2019 GRANT APPLICATION

Indicate the funding source applying for: [X] State (RPG) [ ] Federal (AAI)

Project Title: City of Hallandale Beach Vulnerability Assessment and Adaptation Plan (VAAP)
(Limited to 100 characters)

Grantee Contact Information:

Organization Name: City of Hallandale Beach

Authorized Signer for the Organization: Nydia M. Rafols Sallaberry

Title: Interim City Manager

Address: 400 S. Federal Highway

City: Hallandale Beach

Zip Code:33009

Area Code and Telephone Number: 954-457-1611

E-mail Address: nfarols@cohb.org

Grant Manager Contact Information:

Organization Name: City of Hallandale Beach

Title: Green Initiatives Coordinator

Address: 630 NW 2 Street

City: Hallandale Beach

Zip Code: 33009

Area Code and Telephone Number: 954-457-1617

E-mail Address: ajoneswood@cohb.org

Fiscal Agent Contact Information:

Organization Name: City of Hallandale Beach

Title: Grants Manager

Address: 400 S Federal Highway

City: Hallandale Beach

Zip Code: 33009

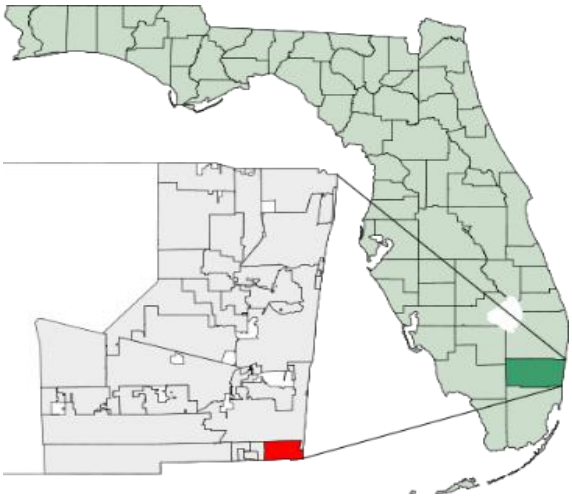
Area Code and Telephone Number: 954-457-3069

E-mail Address: nsandoval@cohb.org

FEID No.: 59-6000333

DUNS No.: 089606685

PROJECT LOCATION: *(Limited to one page, including maps)*
Hallandale Beach, Broward County, FL.



WORK PLAN *(Expand text areas as needed, keeping within the **12-page limit** for the entire application.)*

1. **Project Summary:** The City amended its Comprehensive Plan for Peril of Flood in 2018. While helpful, the vulnerability assessment associated with this amendment was grossly limited due to funding availability. The City requests funding to develop a robust **Vulnerability Assessment and Adaptation Plan (VAAP)** which results in improved mapping, recognition, and informed flood risk management strategies. The **VAAP** will investigate risks associated with climate change including sea level rise, increased precipitation and groundwater resource availability. The results of the **VAAP** will be used to guide future actions in the City's Sustainability Action Plan, Comprehensive Plan, and other future planning documents.

2. **Project Description:** The City of Hallandale Beach has struggled with flooding from rain events, high tide/ King Tide, storm surge, and saltwater intrusion for many years. While anecdotal information can provide some level of prediction of these hazards, numerous tools are now available which can better predict future conditions with accelerated sea level rise and climate change. The City of Hallandale Beach strives to be proactive in the face of these risks and plan accordingly. To do this, the City needs to first have a well-rounded understanding of current conditions, future risks, and the factors which may contribute to or lessen the City's exposure to natural hazards.

   The City is requesting $66,000 to complete a full Vulnerability Assessment and Adaptation Plan (VAAP). This VAAP will examine sea level rise, groundwater resources, shoreline change, and the costs and benefits associated with risks and related resilience strategies. The VAAP will be created utilizing best available data and modeling techniques as well as public engagement to produce a publically-supported plan to make Hallandale Beach more resilient.

Project Need and Benefit: The City of Hallandale Beach is a 4.6 square mile coastal community which is at risk from natural hazards, anthropogenic climate change, and extreme events. To understand these risks, the City worked with the South Florida Regional Planning Council, funded by

the Department of Economic Opportunity, in 2017 to do a brief vulnerability assessment and amend the City's Coastal Management element of the Comprehensive Plan to comply with Peril of Flood requirements. The results of this initial assessment, which only examined the expansion of the Coastal High Hazard Area with 1 and 2 feet of sea-level rise, determined areas of vulnerability previously unknown to City staff and officials.

The City has continued to take a proactive approach to increasing its resiliency and sustainability. On August 15, 2018 the City Commission adopted the Peril of Flood Comprehensive Plan Amendment to the Coastal Management element which included policies related to: pervious pavement, development standards in flood prone areas, the introduction of Low Impact Development into new public projects within the Coastal High Hazard Area and FEMA flood zones, and Adaptation Action Areas, among others. Also included in the Amendment was a commitment to prepare a Post-Disaster Redevelopment Plan (PDRP) which would include sea-level rise as a risk factor. The City submitted a grant request to the Florida Department of Economic Opportunity for the development of a PDRP and a vulnerability assessment of transportation infrastructure in May 2019.

On March 1, 2017 the City Commission awarded the development of a Sustainability Action Plan (SAP). The primary objective of the SAP is to provide a 5-year blueprint that tangibly and measurably advances sustainability in the City. The Plan is designed to outline a series of projects that will be implemented over a 5-year span, however, the benefits of these projects will be seen over a period of 10 years and beyond.

One of the recommended projects from the SAP is a full Vulnerability Assessment and Adaptation Plan (VAAP) which addresses impacts of climate change/ sea level rise on facilities and infrastructure and identifies opportunities to proactively plan for increased efficiency and resiliency. This VAAP would expand on the results produced by the SFRPC and provide the City with a comprehensive picture of its vulnerability and the ways in which it can and should adapt. Additionally, the VAAP will produce tangible results to include within the PDRP and the future designation of Adaptation Action Areas within the City. This work meets the purpose of Priority Area 3: "Vulnerability Assessments, Adaptation Plans or Resilience Plans other than that necessary for compliance with Peril of Flood requirements."

The VAAP scope of work takes place in a twelve (12) month time period. All deliverables will be completed by June 19, 2020. The project will be managed by the City of Hallandale Beach's Green Initiatives Coordinator, Alyssa Jones Wood. Compliance and financial oversight will be provided by the City's Grants Office. This Office provides financial and compliance oversight for grant programs Citywide.

The City is currently contracted with RS&H for the SAP; RS&H has provided a cost estimate of approximately $66,000 to expand the scope of services for the SAP contract to perform the VAAP within a twelve month time period.

3. Budget Summary:

	Grant Amount Requested
AGREEMENT TOTAL	**$ 66,000**

TOTAL GRANT FUNDS

Categories	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	TOTAL BY CATEGORY
Contractual	$11,000	$11,400	$2,750	$4,950	$3,300	$32,600	$66,000
SUB-TOTAL BY TASK	$11,000	$11,400	$2,750	$4,950	$3,300	$32,600	$66,000

5. Project Timeline:

PROJECT TIMELINE

Task/ Deliverable No.	Task or Deliverable Title	Task Start Date	Task End Date	Deliverable Due Date	Task Funding Amount
1	Flood Hazard Mapping	07/01/2019	10/03/2019	10/03/2019	$11,000
2	Flood Vulnerability/Loss Assessment	10/04/2019	01/30/2020	01/30/2020	$11,400
2a	Flood Exposure Assessment			01/30/2020	N/A
2b	Flood Economic Loss Analysis			01/30/2020	N/A
3	Future Precipitation Analysis	10/04/2019	01/30/2020	01/30/2020	$2,750
4	Qualitative Assessment of Groundwater Changes	10/04/2019	01/30/2020	01/30/2020	$4,950
5	Projected Changes in Shoreline	10/04/2019	01/30/2020	01/30/2020	$3,300
6	Initial Strategy Development and Evaluation	01/31/2020	06/11/2020	06/11/2020	$32,600
6a	Initial Strategy Development			06/11/2020	N/A
6b	Strategy Evaluation			06/11/2020	N/A
6c	Infrastructure Specific Strategies			06/11/2020	N/A
6d	Benefit Cost Assessment			06/11/2020	N/A

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TASKS & DELIVERABLES

Task #1

1. **Title:** Flood Hazard Mapping

2. **Description:** Flood hazard extents and depth grids would be produced for a range of conditions including sea level rise, tidal flooding, heavy precipitation, as well as storm surge recurrence intervals of 10-year, 100-year and 500-year flood conditions. Each flood condition would be produced for today- the baseline condition, and then for three sea-level rise scenarios based on the Southeast Florida Regional Climate Compact Unified Sea Level Rise Projection. The three future condition scenarios would include 2030 (0.5 foot increase from today) and 2060 (1 foot and 2 feet increases from today to bound range). Data will be derived at a 15-foot horizontal resolution elevation model to add additional detail as compared to the existing Broward County analysis.

3. **Deliverables:**
    - Technical documentation
    - Cartographic map depictions for each flood type
    - Summaries of change in flood area and frequency per flood type
    - Geospatial data, including flood elevation surfaces, flood extents, flood depth grids, and base topography

4. **Task Total:** $11,000.00

5. **Salaries Detail:** N/A

Task #2

1. **Title:** Flood Vulnerability/Loss Assessments

2. **Description:**

    2a – Flood Exposure Assessment: Flood exposure analysis based on Hallandale Beach GIS data (e.g. at the parcel level) that would determine the vulnerability of the City's public facilities, critical infrastructure, access to those facilities and infrastructure, and other assets as available GIS data allows. Depth attribution would be included. Vulnerability would be summarized to identify the relative flood condition, timing and severity (using flood depth as a proxy) of the potential impact. A weighted scoring system, considering the timing and severity of impact will be applied to quickly identify the assets with the highest risk. Flood hazard mapping from Task 1 would be directly leveraged for this assessment.

    2b – **Flood Economic Loss Analysis:** Analyze potential economic loss analysis for the City's building assets using Hallandale Beach parcel data, ESRI Business Analyst and/or the HAZUS economic loss model. These tools would be applied to the general building stock information for the City census block groups to estimate changes in economic loss from today's baseline to the near and long-term future conditions examined by the flood

mapping analysis. Flood depth products developed in Task 1 would be directly leveraged for this analysis.

3. **Deliverables:**
    - GIS layers of assets attributed with flood vulnerability to each condition
    - Summary tables and short discussion of vulnerabilities, highlighting key at risk assets
    - Technical documentation
    - Direct and indirect economic loss outputs for existing and future conditions, including loss by return period and annualized losses, as well as an assessment of the changes in loss values across the evaluation scenarios
    - Summary of loss profile information, including demographic, building stock, and essential facilities loss estimations

4. **Task Total:** $11,400.00

5. **Salaries Detail:** N/A

Task #3

1. **Title:** Future Precipitation Analysis

2. **Description:** This task would provide site-specific changes in future heavy precipitation relevant to stormwater management and design. The effort would include a review of the existing NOAA Atlas 14 heavy rainfall recurrence statistics against provided existing stormwater design/management guidance. Estimate of future peak 24-hour rainfall would be completed for recurrence intervals up to 200-years for the two future time periods (2030, 2060). Estimates will be based on an ensemble of statistically downscaled precipitation data to encompass the range of model uncertainty. Future exceedance curves will be compared to the historical period and projected changes outside of the existing error range will be noted. Changes will be communicated in the context of the existing guidance.

3. **Deliverables:**
    - Narrative providing summary of technical approach, findings, and insights

4. **Task Total:** $2,750.00

5. **Salaries Detail:** N/A

Task #4

1. **Title**: Qualitative Assessment of Groundwater Changes

2. **Description**: This element would include a review of local hydrogeology studies to provide discussion on aquifer vulnerability to sea level rise, anticipated changes in the water table, and saltwater intrusion. Discussion will include anticipated community impacts of changes in groundwater hydrology induced by sea level rise and a changing climate (i.e. rainfall, recharge/discharge). Contingent on groundwater data availability, geospatial modeling of the coastal water table could be conducted to identify areas with especially shallow water tables that have higher vulnerability to flooding.

3. **Deliverables**:
    - Narrative discussion of groundwater changes, along with documentation of data sources and assessment of impacts
    - Geospatial products including data and existing future water table maps and surficial aquifers, if selected

4. **Task Total:** $2,750.00

5. **Salaries Detail:** N/A

Task #5

1. **Title:** Projected Changes in Shoreline Recession

2. **Description:** Historical shoreline change data will be used in conjunction with simple techniques to estimate changes in recession rates due to sea level rise.

3. **Deliverables:**
    - Estimated change in average recession rate for oceanfront beaches and qualitative assessment of potential impacts to recreation and nourishment intervals

4. **Task Total:** $3,300.00

5. **Salaries Detail:** N/A

Task #6

1. **Title:** Resilience Strategy Development and Evaluation

2. **Description:**
   6a - Initial Strategy Development: This task will entail a review of the vulnerability assessment and lead to identification of potential flood risk management strategies. Strategies will be developed based on noted vulnerabilities within the City, relevant to City infrastructure and further informed by the local hazard mitigation plan, ongoing sustainability plan and also through interviews with community officials and the public. Strategies to consist of combination of policy, regulations, ordinances, as well as flood mitigation strategies including protection, relocation, elevation or hardening (flood and wind-proofing) of existing infrastructure – such strategies will be at a high level but specific to noted vulnerabilities of any specific infrastructure identified by the community such as shelters, water-wastewater infrastructure, public safety facilities. Strategies will be organized into a short and long-term list. Text will also be developed to note areas of broader coordination that would be needed with Broward County and adjacent communities.
   6b – Strategy Evaluation: This task will provide a collaborative review and scoring of the identified strategies with City public engagement. Our team will convene a workshop to discuss benefits and drawbacks of the individual strategies as well as feasibility with the public. This effort will provide some initial preferences and culling of the strategy list. Next, a collaborative evaluation of the preferred strategies across feasibility and impact metrics will be completed to score and objectively identify the favored strategies by apply our Excel based

decision framework tool. Metrics will include consideration to technical, administrative, political, legal, fiscal, environmental, economic and societal factors. Favored strategies would be integrated into the sustainability plan for consideration for implementation.

6c – Infrastructure Specific Strategies: This task would extend the Strategy Evaluation task to include a site visit of vulnerable facilities to enable the development specific strategies that address. The site visit would use the hazard information, identify specific vulnerabilities and recommend operational or structural hazard mitigation strategies to improve resilience.

6d – Benefit Cost Assessment: This task would build on the preceding strategy elements and provide gross estimates of project costs and benefits and initial calculation of the benefit-cost ratio for up to 10 projects.

3. **Deliverables**:
    - List of short- and long-term strategies that can be actioned on or further developed for implementation. Such strategies will complement the SAP
    - Public meeting to process selection of preferred strategies, definition and overview of metrics and scoring process, completed scoring matrix
    - Site visits to selected vulnerable facilities & Project Sheets for each selected facility that describes vulnerabilities and specific resilience strategies
    - Up to ten individual project four-page "Project Sheets" that provide a review and estimate of gross project costs and benefits, as well as the benefit-cost ratio with clearly identified assumptions for the calculations
    - Public meeting to discuss plan changes and the final VAAP
4. **Task Total:** $32,600.00

5. **Salaries Detail:** N/A

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