	$ -	$ -	$ 7,446,121	$ -	$ 7,446,121
Town Center	$ 20,110,421	$ -	$ 20,110,421	$ -	$ -	$ 20,110,421	$ -	$ -	$ -	$ 20,110,421
West Avenue/ Bay Road	$ 42,017,672	$ 42,017,672	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SCADA and PLC	$ 1,237,500	$ -	$ 1,237,500	$ 1,237,500	$ -	$ -	$ -	$ -		$ 1,237,500
SUB-TOTAL	$ 587,146,920	$ 86,264,152	$ 500,882,768	$ 41,864,921	$ 25,615,382	$ 52,498,382	$ 65,854,842	$ 108,860,945	$ 206,188,298	$ 500,882,768
Under Construction / Completed										
Lower North Bay Road	$ 5,025,128	$ 5,025,128	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sunset Island 3 and 4	$ 6,520,000	$ 6,520,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Venetian Islands	$ 20,516,285	$ 20,516,285	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Palm & Hibiscus Islands	$ 32,161,390	$ 32,161,390	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Central Bayshore Bid Pak A	$ 2,815,776	$ 2,815,776	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Citywide Tidal Flooding Mitigation - Ph 1	$ 2,544,588	$ 2,544,588	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Drainage Hot Spots	$ 2,210,000	$ 2,210,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Grand Total	$ 658,940,087	$ 158,057,319	$ 500,882,768	$ 41,864,921	$ 25,615,382	$ 52,498,382	$ 65,854,842	$ 108,860,945	$ 206,188,298	$ 500,882,768

Tranche #	Funding requirements
Tranche 2	$ 41,864,921
Tranche 3	$ 25,615,382
Tranche 3	$ 78,125,803
Tranche 4	$ 149,098,386
Future Revenue Stream	$ 85,903,903
Future Revenue Stream	$ 110,224,395



City of Miami Beach

5 Year Storm Water Master Plan

Figure 6

AECOM

Allison Island North – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $6,154,321

Belle Isle – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $4,550,621

Biscayne Beach – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $20,445,421

Biscayne Point – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $13,266,321

Central Bayshore – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $8,213,400

Central Bayshore South – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $11,439,456

City Center – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $42,527,421

Middle North Bay – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $13,227,421

Nautilus – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $29,236,421

Flamingo Park – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $119,208,242

Indian Creek Parkway – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $14,717,121

LaGorce (Upper North Bay) – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $40,627,421

LaGorce Island – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $9,104,921

Orchard Park – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $13,688,421

Normandy Isle South – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $42,009,721

Normandy Shores – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $29,147,027

North Shore – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $40,627,421

Park View Island – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $4,759,121

South Pointe (1st & 5th Street) – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $25,249,121

Star Island – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $6,032,621

Sunset Harbour – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $16,783,824

Sunset Island #1 – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $5,319,421

Sunset Island #2 – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $7,446,121

Town Center – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $20,110,421

West Avenue/ Bay Road – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost: $42,017,672

SCADA & PLC

The purpose of the project improvements is to install an all-inclusive Supervisory Control and Data Acquisition (SCADA) package that includes engineering, design, integration and installation of a radio-based, internet accessible SCADA system. The SCADA system will be for remote monitor and control of potable water storage tanks, drinking water pumping stations, wastewater pumping stations, stormwater pumping stations, and all associated monitoring stations (flow, pressure, etc.). There are currently 33 stormwater pumping stations operated by the CMB that will be a part of the overall project. The installation will provide the ability to reduce operating costs, while improving performance and reliability. The estimated project cost reflects only the stormwater related portions of the overall project.

Estimated Project Cost: $1,237,500

4.2 Improvements under Construction

Lower North Bay Road – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost to Completion: $5,025,128

Sunset Islands 3 & 4 – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost to Completion: $6,520,000

Venetian Islands – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost to Completion: $20,516,285

Palm & Hibiscus Islands – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost to Completion: $32,161,390

Central Bayshore Neighborhood Bid Pak A – Neighborhood Improvements

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system, and reduce reliance on gravity or pressurized drainage (injection) wells. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Convert pumping stations discharge piping from injection wells and add force mains to new outfall, and 4) Construct new outfall and/or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

Estimated Project Cost to Completion: $2,815,776

Citywide Tidal Flooding Mitigation Phase 1- Improvements

The purpose of the project improvements is to prevent the backflow of water from the Biscayne Bay into the City's stormwater management system and up through the stormwater inlet grates flooding the roadway curb and gutter. This tidal flooding poses a threat to public health and safety, inconveniences the public, and has caused major damage to structures, and killed lawns and landscaping. In addition, tidal flooding saturates the base structure of roadways causing failure of roadways prior to their expected useful design life. This project consists of the installation of backflow prevention valves (aka "Tideflex" valves) on a majority of the PSMS outfalls to the Biscayne Bay and in the lowest lying areas of the City.

Estimated Project Cost to Completion: $2,544,588

Drainage Hot Spots- Improvements

This project will provide localized stormwater improvements that address drainage "hot spots" within the City. The project will provide funding to allow City staff to design, contract for, and implement solutions to limited areas of the City which are within the definition of the projects approved by the City Commission in the Resolution authorizing issuance of the Series 2015 Bonds, but not incorporated into other neighborhood improvement projects identified in the Stormwater Program.

Estimated Project Cost to Completion: $2,210,000

5. Conclusions and Recommendation

AECOM has made the following conclusions with respect to the stormwater system during the course of preparing this Engineer's Report:

- The capital improvement program for the Stormwater Utility is necessary to improve the flood protection LOS and water quality of the City's stormwater management system.
- Continuation of the City's planned capital improvement program for the Stormwater Utility will entail the need for significant additional funding, as described in this Engineer's Report.
- The City's stormwater management system is well maintained, well managed and in good operating condition. Effective planning policies provide for the necessary inspection, repair, improvement and replacement of the City's stormwater management facilities and have enabled the City to comply with state and federal regulations.
- The City's stormwater management system has the physical capacity to meet existing demands. Implementation of the projects included in the capital improvement program will enable the City's stormwater management system in the areas served by those projects to meet projected demands and comply with state and federal regulations expected to be in effect during the study period of this Engineer's Report (Fiscal Years 2018 through 2022).
- The financial plan for improvements to the City's stormwater management system, as described in this Engineer's Report, includes adequate funding for improvements to be constructed and installed in the manner and time periods currently contemplated.
- In the event the City elects to issue additional Stormwater Revenue Bonds in FY 2022 in the amount currently contemplated, and as described in this Engineer's Report, a rate increase applicable to the stormwater system customers is projected to be necessary prior to the issuance of such bonds.

- Key staff of the City in charge of the operations and maintenance of the City's stormwater management system and the implementation of improvements to the system are well qualified and capable of effectively managing the responsibilities of such operations, maintenance and implementation.
- The methodology used to develop the capital improvement program for the City's stormwater management system, the timing of the implementation of the program and the cost of its improvements was an appropriate methodology for such purposes.
- Improvements to be made to the City's stormwater management system have been or are expected to be designed in accordance with usual and customary engineering practices and involve proven technology and proven configurations of that technology.
- The projected cost and time periods for implementing the improvements to the City's stormwater management system to be financed with proceeds of the Series 2017 Bonds are reasonable.
- In the opinion of the Consulting Engineers, the City's issuance of the Series 2017 Bonds in the aggregate principal amount set forth in the Official Statement related to the Series 2017 Bonds, at the time and for the purposes described in this Engineer's Report, is an advisable undertaking.

AECOM recommends that the City proceed with the issuance of the Series 2017 Bonds; continue the implementation of the capital improvement program for the Stormwater Utility and as necessary, the adoption of rate adjustments in anticipation of future issuance of additional Stormwater Revenue Bonds.

Exhibit 4

RESOLUTION NO. 2018-30570

A RESOLUTION OF THE MAYOR AND CITY COMMISSION OF THE CITY OF MIAMI BEACH, FLORIDA, ACCEPTING THE URBAN LAND INSTITUTE (ULI) FINAL EVALUATION REPORT OF THE CITY'S STORMWATER MANAGEMENT STRATEGY, WHICH REPORT WAS FUNDED BY 100 RESILIENT CITIES, AND IS ATTACHED HERETO AS EXHIBIT A.

WHEREAS, at the January 2018 Sustainability & Resiliency Committee meeting Commissioner Mark Samuelian introduced an item to review the City of Miami Beach's Stormwater Resilience Program; and

WHEREAS, the City is interested in obtaining a third-party assessment of the current program; and

WHEREAS, the City is a member of the 100 Resilient Cities (100 RC) Network, an organization dedicated to support cities as they face growing fiscal and development pressures due to climate change, urbanization and globalization; and

WHEREAS, the Urban Land Institute is a 100 Resilient Cities platform partner and is dedicated to creating thriving communities across the globe with expertise in land use, planning and real estate; and

WHEREAS, through the City's membership in 100 Resilient Cities Network, 100 RC has graciously agreed to fund the Stormwater Resilience Program review effort; and

WHEREAS, the Urban Land Institute Technical Assistance Advisory Panel Review was held from April 16-19, 2018, in Miami Beach, Florida.

NOW, THEREFORE, BE IT DULY RESOLVED THAT THE MAYOR AND CITY COMMISSION OF THE CITY OF MIAMI BEACH, FLORIDA, hereby accepts the Urban Land Institute (ULI) Final Report evaluating the City's Stormwater Management Strategy, which report was funded by 100 Resilient Cities, and which report is attached hereto as Exhibit A.

PASSED and **ADOPTED** this 17 of October, 2018.

Dan Gelber, Mayor

ATTEST:

10/30/18

Rafael E. Granado, City Clerk

MIAMI BEACH INCORPORATED MARCH 26TH 1915

APPROVED AS TO FORM & LANGUAGE & FOR EXECUTION

City Attorney

8/27/18

Date

MIAMIBEACH

COMMISSION MEMORANDUM

TO: Honorable Mayor and Members of the City Commission
FROM: Jimmy L. Morales, City Manager
DATE: October 17, 2018

SUBJECT: A RESOLUTION OF THE MAYOR AND CITY COMMISSION OF THE CITY OF MIAMI BEACH, FLORIDA, ACCEPTING THE URBAN LAND INSTITUTE (ULI) FINAL EVALUATION REPORT OF THE CITY'S STORMWATER MANAGEMENT STRATEGY, WHICH REPORT WAS FUNDED BY 100 RESILIENT CITIES, AND IS ATTACHED HERETO AS EXHIBIT A.

RECOMMENDATION

Adopt the Resolution.

ANALYSIS

At the January Sustainability and Resiliency Committee, Commissioner Samuelian introduced an item to review the city's stormwater resilience program. Staff advised that with the support of the Rockefeller Foundation's 100 Resilient Cities (100 RC) Network, the Urban Land Institute (ULI) has been invited to assess the City of Miami Beach's current stormwater management strategy. SRC reviewed the project scope and forwarded to the full Commission in March for approval. In April a multidisciplinary global team convened in Miami Beach to review our program.

The Urban Land Institute (ULI) is the oldest and largest network of cross-disciplinary land use and real estate experts in the world dedicated to creating thriving communities around the globe. Their goal is to make cities better places to live for people from all walks of life. ULI is also a 100 RC platform partner, part of a professional network that provides resilience-building tools and services to 100 RC cities.

ULI panels are intensive, on-site engagements conducted by volunteer panelists that provide strategic advice to governments and organizations on a wide variety of land use challenges. This four-day event convened senior practitioners from a variety disciplines, such as urban planning, engineering, science, finance, insurance etc. Panelists spent hours in reading background material, attending staff orientations and tours, conducting stakeholder interviews, and hosting a public listening session. The final onsite deliverable was a panel presentation to the city at a public meeting. At that meeting the panel shared their recommendations on:

Program vision:

- Integrate stormwater management into the larger resilience strategy
- Enhance trust, trust the public, increase transparency
- Elevate aesthetics and function to perpetuate city's cultural relevance
- Actively use green and open spaces for sponge function
- Increase long term financial and comprehensive protection

- Go big on the resilience brand – distinguish yourself from your coastal competitors

Program principles:

- Maintained urgency,
- incrementalism & evaluation,
- transparency,
- ecological health,
- financial pragmatism,
- co-benefits, social equity,
- cultural identity,
- living with water.

CONCLUSION

It is recommended that the City Commission accept the Urban Land Institute Final Report (attached) for staff implementation. Certain recommendations may require additional Commission approvals and will be vetted through the committee process.

Legislative Tracking

Office of the City Manager

ATTACHMENTS:

Description

- Resolution
- Exhibit A: Urban Land Institute Advisory Services Panel Report - Miami Beach
- ULI Presentation