Sponsored by: Williams

CITY OF MARATHON, FLORIDA
RESOLUTION 2026-41

A RESOLUTION OF THE CITY COUNCIL OF MARATHON, FLORIDA, ADOPTING THE CITY OF MARATHON WATERSHED MANAGEMENT PLAN; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City of Marathon participates in the National Flood Insurance Program (NFIP) Community Rating System (CRS) program which provides premium discounts for qualifying NFIP policy-holders within the Special Flood Hazard Area (SFHA); and

WHEREAS, the CRS program awards a "class rating" based on points achieved equating to a premium discount with each class improvement, starting from a Class 10 (lowest level of participation) to Class 1 (highest level of participation), translating into an additional 5% premium discount; and

WHEREAS, the 2025 Coordinator's Manual for the CRS program includes a series of credits including an option for producing a Watershed Master Plan which requires rainfall, sea level rise and tidal flooding evaluation; and

WHEREAS, a qualified Watershed Master Plan is a mandatory prerequisite for CRS Class 4 or better status and requires meeting or exceeding the criteria outlined in the 2025 Coordinator's Manual; and

WHEREAS, the CRS Watershed Management Plan – Prerequisites for Section 452b require an evaluation of current and future flood conditions impacting the local drainage system during multiple rainfall events and the impacts of sea level rise or tidal flooding ; and

WHEREAS, the City of Marathon received Florida Department of Emergency Management (FDEM) grant funds that supported 75% of the cost of updating the Watershed Master Plan and was able to utilize state funds awarded to conduct its Vulnerability Assessment as the 25% required match; and

WHEREAS, the Insurance Services Office (ISO), which reviews Watershed Master Plans, has completed a courtesy review of the DRAFT Watershed Master Plan which indicates upon adoption the final Watershed Master Plan, it will receive credit in the CRS program and comprise a scored plan that will fulfill the Class 4 prerequisite requirements; and

WHEREAS, having a scored, compliant and adopted Watershed Master Plan will help the City of Marathon continue to participate in the CRS program; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MARATHON, FLORIDA, that:

Section 1. The above recitals are true and correct and are incorporated herein.

Section 2. The City of Marathon Watershed Master Plan is hereby adopted.

Section 3. This resolution shall take effect immediately upon its adoption.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF MARATHON, FLORIDA, THIS 12TH DAY OF MAY, 2026.

THE CITY OF MARATHON, FLORIDA

Lynny Del Gaizo, Mayor

AYES: Matlock, Still, Landry, Struyf, Del Gaizo
NOES: None
ABSENT: None
ABSTAIN: None

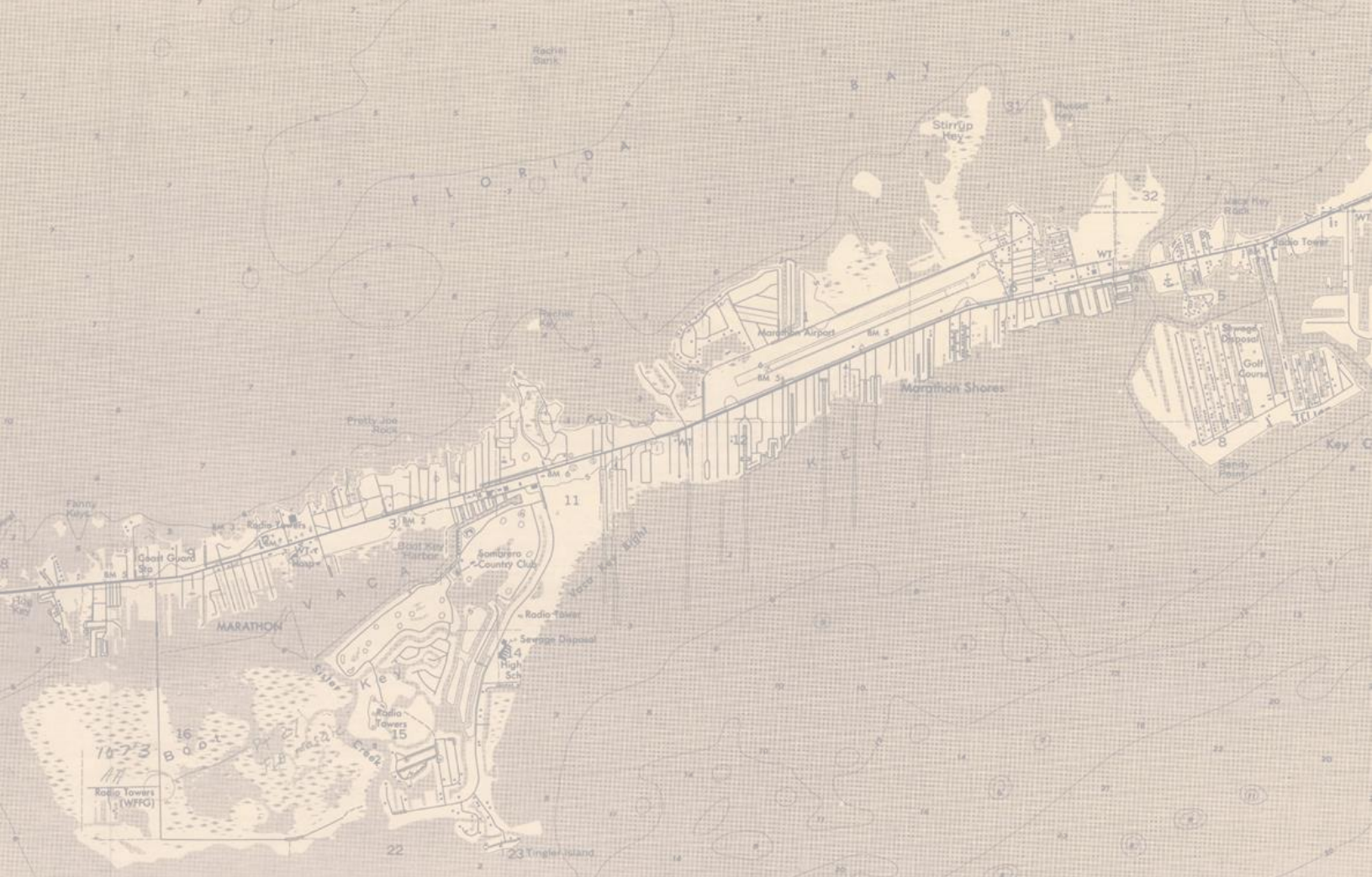
ATTEST:

Diane Clavier, City Clerk

(City Seal)

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND RELIANCE OF THE CITY OF MARATHON, FLORIDA ONLY:

Steve Williams, City Attorney



WATERSHED MANAGEMENT PLAN

CITY OF MARATHON, FLORIDA

OCTOBER 2025

Watershed Management Plan Deliverable 2 Requirements

An electronic copy of the completed WMP will be submitted to the Division. If applicable, the Sub-Recipient will revise the submitted WMP to comply with required revisions and feedback from the Division and then resubmit the WMP to the Division after the beginning of the Period of Performance.

Tasks include:

1. The completed WMP (after incorporating comments from the Division, if applicable).
2. A signed letter from the applicable county's Local Mitigation Strategy (LMS) Chairperson attesting that the completed WMP will be adopted and used to update the risk assessment and mitigation strategy during the next LMS plan update.

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General Marathon Description

The Florida Keys chain of islands is in the tropics, bounded by Florida Bay to the north and west and by the Florida Keys National Marine Sanctuary ("FKNMS") to the east and west. Bounded to the north and west by one of the world's largest estuarine systems, Everglades National Park and Florida Bay, and by the FKNMS to the east and west, the Florida Keys are protected from the rough waters of the Atlantic Ocean by the third largest barrier reef in the world, the only living coral reef in the continental United States.

The municipality of City of Marathon (Marathon) is nestled in the center of this chain of islands, within Monroe County. Marathon separates the two (2) large bodies of water by no more than one (1) mile of land at its widest point with an average elevation of just six (6) feet above sea level. The islands of Marathon have 9,733 permanent residents (2020 U.S. Census). The combined land area of the City's chain of islands is approximately 9.274 square miles with boundaries extending approximately 10.0 linear miles (including the channels between the islands).

The waters surrounding Marathon consist of tidal wetlands, mangrove forests and seagrass habitat, all of which are unique ecosystems that provide food, shelter, and nursery grounds to a multitude of fish, crustaceans, marine mammals, reptiles, and bird species. A vast majority of the saltwater species found in North America are found in the waters surrounding the Florida Keys. The islands of Marathon are home to many threatened and endangered animal and plant species. The waters of the FKNMS, in Florida Bay, the Gulf of Mexico and the Atlantic Ocean surrounding the entire length of the Florida Keys (including Marathon), are designated as Outstanding Florida Waters ("OFW") by the Florida Department of Environmental Protection ("FDEP"). This designation means that these waters are specially protected because of their natural attributes, subjecting them to higher regulatory standards and a greater level of protection regarding water quality. This special protection limits, and in some cases eliminates, discharges to these waters that would lower ambient (existing) water quality.

Larger population growth did not occur in the Florida Keys until the 1900s when Henry Flagler built a railroad from mainland Florida to Key West, which opened in 1912. The first road followed in 1928, originally existing in two (2) segments - one from the mainland to Lower Matecumbe Key and the other from No Name Key to Key West - with an automobile ferry service connecting the forty-one (41) mile gap between Lower Matecumbe and No Name Key. On Labor Day in 1935, the most devastating and deadly hurricane in Florida Keys history struck, wiping out the roadways, the train system and built environment, and killing almost 500 people. Survivors of the 1935 hurricane were dedicated people who remained and rebuilt the community. A road spanning the entire distance of the Florida Keys was later constructed on the remnant Flagler railway bed which opened in 1938. The determination to rebuild after such a catastrophic event led to the rebirth of Marathon. The population of Marathon exploded exponentially after World

War II as northerners discovered the rich history of the islands, building homes and businesses throughout the City.

In 1975, the State of Florida legislature recognized the unique environmental sensitivity and mounting development pressures of the region and designated the Florida Keys (Monroe County and its municipalities) and Key West as an Area of Critical State Concern ("ACSC"), one (1) of only six (6) areas in the state. The ACSC Principles of Guiding Development, found in Section 380.0552, Florida Statutes, limit growth potential in the County and its municipalities by restricting new development, both residential and commercial, to ensure the protection of the natural environment and allow for orderly and balanced growth. This protects natural ecosystems while maintaining safe hurricane evacuation timelines for residents and visitors. As a result, the potential growth of the permanent population in the Florida Keys - including Marathon - is minor.

Marathon incorporated as a municipality in 1999, which set its boundaries, "from the East end of the Seven Mile Bridge approximately Mile Marker (MM) 47 to the West end of Toms Harbors Bridge, approximately MM 60. Being about 1 hour from Key West and Key Largo, Marathon is the Heart of the Florida Keys. The islands of Marathon are Boot Key, Knight Keys, Hog Key, Vaca Key, Stirrup Key, Crawl and Little Crawl Key, East and West Sister's Island, Deer Key and Fat Deer Key, Long Pine Key and Grassy Key. Under the Council-Manager form of government, the Marathon City Council has the independent power to enact local legislation, adopt budgets, determine policies, and appoint officers and officials. All policies and decisions must be consistent with the ACSC Principles of Guiding Development. Most of Marathon's governmental functions and activities are supported by Marathon's Governmental Funds. These funds are generated primarily by taxes, grants, and similar revenue sources, including the collection and disbursement of earmarked monies (special revenue funds) and the servicing of long-term debt (debt service funds).

The water quality designations of the FKNMS and OFW together protect the unique marine ecosystem. Additionally, Marathon has many parks and open space, including eight City parks and beaches.

Finally, Marathon's geology and elevation are such that tidal influence is significant due to the porous cap rock of the land. This is a large factor for consideration in a watershed planning effort (significantly impacted by sea level rise) because "barrier" type solutions will provide little benefit to mitigate against tidal impacts.

Marathon Community Rating System Background AND RECOMMENDATIONS

1. CRS Prerequisites for CRS Class 4

a. 2017 CRS Coordinator's Manual and 2021 Addendum to the 2017 CRS Coordinator's Manual

A Class 4 or better community must demonstrate that it has programs that minimize flood losses, minimize increases in future flooding, protect natural floodplain functions, and protect people from the dangers of flooding. Even though it may have enough points, a community that cleared most of the buildings from its floodplain with disaster assistance funds after a flood cannot be a Class 4 or better if it does not have an effective regulatory program to prevent a recurrence of the problem.

To be a Class 4 or better, a community must demonstrate that it has at least 3,000 points AND meet the following prerequisites.

(1) The community must meet all the Class 6 prerequisites.

(2) The community must have received and continue to maintain a classification of 4/4 or better under the BCEGS.

(3) The community must demonstrate that it has taken appropriate steps to eliminate or minimize future flood losses. To do this, a Class 4 or better community must receive credit for the following CRS activities.

(a) Activity 430 (Higher Regulatory Standards)—The community must show that it enforces higher regulatory standards to manage new development in the floodplain.

i. The community must adopt and enforce at least a 1-foot freeboard requirement (including equipment or mechanical items) for all buildings constructed, substantially improved and/or reconstructed due to substantial damage, and buildings allowed to be floodproofed, throughout its SFHA, except those areas that receive OSP credit under Activity 420 (Open Space Preservation). In unnumbered A, AO, and V Zones, the community must first determine a base flood elevation consistent with the techniques credited under Activity 410 (Flood Hazard Mapping).

ii. The community must receive at least 700 points (after the impact adjustment) under the other elements of Activity 430 and under Sections 422.a, f, and g under Activity 420 (Open Space Preservation).

(b) Activity 450 (Stormwater Management)—The community must receive the following credits for its watershed management plan(s) (WMP) under Section 452.b:

i. WMP1: 90 points (before the impact adjustment) for meeting all the credit criteria for WMP,

ii. WMP2: 30 points (before the impact adjustment) for managing the runoff from all storms up to and including the 100-year event to ensure that flood flows downstream of new development do not increase due to the development, and

iii. An impact adjustment value of rWMP = 0.5 or more. Alternatively, the community may show that at least 50% of the watershed area where future growth is expected is covered by one or more credited watershed management plans.

(c) Activity 510 (Floodplain Management Planning)—The community must have adopted and be implementing a floodplain management plan that receives at least 50% of the maximum credit under Activity 510, calculated after the impact adjustment. This 50% of the maximum credit must include at least 50% of the available points in each of planning steps 2, 5, and 8.

(4) Obtain a minimum total credit of 100 points (after the impact adjustment) from one or a combination of the following elements that credit protecting natural floodplain functions:

- *420—Natural functions open space (NFOS),*
- *420—Natural shoreline protection (NSP),*
- *430—Prohibition of fill (DL1),*
- *440—Additional map data (AMD12) natural functions layer,*
- *450— Managing the volume of stormwater runoff (SMR, DS bonus credit),*
- *450—Low impact development (LID),*
- *450—Watershed management plan (WMP), credit point items 3, 5, 6, and 7,*
- *450—Erosion and sediment control (ESC),*
- *450—Water quality (WQ), and*
- *510—Natural floodplain functions plan (NFP).*

(5) Document the following life safety measures:

(a) Obtain some credit under Activity 610 (Flood Warning and Response).

(b) Have a map of all levees and all areas protected by levees, and an inventory of the types of buildings (residential, commercial, etc.) and the critical facilities that would be exposed to flooding should the levee(s) be overtopped or fail. This is the same as activity credit criterion (3) under Activity 620 (Levees), Section 621.b.

(c) Have a description of the dam failure threat, including a map of all areas that would be flooded by the failure of each high-hazard-potential dam that affects the community, and the types of buildings (residential, commercial, etc.) and critical facilities that would be flooded. This is the same as activity credit criteria (2) under Activity 630 (Dams), Section 631.b.

b. CRS Class 4 Prerequisites Table

To simplify the CRS Class 4 Prerequisites, the chart below lists the prerequisites and compares the requirement to the City's current accomplishments under the CRS program.

Table 1 - CRS Class 4 Prerequisites

Class 4 Prerequisite	Credit	Met
Community agreed to show any draft LiMWAs on the final FIRM, if applic.		Y
Enough points to warrant the Class (3,000+)	2,312	N
If one or more rep loss properties, actions set in Sections 501-504 are met		Y
All flood insurance policies on community owned properties are maintained		Y
BCEGS of 4/4 or better	4	Y
Activity 310 Elevation Certificates		
Maintain all required floodplain-related construction certificates		Y
≥ 90% accuracy on construction certificates during annual review		Y
Credit for construction certificate management procedures (CCMP)	38	Y
Activity 430 Higher Regulatory Standards		
1ft Freeboard throughout the SFHA		Y
≥ 700 pts. in all other 430 elements, including 422.a., e., and f. in 420 Open Space Preservation (after to imp. adj.)	559	N
430—Development limitations (DL)		
430—Freeboard (FRB)		72.68
430—Cumulative substantial improvements (CSI)		
430—Lower substantial improvements (LSI)		
430—Protection of critical facilities (PCF)		
430—Enclosure limits (ENL)		
430—Building codes (BC)		78
430—Local drainage protection (LDP)		10

430—Manufactured home parks (MHP)		
430—Coastal A Zones (CAZ)		
430—Special flood-related hazards regulations (SHR)		
430—Other higher standards (OHS)		
430—Regulations administration (RA)		20
420—Open space preservation (OSP)		319
420—Open space incentives (OSI)		59.25
420—Low-density zoning (LZ)		
Activity 450 Watershed Master Plan (WMP)		
Adopt a Watershed Management Plan		Y
90 pts. for meeting all WMP prerequisites		Y
30 pts. for 452.b.2 (managing all storms up to and including 100-yr. event)		N
rWMP = 0.5 or greater (or show that WMP covers watersheds that comprise at least 50% of its growth)		N
Activity 510 Floodplain Management Plan (FMP)		
Adopt a Floodplain Management Plan		Y
≥ 50% of the maximum credit under Activity 510 after imp. adj. (≥ 191 pts.)	223	Y
≥ 50% of available pts. in Planning Step 2 (≥ 60 pts.)	120	Y
≥ 50% of available pts. in Planning Step 5 (≥ 26 pts.)	51	Y
≥ 50% of available pts. in Planning Step 8 (≥ 30 pts.)	52	Y
Natural Floodplain Functions		
At least 100 pts. (after impact adjustment) from one or a combination of the following elements:	44	N
420 - Natural functions open space (NFOS)		
420 - Natural shoreline protection (NSP)		
430 - Prohibition of fill (DL1)		
440 - Additional map data (AMD) natural functions layer		14
450 - Managing the volume of stormwater runoff (SMR - DS)		
450 - Low impact development (LID)		
450 - Watershed management plan (WMP), Credit point items 3, 5, 6 and 7		
450 - Erosion and Sediment Control (ESC)		10
450 - Water Quality (WQ)		20
510 - Natural floodplain functions plan (NFP)		
Life Safety Measures		
610 - obtain some credit under this Activity	80	Y
620 - meet prerequisite 621.b(2) [map of all areas protected by levees]		N/A
630 - meet prerequisite 631.b(1) [map of all areas flooded by the failure of a high hazard dam and critical facilities that would be flooded.]		N/A

2. Recommendations for Achieving a CRS Class 4

Community Total Points

The city must secure at a minimum, 3,000 points to achieve CRS Class 4. The city currently scored 2,312 points. An additional 688 points are necessary to meet the point requirement for a CRS Class 4 rating. Meeting additional prerequisite points above will result in an additional 305 points. The city will need to implement additional CRS activities to add an additional 383 credit points.

Table 2 - CRS Classes, Points, and Discounts

CRS classes, credit points, and premium discounts.		
CRS Class	Credit Points	Premium Reduction
1	4,500+	45%
2	4,000–4,499	40%
3	3,500–3,999	35%
4	3,000–3,499	30%
5	2,500–2,999	25%
6	2,000–2,499	20%
7	1,500–1,999	15%
8	1,000–1,499	10%
9	500–999	5%
10	0–499	0

Activity 430 Higher Regulatory Standards

An additional 141 points are needed to meet the higher regulatory standards Class 4 pre-requisites for obtaining 700 or more points. Consider implementing higher standards from the list of applicable activities listed in Table 1. Keep in mind that all credit points for higher regulatory standards will be impact adjusted for the open space credited in Activity 420 - Open Space Preservation. Implementing higher regulatory standards often requires changes to

Activity 450 Watershed Master Planning

Prepare and adopt a qualifying Watershed Management Plan that meets the CRS qualifications for credit. The plan would need to have an area ratio of .05 or greater and show that the plan

covers watersheds that comprise at a minimum, 50% of the city's areas of potential growth. The expected score for the in-process Watershed Management Play will be 120 points.

Natural Floodplain Functions

One of the CRS Class 4 prerequisites is to obtain at least 100 points in the elements listed in the chart above under the heading *Natural Floodplain Functions*. The city's current score is 44 points out of the listed elements. The city could consider the following to boost the credit points to or above the 100 required points.

(1) Erosion and Sediment Control - adopt regulations that would require erosion and sediment control on any land disturbance greater than 1,000 feet. Adopting and enforcing the regulation would result in an additional 30 points.

(2) Floodplain Species Assessment and Floodplain Species Plan - the 2021 Addendum to the 2017 CRS Coordinator's Manual added additional credit opportunities under Natural Floodplain Functions Plan. The Floodplain Species Assessment would add 15 points, preparing and adopting a Floodplain Species Plan would result in an additional 85 points for a total of 100 points.

(3) Revisit open space credit and document open space in the SFHA that is currently in it natural and beneficial state.

I. Data Inventory and Collection

1. Data inventory (used for initial flood modeling):

a. Inventory of ground characteristics (e.g., soil type, impervious surfaces, wetlands)

The Florida Keys is a chain of islands approximately 220 miles long, extending from the end of the Florida peninsula curving southwest toward the Dry Tortugas. Consisting of 822 islands, of which about 30 are inhabited, the Florida Keys are traversed by U.S. Highway 1 (a.k.a., US 1 or Overseas Highway) with 19 miles of bridges. The Keys are entirely within Monroe County and includes the municipalities of Marathon, Key Colony Beach, Layton Marathon and Key West. Key West represents about 30 percent (24,000 people) of the population of Monroe County, which, according to the 2000 Census, is about 79,600 people. Marathon is comprised of approximately 9.274 acres within the island chain set on 13 islands. Aside from the conservation areas, land within the City of Marathon has primarily been developed for urban use.

In general, Florida watersheds are characterized by a large land mass that concentrates and directs runoff to a relatively small waterbody. Thus, runoff is discharged to receiving waters

wherein pollutants are concentrated. As a result, local runoff is not focused, and pollutants are dispersed in the Gulf of Mexico and Straits of Florida.

The Floridian Plateau, which is characterized by chemically or biologically produced sediments, underlies the Everglades, Florida Bay, and the Florida Keys, as well as a large portion of the west Florida continental shelf. The islands of the Florida Keys represent elevated remnants of a Pleistocene coral reef tract that extends from Soldier Key through Key West. The Florida Keys can be divided into two physiographic provinces distinguished by the shape, orientation, and lithology of the banks and islands in each. The northernmost province of the Florida Keys (Key Biscayne through Marathon) is characterized by long, narrow islands oriented northeast to southwest. These narrow islands and the man-made land bridges between them restrict water exchange between the Atlantic, Florida Bay, and the various sounds in this area. It is here that the Florida Reef Tract is best developed. These islands are formed of an aerially weathered and re-crystallized limestone known as Key Largo Limestone. The southwestern province of the Florida Keys (Bahia Honda through Key West) is characterized by roughly triangular islands oriented in a northwest to southeast direction, or at right angles to the Florida Reef Tract. These islands are built on an extension of the older Miami Oolite Formation and their northwest-southeast orientation results from the directional movement of tidal currents over differing sea-level stands in the Gulf of Mexico and the Straits of Florida.

Soils are such that infiltration and percolation are relatively enhanced, moving infiltrated runoff and its pollutants to nearshore waters quickly, yielding little or no nutrient entrapment or treatment in the soil matrix. The Florida Keys are in USDA Hardiness Zones 11a (Key Largo to Marathon) and 11b (Marathon through Key West). Soils (Key Largo Limestone and Miami Oolite) are alkaline, with a pH range from 7.2 to 8.2. Rainy/hurricane season extends from June through November. The rest of the year is the dry season. On average, rainfall is about 40 inches per year, with most rainfall occurring during the rainy season.

Land use data representing land cover conditions was derived from the City of Marathon's Future Land Use Map (FLUM) and converted based on land use classification from the most recent statewide Florida Land Use and Cover Classification System (FLUCCS) code database (2019). Note that vacant parcels not under conservation and available for development were classified under the corresponding developed category for the existing/future conditions.

Most of the watershed is classified as residential (25.8%), divided into low (2.47), medium (17.46), and high residential (5.87), and commercial, recreational, industrial, and public land uses (22.68%). This is followed by Conservation (47.47%), and airport at 4.04% respectively. Total impervious surfaces are estimated at 28.84%. Impervious surface percentages are derived from *Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports, 2012.*

b. Inventory of existing drainage system

City's drainage system

The City of Marathon has provided pdf stormwater record as-builts that includes relevant stormwater infrastructure such as driveway culverts, curb, and ditch inlets along US-1 to be used for the City's watershed management plan. Digitized stormwater structure locations and descriptions, including invert elevation data, were exported, and individually assessed within the Interconnected Channel and Pond Routing Model (ICPRv4.07.08) created for this Watershed Management Plan. The available stormwater inventory includes structures along US-1 along with several networks along local and collector roadways. Most of the stormwater infrastructure along local roadways consists of primarily exfiltration systems not hydraulically connected to coastal waterways. This combined with poor hydraulic conductivities, as discussed in City of Marathon's June 7th 2024 workshop titled "Sombrero Blvd Improvements Meeting", leads to lack of drainage and increased risk of persisting inundation during higher intensity storm events.

Florida Department of Transportation (FDOT) drainage system

The existing available stormwater inventory was limited to FDOT structures along US-1, developments adjacent to Sombrero Blvd, Hog Key, Marathon Shores, Rachel Key, Shands Key, Crawl Key, and select sections of Grassy key. The lack of stormwater invert and feature information for FDOT structures resulted in using drainage assumptions and engineering judgment to obtain missing data, based on LiDAR data, relative positioning of existing structures to major waterways, and characteristics of nearest stormwater structures.

c. Inventory of data availability

Data availability within City has been adequately accessible. Several simultaneous efforts are ongoing at the County and City levels that are focused on overall resiliency, climate planning, and infrastructure adaptation. Central to those efforts have been data compilation and collection and the key to developing a Watershed Management Plan is the development of infrastructure data sources and evaluating how those assets are being or will be impacted by flood risk.

City of Marathon

Sustainability and Climate Plan

The Marathon Sustainability and Climate Plan was developed in 2012 and was the City's first effort to coalesce sustainability and resiliency principles with data related to future sea level rise impacts. The City undertook the effort to develop data sources, policies, strategies and start the community discussion related to resiliency. There were several focus areas identified in the final Marathon Sustainability and Climate Plan:

- Sustainability

- Energy efficiency and greenhouse gas emissions
- Resiliency

This Plan evaluated the City's level of preparedness and investigated the potential impacts of sea level rise, exceptionally high tides, storm surge and other sea level rise issues. The Plan evaluated initial impacts to infrastructure and methods to reduce exposure and risk.

Stormwater Master Plan

In 2002 (adopted 2003), the City of Marathon developed a Stormwater Master Plan to address water quality improvements to the stormwater discharges into City Canals and near shore waters of the Florida bay and Atlantic Ocean. The Stormwater Master Plan allowed the City to implement corrective actions and preventative measures to minimize stormwater pollutant loading to canals, near shore waters, and provide solutions that account for natural and ecological resources. Additionally, the Master Plan identifies management initiatives such as ordinances and Best Management Practices (BMPs) that will ensure the health and safety of the ecosystem and protect public and private property.

The City's Stormwater Master Plan includes identification of drainage basin boundaries, on-site evaluation of existing drainage structures, assessment of natural areas, and assembly of the data. A few existing documents were examined to provide an understanding of the geographical and population characteristics of the City of Marathon. These documents included the 1998 Marathon Facilities Plan prepared by CH2M Hill, the Monroe County Stormwater Master Plan prepared by CDM, the City of Marathon Stormwater Master Plan prepared by CGA and the Marathon SRF Planning Documents Wastewater Facilities Plan prepared in 2006 by The Weiler Engineering Corporation. It was determined from the examination of these documents that management of stormwater in the City of Marathon could best be planned and managed by division of the City into service areas as defined in the 2006 wastewater facilities plan. In this approach, the City has seven basins, defined largely by naturally occurring boundaries. The division of the City into smaller basins following geographical boundaries allows for the design and construction of infrastructure to be phased in multiple projects.

Having defined the service basins, the next step was to determine the most cost-effective means of collecting and treating the stormwater in the public right of way. It was determined that the only practical means of collection of stormwater was through conventional gravity systems consisting of catch basins located to gather stormwater from areas defined by naturally occurring grade lines or by construction of drainage swales to direct the water to the catch basins. In this type of system, some degree of treatment is provided by the baffling within the catch basins that trap floatable and settled debris, discharging the treated stormwater to the disposal system.

Preliminary cost estimates, project justification and timeframes were estimated for construction between 2006 and beyond. From the 2003 Stormwater Master Plan: The construction of a system

for collection and disposal of stormwater in the City of Marathon is a major undertaking. Due to the low elevation of the islands, some methods of collection and disposal used on the mainland are not practical. The lay of the land and the porosity of the bedrock make the use of roadside ditches with catch basins and underdrains the most reliable and cost effective approach to managing stormwater in Marathon. This project consists of providing drainage to areas that are primarily already developed. There will be no net increase in impervious area by this project. Therefore, the project will provide as much treatment to the stormwater as is possible given the existing condition but will not be able to provide the 1 inch of treatment over the entire project area or 2.5 inches over the impervious. This would require complete rebuilding of the infrastructure system within the City and the cost is not justified.

Stormwater Assessments

On July 30, 2002, the City of Marathon adopted Ordinance 02-07-13 titled Master Service Assessment Ordinance allowing the City to collect assessments as necessary for infrastructure purposes.

On March 10, 2004, the Florida Department of Environmental Protection (FDEP) designated the City of Marathon as a regulated municipality under Phase II of the National Pollutant Discharge Elimination System (NPDES). FDEP is authorized to designate the City as a regulated Phase II MS4 by criteria set forth in Rule 62-624.800, Florida Administrative Code (FAC).

One of the requirements of the MS4 designation was the requirement to institute a stormwater utility and commence a five-year program to prohibit stormwater from running off our islands into Florida Outstanding Waters as well as other requirements which we are audited on annually.

On May 10, 2005, the City adopted Ordinance 2005-10 creating a stormwater utility and adopted an initial rate of $60 per Equivalent Residential Unit (ERU) for a single-family home and 1 ERU for every 4,769 sf of impervious area for commercial properties. (This includes vacant properties) This money is collected through non-ad valorem taxes annually. The first year of collection was 2005.

When a municipality collects non-ad valorem assessments they are required to hold Public Hearings annually. Additionally, if the rate increases; as is the case with the stormwater assessment, first class letters must be mailed to all who fall within the assessment area. The letter you all have recently received is because of this requirement.

On September 9, 2009, the City Adopted Resolution 2009-121 increasing the rates to $120 per Equivalent Residential Unit (ERU).

Mobile LiDAR

Marathon has secured mobile LiDAR across the municipality to better understand the elevation changes along owned / maintained roadways and critical infrastructure within the City. The

mobile LiDAR survey was executed in accordance with the FDOT terrestrial mobile LiDAR (TML) Type A Survey standards to achieve the required accuracies. This includes specific target and validation point spacing, point density requirements and redundant / multiple pass measurements. The dataset is expected to be completed July 2024.

Monroe County

Monroe County has been engaged in resiliency, climate, and sustainability planning since 2010 when it first hired a staff person to head the County's sustainability and climate initiatives. That effort was concurrent with the award of American Reinvestment and Recovery Act (ARRA) funds and was one catalyst in undertaking these broader planning and infrastructure initiatives. This led to the County's first sustainability and resiliency planning document known as GreenKeys. Prior to the development of GreenKeys, the City of Marathon produced its first previously referenced climate planning document known as the Marathon Sustainability and Climate Plan.

The County has continued its resiliency planning initiatives and coordination between the County and the City on these initiatives has increased. The County has amended provisions of its Comprehensive Plan and integrated sea level rise policy initiatives into the Plan and its Code of Ordinances. The County also produced its first Vulnerability Assessment in 2015 in conjunction with the GreenKeys Planning process. The County also produced a credited CRS Watershed Management Plan in 2019 and was awarded 120 points for that effort. This WMP was one of the first in the Country to incorporate the new guidance related to sea level rise into the effort evaluating the NOAA Intermediate High 2100 condition. The County undertook numerous other policy initiatives such as a specific state-mandated update of its Coastal and Conservation Element of the Comprehensive Plan to comply with new state guidelines. The County updated its Vulnerability Assessment work in 2021. In 2021, new state law was enacted requiring certain technical parameters be included within the local government Vulnerability Assessments and the County is launching that work in 2023.

The County also initiated a planning effort in 2020 to conduct a Roads Vulnerability Analysis and Capital Plan. This extensive engineering-based effort has been based on updated and highly accurate mobile LiDAR previously collected by the County and evaluates the vulnerability and criticality of the County's roadways. The Plan includes conceptual engineering design, cost estimates, and a timetable in five-year increments to undertake road elevation, stormwater, and tidewater adaptation projects. The County and municipalities have engaged in extensive coordination to expand that planning process across the entirety of the Keys including the municipalities. The County has recently completed a Natural Resources Adaptation planning process to determine the cost-benefit and natural resources adaptation priorities in the County. Finally, the County has begun implementing several road elevation/adaptation and shoreline projects according to state and federal grants and appropriations received.

FDOT

FDOT has developed a statewide Resilience Action Plan (RAP), including US-1 as required by Section 339.157, F.S. The plan should enhance infrastructure and operational resilience, design retrofits and construct highway facilities, and enhance partnerships to address multijurisdictional needs. The RAP assesses potential impacts of storms, flooding, and sea level rise on the State Highway System, and identifies strategies to improve the resiliency of Transportation facilities. Recently, FDOT initiated development of the Statewide Resilience Improvement Plan (RIP) which will build on the prior analysis on the statewide RAP and can potentially provide additional federal funding identified by the plan.

The current RAP includes a priority project list, which categorizes short-term projects in line with FDOT's five-year work program and long-term projects based on their respective needs and cost-feasible long-range plans. The priority project list identifies geographic areas that may be subjected to water-related hazards. The *FDOT Resilience Action Plan Appendix A (Project List)* reflects that Marathon falls under the medium tier project category.

Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) has provided data to both the City of Marathon and Monroe County in efforts to conduct Vulnerability Assessments simultaneously with this effort to produce the Watershed Management Plan. Data regarding critical facilities has been incorporated into baseline asset maps referenced later within this document. Because the City does not own or manage FKAA assets, they are considered "regionally significant" and will be evaluated under the scenarios required by Section 380.093, F.S. and incorporated into the Critical Asset Inventory work product from the Vulnerability Assessment effort.

2. Locations

a. Critical facilities, cultural/historical, and other places/areas of interest

Within the City of Marathon, the public has access to the water via beaches, marinas, boat ramps and parks. Marathon has several parks, several of which include water access: Sombrero Beach, Marathon Community Park, Children's Rotary Park, Oceanfront Park, Sunset Bay Park on Grassy Key, Coco Plum Beach, Jessie Hobbs Park, Marathon's Dog Park and Kayak Launch at Oceanfront Park.

Another way for the public to access the scenery and natural beauty of Marathon is by the Overseas Highway (U.S. 1). Within the City of Marathon, U.S. 1 has several points where either the Atlantic Ocean or the Florida Bay is visible. Located at the very west end of the City of Marathon is the Seven Mile Bridge. It is a famous bridge in the Florida Keys and connects the Middle Keys to the Lower Keys and is among the longest bridges in existence when it was built.

Of the many bridges that connect the FL Keys, the Seven-mile bridge is the longest. The Old Seven was originally constructed in early 1900 as part of Henry Flagler's Florida East Coast Railway's Key West Extension, also known as the Overseas Railroad. In the early 1980's this old bridge was no longer used for vehicular traffic when the new bridge was constructed. Today the Old Seven Mile Bridge (the original Knights Key Bridge) to Pigeon Key is listed on the National Register of Historic Places. It has served as a world-famous fishing pier, jogging, and walking route, and of course the major path to Pigeon Key.

Infrastructure components in the coastal area include roads, water and sewer lines and drainage facilities and at this time, it is not anticipated that any infrastructure will need to be relocated due a severe storm event. All the drainage structures within Marathon are in the coastal area. The public infrastructure, as identified above, could sustain damage from a natural disaster. Relocation of infrastructure is not a viable solution since the existing infrastructure is necessary to protect the health and safety of the residents in City of Marathon.

Marathon recently completed a Resilient Florida Vulnerability Assessment concurrently with this Watershed Management Plan. Asset Inventory maps are in Appendix D and include the four primary asset classes as defined in Section 380.093(2), F.S.:

1. Transportation assets and evacuation routes, including airports, bridges, bus terminals, ports, major roadways, marinas, rail facilities, and railroad bridges.
2. Critical infrastructure, including wastewater treatment facilities and lift stations, stormwater treatment facilities and pump stations, drinking water facilities, water utility conveyance systems, electric production and supply facilities, solid and hazardous waste facilities, military installations, communications facilities, and disaster debris management sites.
3. Critical community and emergency facilities, including schools, colleges, universities, community centers, correctional facilities, disaster recovery centers, emergency medical service facilities, emergency operation centers, fire stations, health care facilities, hospitals, law enforcement facilities, local government facilities, logistical staging areas, affordable public housing, risk shelter inventory, and state government facilities.
4. Natural, cultural, and historical resources, including conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets.

The baseline infrastructure map series generally follows these 4 defined asset classes, but certain maps were separated further within that classification system because the maps would have included too many assets to make them legible. For instance, there are 3 Critical Infrastructure Baseline Maps and 5 related to Natural, Cultural and Historical Resources. The asset data provided by the City was also supplemented with asset information from the State of Florida, the Department of Homeland Security, and the Florida Department of Transportation.

Actual Asset Maps include the following:

- Community and Emergency Management Baseline
- Critical Infrastructure Baseline (Electrical)
- Critical Infrastructure Baseline (Other)
- Critical Infrastructure Baseline (Potable Water)
- Critical Infrastructure Baseline (Stormwater, Sewer, Reuse)
- Natural Cultural and Historic Areas Baseline
- Transportation Baseline

b. Vulnerable areas and their descriptions

The most catastrophic threat to public safety in coastal areas of Florida is the potential loss of life and property from storm surge, flooding and high winds associated with hurricanes. Marathon is situated in the Florida Keys along the Atlantic coast, which has been identified by the National Oceanic and Atmospheric Administration (NOAA) as the area of the United States most vulnerable to hurricanes. The National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA) has determined that most land within Marathon is subject to flooding from a 100-year storm. The areas of Marathon most threatened by flooding are the waterfront properties. As a coastal community, the threat to property and human life from flooding in the City is primarily from tidal inundation and storm surges associated with severe storm events, not from upstream drainage conditions.

The coastal high hazard area in Florida is defined by Section 163.3178, F.S. as "…the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model". Under the South Florida Regional Planning Council's (SFRPC)'s Hurricane Evacuation Plan, all of Marathon has been identified in the evacuation zone for a Category 1 storm. In the event of a Category 1 or 2 hurricane, the residents of Marathon are instructed to go to one of the three designated Monroe County Shelters of Last Resort in Marathon or evacuate from the community. Within Marathon approximately 9,733 permanent residents would need to be evacuated. Marathon residents would primarily use U.S. 1 to evacuate to one of the shelters in Marathon or on the mainland.

c. Natural and constructed drainage systems and channels

Based on the stormwater inventory provided by the City of Marathon, a significant percentage of storm drain inlets and connected pipes lie along US-1. The inventory was provided in the form of ArcGIS stormwater shapefiles and electronic copies of the existing feature maps and utility records. Several isolated exfiltration systems exist along collector and local roadways including but not limited to Morton St, Coco Plum Dr, Stirrup Ley Rd, Sombrero Beach Rd, and Sombrero

Blvd. Though invert and structural condition information generally remains unidentified. Consequently, it is a conservative assumption that the exfiltration systems are generally mucked and have limited capacity to drain stormwater during higher intensity storm events. Furthermore, assessing existing channels in basins primarily connected to coastal outfalls as the case of Marathon, provides little to no benefit from a modeling perspective with increased margin of error and model instability. As a result, existing channels were not modeled in the WMP as they were also accounted for in the stage storage information.

3. Existing regulations and plans in place for reducing flood risks

From the City's Comprehensive Plan[1] the following policies are included related to reducing flood risks and stormwater management:

Policy 1-1.2.2 Enhance U.S 1 Corridor

The City shall promote land use and transportation plans and policies designed to improve the appearance and function of the U.S. 1 corridor. These plans and policies shall include, but not limited to:

A. *Installation and maintenance of landscaping*
B. *Installation and maintenance of medians, including additional left hand turn lanes*
C. *Installation and maintenance of traffic signals and signage*
D. *Installation and maintenance of stormwater*
E. *Pedestrian and bike paths and lanes*

These improvements, in addition to improving the appearance and functionality of the US 1 Corridor, may also be designed to provide traffic calming measures and increase pedestrian activity where appropriate.

Policy 1-2.1.3 Ensure Adequate Easements and Rights-Of-Ways

The City shall continue to maintain and require the dedication of adequate easements and rights-of-way for uses such as, but not limited to, roadways, wastewater lines, and stormwater management, for use by utility companies for new construction, service extensions, or facility improvements.

Policy 1-3.4.1 Protect Established Residential Densities

[1] Available at: https://marathon.municipalcodeonline.com/book?type=plan#name=Policy_Document

Notwithstanding Table 1-1, herein all lawfully established transient, non-transient, or permanent RV residential dwelling units in existence in 1996 shall be entitled to a density of one dwelling unit as follows: a transient dwelling unit, such as a campground space, recreational vehicle space or a motel/hotel unit, shall only be entitled to redevelop as a transient dwelling unit and a non-transient dwelling unit or permanent RV shall be entitled to redevelop as a non-transient dwelling unit. If any such residential dwelling unit is a legal nonconformity as a condition of redevelopment the developer/property owner shall:

A. *bring their property into compliance with the Plan and Land Development Regulations; or*

B. *if it is physically impossible to bring the site into compliance with the Plan and Land Development Regulations due to the size of the site and physical layout of the structure, the site shall be brought into compliance to the maximum extent practical but at a minimum the site shall meet a fifteen percent open space ratio, and all applicable FEMA/floodplain, wastewater, and stormwater requirements, however the size of the structure shall not be increased unless it complies with all of the provision of this Plan and the Land Development Regulations.*

The re-establishment of any such transient, non-transient, or permanent RV dwelling unit shall not adversely impact the existing inventory of affordable/workforce housing in the City, by decreasing the number of affordable housing units within the City. Any new parks must comply with density standards established in Table 1-1.

Policy 1-3.4.2 Protect Established Non-Residential Intensities

Notwithstanding Table 1-1 herein all lawfully established non-residential intensities in existence on or before 1996 shall be entitled to existing intensities. If any such non-residential intensity is a legal nonconformity as a condition of redevelopment the developer/property owner shall:

A. *bring their property into compliance with the Plan and LDRs; or*

B. *if it is physically impossible to bring the site into compliance with the Plan and Land Development Regulations due to the size of the site and physical layout of the structure, the site shall be brought into compliance to the maximum extent practical but at a minimum the site shall meet a fifteen percent open space ratio, and all applicable FEMA/floodplain, wastewater, and stormwater requirements, however the size of the structure shall not be increased unless it complies with all of the provision of this Plan and the Land Development Regulations.*

Chapter 3 - Infrastructure Element Goals, Objectives and Policies

Objective 3-1.1 Adopt Level Of Service (LOS) Standards

The City shall ensure that, at the time a development permit is issued, adequate wastewater treatment facilities, stormwater facilities, potable water and solid waste disposal facilities are available to support the development at adopted level of service standards, concurrent with the impacts of such development, in accordance with the following policies. §163.3177(6)(c) and §163.3180(1)(b) F.S.

Policy 3-1.1.2 Adopt Stormwater Management Level of Service Standards

The City hereby adopts LOS standards for stormwater management as currently mandated by State agencies, as defined in the City's adopted Stormwater Management Master Plan as follows:

A. *Post development runoff shall not exceed the pre-development runoff rate for a 25 year storm event, up to and including an event with 24 hour duration;*
B. *Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in Chapter 62-25, Section 25.025, FAC, with treatment of the runoff from the first one inch of rainfall on-site to meet the water quality standards required by Chapter 62, Section -302.500, F.A.C; and*
C. *Stormwater facilities which directly discharge into 'Outstanding Florida Waters' (OFW) shall provide an additional treatment pursuant to Chapter 62-25.025 (9), FAC. Stormwater facilities must be designed so as to not degrade the receiving water body below the minimum conditions necessary to assure the suitability of water for the designated use of its classification as established in Chapter 62-302, F.A.C.*

Goal 3-4 Stormwater Management

The City shall provide a stormwater management system which corrects existing deficiencies, protects real and personal property and enhances and protects ground and nearshore water quality. §163.3177(6)(c) F.S.

Objective 3-4.1 Stormwater Improvements

The City, in coordination with SFWMD and DEP, shall maintain and implement a comprehensive Stormwater Management Master Plan through administering an annual Stormwater Management Program, which will ensure that stormwater management facilities are maintained and developed to attain adopted levels of service for all existing and proposed land uses.

Policy 3-4.1.1 Complete A Detailed Engineering Study of Drainage

The City shall maintain coordination with the SFWMD and DEP, regarding detailed engineering studies of drainage within the City limits. This study shall maintain an inventory of surface water conveyance, treatment and discharge systems, both natural and manmade. The effects of pollutant loading, including the effects on recharge areas, will also be assessed. The study shall consider the unique hydrogeological characteristics of the Keys, and their effects on surface water runoff and pollutant loading. The City shall implement and fund applicable recommendations through the Capital Improvements Program and shall amend the Plan as needed to include implementation of the recommendations.

Policy 3-4.1.2 Implement Priority Stormwater Projects

The City shall continue implementation of priority improvement projects identified in the City's Stormwater Management Master Plan to improve and make corrections for stormwater management, erosion and sedimentation control and water quality. The Stormwater Management Program shall follow the schedule for improvements provided in the Stormwater Management Master Plan. Each improvement project shall include planning, design and construction phases. The City shall fund annual improvement projects through the various innovative funding mechanisms and grant programs identified in the Stormwater Management Master Plan. The City shall acquire easements as necessary, in conjunction with annual stormwater improvement projects. The City shall review and update the Stormwater Management Program, as needed, on an annual basis.

Policy 3-4.1.3 Implement Financial and Regulatory Mechanisms For Stormwater Improvements

The City shall amend the capital improvement schedule as necessary to incorporate programs and funding allocations for drainage basin improvements and for monitoring the performance of the system, including the establishment of stormwater utility, by December 2005 to implement stormwater improvement projects. Within two years of the effective date of the Plan, the City shall recommend a regulatory framework for alleviating or preventing increased stormwater and surface water management problems and issues generated by development or redevelopment activity.

Policy 3-4.1.4 Request Funding From State and Federal Agencies for Stormwater Improvements

The City shall continue to request funding from State and Federal agencies, as necessary to correct identified stormwater deficiencies within the City.

Policy 3-4.1.5 Establish Improvement Priorities

The City shall adopt a priority list of and sequence of stormwater outfalls to surface water that will be eliminated. Proposed surface water capital improvements projects shall be evaluated and ranked, with priority assigned to projects needed to correct existing deficiencies and to projects which eliminate known direct discharges in surface waters and areas disturbed by the construction of wastewater collection and distribution lines. The City shall adopt Land Development Regulations to ensure direct discharge outfalls are prohibited within the City of Marathon.

Objective 3-4.2 Protect Natural Functions

The City shall protect the functions of natural groundwater recharge areas and natural drainage features. §163.3177(6)(c)2 F.S.

Policy 3-4.2.1 Ensure That Developed Lands Provide Adequate Drainage and Protection From Flooding and Manage the Retention of Ground and Surface Water at Levels That Enhance Natural Storage Capacity of Watersheds

The City shall promote the ecological, biological and hydrological role that surface waters play in sustaining surface vegetation. The City shall manage the location, design and intensity of development in order to foster continuance of natural hydrological processes, including promoting on-site retention of surface waters, natural return of surface water into the soil, and channeling excess stormwater volume primarily via natural grassy swales. Within one year of the effective date of the Plan, Land Development Regulation shall be adopted requiring the integration of natural storage areas and natural drainage courses into water management plans for new development and redevelopment. The use of stormwater injection wells shall be discouraged.

Policy 3-4.2.2 Ensure Local Regulatory Consistency

Prior to any revision of City Regulations affecting natural groundwater drainage areas and natural features, the City shall ensure coordination of watershed management plans and policies with appropriate local, regional, State and Federal agencies, including Monroe County, the South Florida Water Management District, the State Department of Environmental Protection, the Agricultural Extension Service, the United States Army Corps of Engineers and the U.S. Fish and Wildlife Service to ensure that the local regulatory framework is consistent with the planning objectives and regulations of the region.

Policy 3-4.2.3 Land Use Controls to Assist Implementation of Stormwater Management Program

The City shall continue to maintain Land Development Regulations to include land use controls, such as subdivision regulations, zoning and site plan review, erosion controls,

water quality controls, landscaping and flood management regulations to assist in implementing the Stormwater Management Program. The programs shall be assessed annually and updated as necessary based on improved knowledge of problems, issues and best management practices.

Policy 3-4.2.4 Pursue the Development of Adequate Off-Site Surface Water Management Facilities

The City shall monitor, at regular intervals, the performance of existing off-site drainage facilities, evaluate existing and potential future problems or issues, and pursue the funding of necessary structural and non-structural system improvements for effective surface water management. All new developments shall provide an equitable contribution for off-site drainage improvements necessitated by the development.

Policy 3-4.2.5 Require Buffer Zones

Within one year of the effective date of the Plan, the City shall adopt Land Development Regulations that require new development to provide buffer zones adjacent to natural drainage ways and retention areas.

Policy 3-4.2.6 Manage Land Use in the Floodplain and Coastal Areas

Within one year of the effective date of the Plan, the City shall amend its Land Development Regulations to include performance criteria regulating development within floodplain and shoreline areas as a result of the Stormwater Management Master Plan.

Chapter 4 - Conservation And Coastal Element Goals, Objectives And Policies

PURPOSE

Pursuant to Sections 163.3177(6)(d)&(g) and 163.3178, F.S., the purpose of the Conservation and Coastal Element is to promote the conservation, use and protection of natural resources as well as to plan for, and where appropriate, restrict development and redevelopment activities where such activities would damage or destroy coastal resources, and protect human life and property while limiting public expenditures in locations that are subject to destruction by natural disaster, high tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea level rise. The Conservation and Coastal Element also includes a redevelopment component that outlines the broad Goals, Objectives and Policy principles that must be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise as mandated by Section 163.3178(2)(f), Florida Statutes.

Policy 4-1.3.1 Protect, Conserve and Enhance Coastal Resources, Wetlands, Water Resources, Living Marine Resources, Wildlife Habitats and Other Natural Resources

The City shall adopt Land Development Regulations to protect, by:

A. *Preventing adverse impacts of development and redevelopment on wetlands, estuaries, water resources, living marine resources and other natural resources;*

B. *Maintaining or improving coastal environmental quality by commencing the Stormwater Management Plan identified in this Plan;*

C. *Regulating land development activities that could have negative impacts on coastal shorelines, including impacts on water quality, living marine organisms, seagrass beds and wetlands;*

D. *Directing growth away from VE Flood Zones through Local Mitigation Strategies and the Building Permit Allocation System identified in this Plan;*

E. *Creating a Transfer of Development Rights (TDR) Program that directs growth away from VE zones as described in this Plan;*

F. *Managing nearshore waters and flats through the enforcement of speed limits, no wake zones and no motor zones;*

G. *Regulating activities with potentially adverse impacts on coastal resources, including but not limited to ultra-light planes, seaplanes, live-aboard vessels and personal watercraft;*

H. *Preventing adverse impacts of lighting on coastal resources;*

I. *Prohibiting the mooring of live aboard vessels outside of approved marinas;*

J. *Prohibiting boat launching from various rights-of-way that are not designated as public boat ramps and restricting random water access points; and*

K. *Regulating the impacts of development on native vegetative communities and wildlife habitats; and*

L. *Providing for the distinction between riparian mangrove fringes and those mangroves growing in isolated communities on infill, landlocked lost where surface water run-off from surrounding development has created the wet condition which facilitated the establishment of the isolated community of mangroves which do not perform the functions of riparian mangrove fringes, i.e. resisting and preventing shoreline erosion, providing food and habitat for the marine food chain, maintaining and improving the quality of coastal waters. This provision is not applicable to parcels which are historically, naturally, vegetated with mangroves such as are found on Grassy Key.*

These objectives shall be accomplished as described below, and through coordination with the South Florida Water Management District (SFWMD).

Policy 4-1.3.3 Surface Water Management and Flood Damage Prevention

The City shall continue to maintain surface water management and flood damage prevention regulations. New development and all redevelopment encroaching into the 100 year floodplain shall incorporate elevation and flood protection measures sufficient to protect against the 100 year flood. The City shall maintain consistency with program policies of the National Flood Insurance Program to ensure it maintains the highest possible rating within the National Flood Insurance Program's Community Rating System. The City shall monitor and implement new cost effective development and redevelopment principles, strategies, and engineering solutions for minimizing flood damage resulting from high tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea level rise. Such principles, strategies, and engineering solutions may include modifications to construction setback requirements, site design techniques, as well as upgraded building and construction techniques which include resilient construction techniques.

Policy 4-1.4.1 Protect Living Marine Resources, Wetlands and Seagrass Beds

The City shall continue to maintain Land Development Regulations that prevent adverse impacts of development on seagrass beds, wetlands and other living marine resources. Since these areas are sensitive to increased turbidity, stormwater runoff and other forms of pollution, the introduction of nutrients shall be regulated through effective water quality management. Development impacting marine resources shall be coordinated with State and Federal agencies having jurisdiction prior to the City granting plan approval and/or prior to release of any permit for construction. §163.3177(6)(d)2.e F.S.

Policy 4-1.4.2 Maintain A 50 Foot Buffer Adjacent yo Wetlands

The City shall require minimum vegetated setbacks of fifty (50) feet to be maintained as an open space buffer for development occurring adjacent to all types of wetlands except for tidally inundated mangrove fringes or permitted under Objective 4-1.11. If a fifty (50) foot setback results in less than 2,000 square feet of principal structure footprint of reasonable configuration then the setback may be reduced to allow for 2,000 square feet of principal structure footprint of reasonable configuration, provided the setback is not reduced to less than twenty-five (25) feet. The wetland setback may be reduced to an average of twenty-five (25) feet, but no less than fifteen (15) feet, if the entire setback area is planted and maintained in native vegetation with a site-suitable stormwater management plan, and thereafter placed under conservation easement. The wetland setback reduction shall not apply to wetlands used by bald eagles for nesting, or listed

species for nesting, denning, or critically important feeding habitat. The mere fact that a species is listed does not imply that all of its feeding habitat is critically important. The wetland setback required by this subsection shall not apply to mangrove or wetland fringes occurring along man-made canals, channels, or basins. Wetlands or other surface waters shall not be filled to achieve the setback buffer requirement. 'Development' shall include all activities as currently defined in the F.S. 380.05, hereby incorporated by reference. §163.3177(6)(d)2. j. F.S.

Policy 4-1.4.9 Principal Structure Shoreline Setbacks

The City shall establish that, at a minimum, all principal structures shall be setback from shorelines as follows. For the purposes of this policy cut-in boat slips shall be excluded from the shoreline setback requirements for lots 5,000 square feet or less in area. Such lots must meet all applicable regulations including, but not limited to, ten (10) foot setback from the cut-in boat slip, stormwater management, other required setbacks, and open space ratio.

Policy 4-1.17.11 Best Practices And Mitigation Strategies

The City shall utilize best practices and initiate mitigation strategies to reduce the flood risk in coastal areas that result from high tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea level rise by incorporating into its land development regulations where practical and economically feasible, resilient construction technique requirements, promotion of living shorelines, protection of coastal marsh and mangroves, and use of innovative natural material breakwaters to reduce wave energy.

Policy 4-1.22.5 Manage Redevelopment Activities

The City shall manage unanticipated future redevelopment activities necessitated by hurricane events, high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea-level rise or other natural disasters through this Plan, the adopted Land Development Regulations and the City Master Plan. Redevelopment in the City will be consistent with or more stringent than the flood-resistant construction requirements in the Florida Building Code and applicable floodplain management regulations set forth in 44 C.F.R. part 60. Furthermore, in the event that coastal construction control lines become established within the City's jurisdiction pursuant to Section 161.053, F.S., all construction activities seaward of established coastal construction control lines shall be consistent with Chapter 161, Florida Statutes.

Policy 6-1.2.1 Update and Adopt a Five Year Schedule of Capital Improvements Annually

Table 6-1: Capital Improvement Program 2004-2009, adopts the estimated projected cost and anticipated potential revenue sources for each of the capital improvement needs identified within the respective Plan elements. These capital improvements are prioritized and scheduled in order to ensure that the goals, objectives and policies established in this Plan shall be met according to the appropriate timeframes.

Specific expenditure projections to meet Plan goals, objectives and polices for stormwater and wastewater improvements shall be provided in the master plans for each. The sources for anticipated revenues for improvements shall be through a combination of a stormwater management utility, grants and loans.

Policy 8-1.1.5 Maintain Existing Recreational Land And Facilities

The City shall establish a routine preventive maintenance program and shall annually review all City owned recreational and open space resources for safety standards, compliance to applicable regulations, and stormwater management.

Pursuant to Article 107-11 the Land Development Regulations (LDRs) of Marathon, Code of Ordinance (the Code), the purpose and intent of the stormwater management regulations is to implement the goals, objectives, and policies of the Comprehensive Plan of the City of Marathon by providing standards for the design, construction, and operation of stormwater management systems in conformance with the best overall management practices for the control of runoff volume and treatment of stormwater runoff for the protection of surface water and groundwater quality, and for the control and prevention of erosion, sedimentation, and flooding. It is further the intent of the article to provide flexibility in meeting the design standards to encourage the construction of stormwater management systems that are an amenity to the development.

From the City's Code of Ordinances (current), the following policies are included in their entirety in Appendix A:

- Article 107-12 Floodplain Management
- Article 34-III Stormwater System
- Article 107-II Stormwater Management

II. Initial Flood Modeling

As stated throughout this WMP, Marathon is conducting two efforts simultaneously. There was coordination throughout the development of the WMP and Marathon's Vulnerability Assessment because members of the Team were consistent across the two projects. Collaboration occurred on elevation data, flood data and scenarios, tide gauge and other data sources to ensure outcomes were coordinated. While the efforts used two different evaluation methods, both were harmonized to meet the objectives under their respective programs including the Section 380.093(3), F.S. criteria for Vulnerability Assessments as well as the CRS Coordinator's Manual (2017 & 2021 Addendum). Summaries of the modeling approaches follow.

For the Vulnerability Assessment, the Team conducted a geospatial analysis to evaluate current and future flood risk based on 38 parameters. Sea level rise, high tide flooding, storm surge, rainfall, and combination flood simulation modeling and corresponding data visualization will be produced using ESRI's ArcGIS Pro. The model foundation harnesses the most recent, best available LiDAR data with numerous federal, state, and private methodologies and GIS data sets, each with its specific limitations and constraints. For the Vulnerability Assessment analysis, the digital elevation model used to map the various flood projections does not incorporate a detailed pipe network analysis, or engineering-grade hydrologic analysis. Climate risk modeling will be provided via high-resolution raster depth grids that detail the maximum water depth for the planning horizon (for this assessment the planning horizons are the years 2040, 2070, and 2100) and the various climate projections in the assessment. The exposure and sensitivity of the critical assets defined in Subsection 380.093, F.S. will be determined by the locations and information stored within the GIS data gathered during the project timeline and produced.

Modeling approaches and corresponding data requirements are described briefly below.

1. Sea level rise is modeled using NOAA Office for Coastal Management's Detailed Method for Mapping Sea Level Rise Inundation (Jan 2017), generally described as a modified bathtub approach and will depict tidal inundation for the Intermediate Low and Intermediate High curves described in NOAA Technical Report NOS CO-OPS 083 Global and Regional Sea Level Rise Scenarios for the United States.
2. High tide flooding, often referred to as "king tides," "nuisance," or "sunny day" flooding will be modeled following a similar approach to the method above and will account for high tide flooding thresholds noted in NOAA Technical Report NOS CO-OPS 086 Patterns and Projections of High Tide Flooding Along the US Coastline Using a Common Impact Threshold as well as the Intermediate High curve described in NOS CO-OPS 083.
3. Storm Surge flooding is modeled using FEMA's HAZUS-MH software's Flood Hazard Analysis module where still water elevations derived from the most recent effective Flood Insurance Study are adjusted for to account for sea level rise.

4. Rainfall precipitation estimates will be sourced from NOAA's Atlas 14 and future rainfall precipitation change factors derived from the SFWMD will be applied to account for future rainfall totals.
5. Various combinations of sea level rise, high tide flooding, storm surge, and rainfall-induced flooding simulations will be modeled using ArcGIS Pro as the foundation for combining the output of the analytical modeling efforts.

Initial and in-progress Inundation Map Series results can be found linked in the footnotes.[2] The following scenarios are being completed as part of the Vulnerability Assessment:

Table 3 - Scenarios: Depth of Tidal Flooding, NOAA/FDEP "Thresholds"

Timeframe	*Sea Level Rise*	*Sea Level Rise*
Present Date	Mean Sea Level / Mean Higher High Water	
2040	NOAA Intermediate Low	NOAA Intermediate High
2070	NOAA Intermediate Low	NOAA Intermediate High
2100	NOAA Intermediate Low	NOAA Intermediate High

Table 4 - Storm Surge + FEMA Storm Surge Module of HAZUS (will approximate flood elevations to Category storm events, 1-5)

Timeframe	*Sea level Rise + Storm Surge*		
Present Day	100-year Storm		
2040	NOAA Intermediate Low	NOAA Intermediate High	100-year storm
2070	NOAA Intermediate Low	NOAA Intermediate High	100-year storm
2100	NOAA Intermediate Low	NOAA Intermediate High	100-year storm

Table 5 - Rainfall with future boundary conditions modified to consider sea level rise and high tide

Timeframe	*High Tide + Sea Level Rise + Rainfall*
Present Day	10-year 24 hour; 50-year 24 hour; 100-year 24 hour; 500-year 24 hour

[2] Days of Tidal, Sea level rise, Surge, Rainfall, Combination flooding maps can be found at the following link: City of Marathon Exposure and Sensitivity Map Series

Timeframe	*High Tide + Sea Level Rise + Rainfall*			
2040	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year Rainfall
2070	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year Rainfall
2100	High Tide	NOAA Intermediate Low	NOAA Intermediate High	25-year, 100-year Rainfall

Table 6 - Compound Flooding

Timeframe	*Sea Level Rise + Storm Surge (100-year) + 100-year 24 hour Rainfall + High Tide*				
Present Day	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year & 500-year storms	100-year 24-hr Rainfall
2040	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm & 500-year storms	100-year 24-hr Rainfall
2070	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm & 500-year storms	100-year 24-hr Rainfall
2100	High Tide	NOAA Intermediate Low	NOAA Intermediate High	100-year storm & 500-year storms	100-year 24-hr Rainfall

The Team also used the Sea Level Affecting Marshes Model (SLAMM) to evaluate future impacts on shorelines and habitats as a function of land elevation, tide range, sea level rise and other environmental factors.

4. For the current/existing conditions land use, future land use, and the fully developed watershed

a. Evaluations of the existing drainage system's runoff response from design storms using a hydrologic and hydraulic study with a hydrograph approach under current and predicted future land use conditions with assessments of the impacts of climate change and sea level rise for 10-, 25- & 100-year storm events.

General Overview of the WMP

A hydrologic and hydraulic model for Marathon watersheds was created using Interconnected Channel and Pond Routing (ICPR) software version 4.07.08. The project location is shown in **Figure 2**. The hydrologic portion of the model simulates rainfall runoff hydrographs while the hydraulic component routes hydrographs through stormwater features to determine flood stages and peak flows resulting from specific storm events. While ICPR version 4 has the capabilities to model groundwater and 2D overland flow, for the purposes of this project, the model was constructed using only 1D node-link routing with manually defined sub-basins, as shown in **Figures 12-14**.

Rainfall

The Mean Annual [2.33-year (yr) 24-hour (hr)], 10-yr 24-hr, 25-yr 24-hr, and 100-yr 24-hr storm events were modeled in ICPR4. The mean annual storm event was used to determine the initial stages for the larger storm events described in the subsequent **Initial Stages** Section. The rainfall amounts for the existing conditions (2025 scenario) were determined using the NOAA Atlas 14, Volume 9, Version 2 Point Precipitation Frequency Estimates for the Project area. The rainfall totals are listed in **Table 7** below. The total rainfall for the mean annual event (2.33-Year) was interpolated based on the 2-year and 5-year 24-hour events. Future extreme rainfall change factors for Monroe County were used to adjust NOAA depth of rainfall for future scenarios 2040, 2070, and 2100 (SFWMD, 2022). Future rainfall depths for 2040, 2070, and 2100 scenarios were determined based on the product of the existing rainfall depth and the corresponding future rainfall change factor.

Table 7 - Design Storm Events

Frequency (years)	*Duration (hours)*	*Total Rainfall Existing 2025 Scenario (inches)*	*Total Rainfall 2040, 2070, 2100 Scenarios (inches)*
Mean Annual (2.33)	24	4.84	5.23
10	24	7.39	8.13
25	24	9.53	10.86
100	24	13.5	16.07

Source: NOAA, 2023

Initial Stages

Initial stage elevations for all basins were calculated based on using the hot start methodology in ICPR version 4.07.08, further described below.

The initial stages were set at the ground surface elevation based on the Digital Elevation Model (DEM). A dry condition with no rainfall was simulated for 10 hours in the model to establish initial stages for other storm events, leveling out after any initial surges occurred in the model. The mean annual storm event was then run using the node stage elevations at time 9 hours from the no rainfall simulation as the initial stages in the mean annual simulation. The 10-yr 24-hr, 25-yr 24-hr, and 100-yr 24-hr model simulations used the "hot start" function based on the results of the mean annual model simulation at time 96 hours, thereby setting the post-storm mean annual node stages as the initial stages for the larger storm event simulations.

The model results were reviewed to ensure their adequacy and representativeness.

Subbasin Area

The DEM acquired for Marathon was created based on the 2018-2019 NOAA NGS Topobathy LiDAR (Light Detection and Ranging) DEM ranging from Miami to Marquesas, FL (Refer to **Figures 3-5**). All elevation data incorporated in this project is referenced to NAVD88 datum unless otherwise specified. The Marathon terrain ranges from an upper elevation of 28.2 ft on the westernmost end of Marathon on US-1 to a lower elevation of -12.5 ft.

The project site's level terrain proposed work boundary, survey data, and LiDAR elevations were used in determining the subbasin size and shape. The subbasin areas and the existing conditions of the ICPR model node-link schematic are shown in **Figures 12-14** and **Figures 15-17** respectively.

Curve Number Method

ICPR4 utilizes the soil information and land use data in the map layers and intersects the two datasets to calculate surface runoff via the Technical Release 55 (TR-55) curve number (CN) guidance (NRCS, 1986). Inputs into the model calculations include a curve number set (**Table 8**) with all relevant combinations of land use zones and soil zones. Once mapped, soil and land use lookup tables were used in ICPR4 to compute rainfall excess for each subbasin. The soil lookup table was populated using data from the SSURGO database and following the ICPR4 guidance document methodology. The model uses this information to determine surface runoff from each union of land use type and soil type within the dataset. CN and Land Use lookup values are summarized in **Table 8**. The respective soils maps for Marathon are shown in **Figures 6-8**.

Table 8 - Curve Number Soil Parameters

FLUCCS Code	*FLUCCS Description*	*Hydrologic Group*	*Curve Number*
1100	Residential Low Density < 2 Dwelling Units Per Acre	A	50
1100	Residential Low Density < 2 Dwelling Units Per Acre	A/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	B	68
1100	Residential Low Density < 2 Dwelling Units Per Acre	B/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	C	79

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
1100	Residential Low Density < 2 Dwelling Units Per Acre	C/D	81.5
1100	Residential Low Density < 2 Dwelling Units Per Acre	D	84
1100	Residential Low Density < 2 Dwelling Units Per Acre	W	100
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	A	57
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	A/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	B	72
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	B/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	C	81
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	C/D	83.5
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	D	86
1200	Residential Med Density 2 To 5 Dwelling Units Per Acre	W	100
1300	Residential High Density	A	77
1300	Residential High Density	A/D	91
1300	Residential High Density	B	85
1300	Residential High Density	B/D	91
1300	Residential High Density	C	90
1300	Residential High Density	C/D	91
1300	Residential High Density	D	92
1300	Residential High Density	W	100
1400	Commercial And Services	A	89
1400	Commercial And Services	A/D	94.5
1400	Commercial And Services	B	92
1400	Commercial And Services	B/D	94.5
1400	Commercial And Services	C	94
1400	Commercial And Services	C/D	94.5
1400	Commercial And Services	D	95
1400	Commercial And Services	W	100
1500	Industrial	A	81
1500	Industrial	A/D	92
1500	Industrial	B	88
1500	Industrial	B/D	92
1500	Industrial	C	91
1500	Industrial	C/D	92
1500	Industrial	D	93
1500	Industrial	W	100
1600	Extractive	A	77
1600	Extractive	A/D	92.5
1600	Extractive	B	86
1600	Extractive	B/D	92.5
1600	Extractive	C	91
1600	Extractive	C/D	92.5
1600	Extractive	D	94
1600	Extractive	W	100
1700	Institutional	A	69
1700	Institutional	A/D	88.5
1700	Institutional	B	81
1700	Institutional	B/D	88.5
1700	Institutional	C	87
1700	Institutional	C/D	88.5
1700	Institutional	D	90
1700	Institutional	W	100
1800	Recreational	A	49

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
1800	Recreational	A/D	81.5
1800	Recreational	B	69
1800	Recreational	B/D	81.5
1800	Recreational	C	79
1800	Recreational	C/D	81.5
1800	Recreational	D	84
1800	Recreational	W	100
1900	Open Land	A	39
1900	Open Land	A/D	77
1900	Open Land	B	61
1900	Open Land	B/D	77
1900	Open Land	C	74
1900	Open Land	C/D	77
1900	Open Land	D	80
1900	Open Land	W	100
2100	Cropland And Pastureland	A	49
2100	Cropland And Pastureland	A/D	81.5
2100	Cropland And Pastureland	B	69
2100	Cropland And Pastureland	B/D	81.5
2100	Cropland And Pastureland	C	79
2100	Cropland And Pastureland	C/D	81.5
2100	Cropland And Pastureland	D	84
2100	Cropland And Pastureland	W	100
2200	Tree Crops	A	44
2200	Tree Crops	A/D	79.5
2200	Tree Crops	B	65
2200	Tree Crops	B/D	79.5
2200	Tree Crops	C	77
2200	Tree Crops	C/D	79.5
2200	Tree Crops	D	82
2200	Tree Crops	W	100
2300	Feeding Operations	A	73
2300	Feeding Operations	A/D	90.5
2300	Feeding Operations	B	83
2300	Feeding Operations	B/D	90.5
2300	Feeding Operations	C	89
2300	Feeding Operations	C/D	90.5
2300	Feeding Operations	D	92
2300	Feeding Operations	W	100
2400	Nurseries And Vineyards	A	57
2400	Nurseries And Vineyards	A/D	84
2400	Nurseries And Vineyards	B	73
2400	Nurseries And Vineyards	B/D	84
2400	Nurseries And Vineyards	C	82
2400	Nurseries And Vineyards	C/D	84
2400	Nurseries And Vineyards	D	86
2400	Nurseries And Vineyards	W	100
2500	Specialty Farms	A	59
2500	Specialty Farms	A/D	84
2500	Specialty Farms	B	74
2500	Specialty Farms	B/D	84
2500	Specialty Farms	C	82

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
2500	Specialty Farms	C/D	84
2500	Specialty Farms	D	86
2500	Specialty Farms	W	100
2600	Other Open Lands	A	30
2600	Other Open Lands	A/D	74.5
2600	Other Open Lands	B	58
2600	Other Open Lands	B/D	74.5
2600	Other Open Lands	C	71
2600	Other Open Lands	C/D	74.5
2600	Other Open Lands	D	78
2600	Other Open Lands	W	100
3100	Herbaceous Upland Nonforested	A	63
3100	Herbaceous Upland Nonforested	A/D	85
3100	Herbaceous Upland Nonforested	B	71
3100	Herbaceous Upland Nonforested	B/D	85
3100	Herbaceous Upland Nonforested	C	81
3100	Herbaceous Upland Nonforested	C/D	85
3100	Herbaceous Upland Nonforested	D	89
3100	Herbaceous Upland Nonforested	W	100
3200	Shrub And Brushland	A	35
3200	Shrub And Brushland	A/D	73.5
3200	Shrub And Brushland	B	56
3200	Shrub And Brushland	B/D	73.5
3200	Shrub And Brushland	C	70
3200	Shrub And Brushland	C/D	73.5
3200	Shrub And Brushland	D	77
3200	Shrub And Brushland	W	100
3300	Mixed Rangeland	A	49
3300	Mixed Rangeland	A/D	81.5
3300	Mixed Rangeland	B	69
3300	Mixed Rangeland	B/D	81.5
3300	Mixed Rangeland	C	79
3300	Mixed Rangeland	C/D	81.5
3300	Mixed Rangeland	D	84
3300	Mixed Rangeland	W	100
4100	Upland Coniferous Forest	A	45
4100	Upland Coniferous Forest	A/D	80
4100	Upland Coniferous Forest	B	66
4100	Upland Coniferous Forest	B/D	80
4100	Upland Coniferous Forest	C	77
4100	Upland Coniferous Forest	C/D	80
4100	Upland Coniferous Forest	D	83
4100	Upland Coniferous Forest	W	100
4200	Upland Hardwood Forest	A	36
4200	Upland Hardwood Forest	A/D	76
4200	Upland Hardwood Forest	B	60
4200	Upland Hardwood Forest	B/D	76
4200	Upland Hardwood Forest	C	73
4200	Upland Hardwood Forest	C/D	76
4200	Upland Hardwood Forest	D	79
4200	Upland Hardwood Forest	W	100
4300	Upland Hardwood Forests Continued	A	36

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
4300	Upland Hardwood Forests Continued	A/D	76
4300	Upland Hardwood Forests Continued	B	60
4300	Upland Hardwood Forests Continued	B/D	76
4300	Upland Hardwood Forests Continued	C	73
4300	Upland Hardwood Forests Continued	C/D	76
4300	Upland Hardwood Forests Continued	D	79
4300	Upland Hardwood Forests Continued	W	100
4400	Tree Plantations	A	36
4400	Tree Plantations	A/D	76
4400	Tree Plantations	B	60
4400	Tree Plantations	B/D	76
4400	Tree Plantations	C	73
4400	Tree Plantations	C/D	76
4400	Tree Plantations	D	79
4400	Tree Plantations	W	100
5100	Streams and waterways	A	100
5100	Streams and waterways	A/D	100
5100	Streams and waterways	B	100
5100	Streams and waterways	B/D	100
5100	Streams and waterways	C	100
5100	Streams and waterways	C/D	100
5100	Streams and waterways	D	100
5100	Streams and waterways	W	100
5200	Lakes	A	100
5200	Lakes	A/D	100
5200	Lakes	B	100
5200	Lakes	B/D	100
5200	Lakes	C	100
5200	Lakes	C/D	100
5200	Lakes	D	100
5200	Lakes	W	100
5300	Reservoirs	A	100
5300	Reservoirs	A/D	100
5300	Reservoirs	B	100
5300	Reservoirs	B/D	100
5300	Reservoirs	C	100
5300	Reservoirs	C/D	100
5300	Reservoirs	D	100
5300	Reservoirs	W	100
5400	Bays and estuaries	A	100
5400	Bays and estuaries	A/D	100
5400	Bays and estuaries	B	100
5400	Bays and estuaries	B/D	100
5400	Bays and estuaries	C	100
5400	Bays and estuaries	C/D	100
5400	Bays and estuaries	D	100
5400	Bays and estuaries	W	100
5500	Major Springs	A	100
5500	Major Springs	A/D	100
5500	Major Springs	B	100
5500	Major Springs	B/D	100
5500	Major Springs	C	100

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
5500	Major Springs	C/D	100
5500	Major Springs	D	100
5500	Major Springs	W	100
5600	Slough waters	A	100
5600	Slough waters	A/D	100
5600	Slough waters	B	100
5600	Slough waters	B/D	100
5600	Slough waters	C	100
5600	Slough waters	C/D	100
5600	Slough waters	D	100
5600	Slough waters	W	100
5700	Ocean and Gulf	A	100
5700	Ocean and Gulf	A/D	100
5700	Ocean and Gulf	B	100
5700	Ocean and Gulf	B/D	100
5700	Ocean and Gulf	C	100
5700	Ocean and Gulf	C/D	100
5700	Ocean and Gulf	D	100
5700	Ocean and Gulf	W	100
6100	Wetland Hardwood Forests	A	98
6100	Wetland Hardwood Forests	A/D	98
6100	Wetland Hardwood Forests	B	98
6100	Wetland Hardwood Forests	B/D	98
6100	Wetland Hardwood Forests	C	98
6100	Wetland Hardwood Forests	C/D	98
6100	Wetland Hardwood Forests	D	98
6100	Wetland Hardwood Forests	W	98
6200	Wetland Coniferous Forests	A	98
6200	Wetland Coniferous Forests	A/D	98
6200	Wetland Coniferous Forests	B	98
6200	Wetland Coniferous Forests	B/D	98
6200	Wetland Coniferous Forests	C	98
6200	Wetland Coniferous Forests	C/D	98
6200	Wetland Coniferous Forests	D	98
6200	Wetland Coniferous Forests	W	98
6300	Wetland Forested Mixed	A	98
6300	Wetland Forested Mixed	A/D	98
6300	Wetland Forested Mixed	B	98
6300	Wetland Forested Mixed	B/D	98
6300	Wetland Forested Mixed	C	98
6300	Wetland Forested Mixed	C/D	98
6300	Wetland Forested Mixed	D	98
6300	Wetland Forested Mixed	W	98
6400	Vegetated Non-Forested Wetlands	A	98
6400	Vegetated Non-Forested Wetlands	A/D	98
6400	Vegetated Non-Forested Wetlands	B	98
6400	Vegetated Non-Forested Wetlands	B/D	98
6400	Vegetated Non-Forested Wetlands	C	98
6400	Vegetated Non-Forested Wetlands	C/D	98
6400	Vegetated Non-Forested Wetlands	D	98
6400	Vegetated Non-Forested Wetlands	W	98
6500	Non-Vegetated	A	98

FLUCCS Code	FLUCCS Description	Hydrologic Group	Curve Number
6500	Non-Vegetated	A/D	98
6500	Non-Vegetated	B	98
6500	Non-Vegetated	B/D	98
6500	Non-Vegetated	C	98
6500	Non-Vegetated	C/D	98
6500	Non-Vegetated	D	98
6500	Non-Vegetated	W	98
7100	Beaches other than swimming	A	77
7100	Beaches other than swimming	A/D	92.5
7100	Beaches other than swimming	B	86
7100	Beaches other than swimming	B/D	92.5
7100	Beaches other than swimming	C	91
7100	Beaches other than swimming	C/D	92.5
7100	Beaches other than swimming	D	94
7100	Beaches other than swimming	W	100
7400	Disturbed	A	77
7400	Disturbed	A/D	92.5
7400	Disturbed	B	86
7400	Disturbed	B/D	92.5
7400	Disturbed	C	91
7400	Disturbed	C/D	92.5
7400	Disturbed	D	94
7400	Disturbed	W	100
8100	Transportation	A	81
8100	Transportation	A/D	92
8100	Transportation	B	88
8100	Transportation	B/D	92
8100	Transportation	C	91
8100	Transportation	C/D	92
8100	Transportation	D	93
8100	Transportation	W	100
8200	Communication	A	81
8200	Communication	A/D	92
8200	Communication	B	88
8200	Communication	B/D	92
8200	Communication	C	91
8200	Communication	C/D	92
8200	Communication	D	93
8200	Communication	W	100
8300	Utilities	A	81
8300	Utilities	A/D	92
8300	Utilities	B	88
8300	Utilities	B/D	92
8300	Utilities	C	91
8300	Utilities	C/D	92
8300	Utilities	D	93
8300	Utilities	W	100

Source: FLUCCS, 2019, Checked by Gary Qiu

Time of Concentration

The time of concentration (t_c) is the time it takes for runoff to travel from the hydraulically most distant part of the subbasin to the determined subbasin outlet or other point of reference. The t_c is calculated based on the slope of the ground, travel distance within the sub-basin, and type of ground cover as described in the following steps:

- Tc Lines were individually drawn and calculated in Arcmap 10.8.1 and stored in the "time_of_concentration_Marathon" geodatabase.
- The Tc values for each subbasin were calculated using the NRCS Technical Release 55 (TR-55) methodology, which divides the flow path into three main components:
- Overland flow (i.e., sheet flow)
- Shallow concentrated flow
- Open channel flow.
- Overland sheet flow was limited to the first 100 feet.
- The Manning's n value used for sheet flow was calculated as the weighted average of the land-use-based (2011 SWFWMD Land Use) Manning's n value that the sheet flow portion of the Tc line intersected.
- A minimum slope of 0.001 ft/ft was assumed for all calculations.
- The shallow concentrated flow was classified as paved if greater than 40% of the shallow concentrated portion of the TC line intersected with an impervious surface.
- The average velocity for pipe flow was assumed to be 2.5 feet per second.
- A minimum Tc of 10 minutes was enforced for calculations.

A summary of the t_c for each subbasin is summarized in **Table 9** below:

Table 9 - Basin Time of Concentration Breakdown

Subbasin Name	*SHEET FLOW: Travel Time (minutes)*	*SHALLOW CONCENTRATED: Travel Time (minutes)*	*CHANNELIZED: Travel Time (minutes)*	*Calculated TC (minutes)*	*Effective TC (minutes)*
B001	10.08	0.26	0.00	10.34	10.34
B002	2.81	0.86	0.00	3.67	10.00
B003	5.54	0.34	0.00	5.88	10.00
B004	11.80	2.69	0.00	14.48	14.48
B005	3.95	12.15	0.00	16.11	16.11

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B006	2.29	6.14	0.00	8.44	10.00
B007	5.41	4.30	0.00	9.71	10.00
B008	1.93	4.72	0.00	6.66	10.00
B009	5.48	2.97	0.00	8.45	10.00
B010	2.34	2.55	0.00	4.90	10.00
B011	2.78	3.44	0.00	6.22	10.00
B012	5.99	0.31	0.00	6.30	10.00
B013	7.42	3.05	0.00	10.46	10.46
B014	5.72	1.79	0.00	7.51	10.00
B015	14.84	9.20	0.00	24.04	24.04
B016	10.28	1.90	0.00	12.19	12.19
B017	7.88	1.13	0.00	9.01	10.00
B018	6.18	0.46	0.00	6.64	10.00
B019	12.91	3.30	0.00	16.22	16.22
B020	8.50	2.31	0.00	10.81	10.81
B021	9.71	1.80	0.00	11.51	11.51
B022	8.72	3.84	0.00	12.56	12.56
B023	7.59	4.93	0.00	12.52	12.52
B024	6.38	1.90	0.00	8.27	10.00
B025	16.86	4.14	0.00	21.01	21.01
B026	6.72	4.15	0.00	10.87	10.87
B027	15.74	2.75	0.00	18.49	18.49
B028	13.15	4.62	0.00	17.77	17.77
B029	13.99	0.57	0.00	14.56	14.56
B030	6.42	7.13	0.00	13.55	13.55
B031	5.79	3.15	0.00	8.94	10.00
B032	8.07	4.05	0.00	12.12	12.12
B033	6.19	0.82	0.00	7.01	10.00
B034	7.82	4.78	0.00	12.61	12.61
B035	16.52	4.48	0.00	21.00	21.00
B036	4.69	0.00	0.00	4.69	10.00
B037	10.97	6.77	0.00	17.73	17.73
B038	17.70	2.80	0.00	20.51	20.51
B039	1.88	0.00	0.00	1.88	10.00
B040	10.21	0.00	0.00	10.21	10.21
B041	14.01	3.99	0.00	18.00	18.00
B042	14.71	2.25	0.00	16.96	16.96

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B043	13.38	8.49	0.00	21.88	21.88
B044	12.40	2.84	0.00	15.24	15.24
B045	6.47	1.18	0.00	7.65	10.00
B046	13.24	2.67	0.00	15.91	15.91
B047	9.41	4.51	0.00	13.92	13.92
B048	12.97	1.45	0.00	14.42	14.42
B049	9.53	4.47	0.00	13.99	13.99
B050	7.50	3.85	0.00	11.35	11.35
B051	17.28	10.16	0.00	27.44	27.44
B052	5.08	9.44	0.00	14.52	14.52
B053	3.14	0.00	0.00	3.14	10.00
B054	6.09	1.18	0.00	7.27	10.00
B055	22.43	1.70	0.00	24.12	24.12
B056	5.56	0.44	0.00	6.00	10.00
B057	6.68	3.72	0.00	10.40	10.40
B058	17.34	11.51	0.00	28.85	28.85
B059	12.67	14.92	0.00	27.59	27.59
B060	7.47	5.31	0.00	12.78	12.78
B061	11.59	1.55	0.00	13.14	13.14
B062	6.74	1.37	0.00	8.10	10.00
B063	4.11	0.91	0.00	5.02	10.00
B064	4.66	1.71	0.00	6.37	10.00
B065	2.45	2.09	0.00	4.54	10.00
B066	5.67	2.14	0.00	7.81	10.00
B067	7.92	0.72	0.00	8.64	10.00
B068	3.18	3.16	0.00	6.34	10.00
B069	7.58	2.08	0.00	9.66	10.00
B070	5.36	1.04	0.00	6.40	10.00
B071	5.84	2.31	0.00	8.15	10.00
B072	4.52	0.87	0.00	5.38	10.00
B073	4.37	0.74	0.00	5.12	10.00
B074	7.08	1.43	0.00	8.51	10.00
B075	7.09	2.38	0.00	9.46	10.00
B076	4.21	1.21	0.00	5.42	10.00
B077	3.88	2.27	0.00	6.15	10.00
B078	4.89	0.77	0.00	5.67	10.00

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B079	3.09	3.06	0.00	6.16	10.00
B080	11.83	1.35	0.00	13.19	13.19
B081	13.14	2.02	0.00	15.16	15.16
B082	9.29	2.42	0.00	11.71	11.71
B083	2.51	0.76	0.00	3.26	10.00
B084	5.67	3.48	0.00	9.15	10.00
B085	5.94	2.06	0.00	8.00	10.00
B086	3.31	5.41	0.00	8.71	10.00
B087	9.06	1.03	0.00	10.08	10.08
B088	6.26	4.80	0.00	11.06	11.06
B089	6.17	4.08	0.00	10.25	10.25
B090	3.93	2.37	0.00	6.30	10.00
B091	19.18	2.22	0.00	21.40	21.40
B092	5.41	0.39	0.00	5.79	10.00
B093	3.24	4.50	0.00	7.74	10.00
B094	5.61	1.49	0.00	7.10	10.00
B095	3.82	0.00	0.00	3.82	10.00
B096	7.61	0.49	0.00	8.10	10.00
B097	6.14	2.02	0.00	8.16	10.00
B098	5.54	2.67	0.00	8.21	10.00
B099	11.96	0.79	0.00	12.75	12.75
B100	2.89	0.00	0.00	2.89	10.00
B101	3.36	0.95	0.00	4.31	10.00
B102	5.21	4.64	0.00	9.85	10.00
B103	6.94	3.29	0.00	10.24	10.24
B104	8.10	2.03	0.00	10.13	10.13
B105	11.57	2.30	0.00	13.87	13.87
B106	8.87	9.17	0.00	18.04	18.04
B107	11.78	3.47	0.00	15.25	15.25
B108	2.67	1.38	0.00	4.05	10.00
B109	16.77	4.17	0.00	20.94	20.94
B110	5.66	1.26	0.00	6.92	10.00
B111	6.24	1.11	0.00	7.35	10.00
B112	7.46	4.95	0.00	12.40	12.40
B113	9.21	6.99	0.00	16.19	16.19
B114	9.05	2.14	0.00	11.19	11.19

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B115	8.04	3.21	0.00	11.25	11.25
B116	6.69	0.92	0.00	7.62	10.00
B117	9.22	1.12	0.00	10.33	10.33
B118	6.83	5.13	0.00	11.96	11.96
B119	6.19	8.53	0.00	14.72	14.72
B120	6.52	9.83	0.00	16.35	16.35
B121	9.44	8.44	0.00	17.88	17.88
B122	7.85	0.92	0.00	8.77	10.00
B123	8.33	0.23	0.00	8.56	10.00
B124	6.78	6.64	0.00	13.42	13.42
B125	4.43	1.16	0.00	5.59	10.00
B126	2.63	7.43	0.00	10.06	10.06
B127	5.71	2.33	0.00	8.04	10.00
B128	4.51	9.59	0.00	14.10	14.10
B129	6.83	3.04	0.00	9.86	10.00
B130	6.37	2.60	0.00	8.97	10.00
B131	4.72	3.26	0.00	7.98	10.00
B132	8.12	2.00	0.00	10.12	10.12
B133	6.54	2.34	0.00	8.88	10.00
B134	6.46	0.39	0.00	6.85	10.00
B135	0.00	0.00	0.00	0.00	10.00
B136	8.12	0.51	0.00	8.63	10.00
B137	6.03	3.12	0.00	9.16	10.00
B138	0.00	0.00	0.00	0.00	10.00
B139	3.29	14.15	0.00	17.44	17.44
B140	4.74	2.06	0.00	6.81	10.00
B141	5.61	1.35	0.00	6.96	10.00
B142	54.29	0.68	0.00	54.97	54.97
B143	5.92	1.02	0.00	6.94	10.00
B144	8.50	6.13	0.00	14.63	14.63
B145	7.84	9.78	0.00	17.62	17.62
B146	6.45	2.91	0.00	9.36	10.00
B147	6.98	3.60	0.00	10.58	10.58
B148	2.71	3.08	0.00	5.79	10.00
B149	7.93	3.24	0.00	11.18	11.18
B150	2.59	4.66	0.00	7.25	10.00

Subbasin Name	SHEET FLOW: Travel Time (minutes)	SHALLOW CONCENTRATED: Travel Time (minutes)	CHANNELIZED: Travel Time (minutes)	Calculated TC (minutes)	Effective TC (minutes)
B151	7.13	4.05	0.00	11.19	11.19
B152	6.03	3.60	0.00	9.62	10.00
B153	4.85	3.73	0.00	8.58	10.00
B154	5.03	0.97	0.00	6.00	10.00
B155	4.84	2.39	0.00	7.23	10.00
B156	2.21	1.86	0.00	4.07	10.00
B157	3.27	1.91	0.00	5.19	10.00
B158	4.70	2.22	0.00	6.92	10.00
B159	10.88	4.97	0.00	15.85	15.85
B160	5.87	0.22	0.00	6.09	10.00
B161	7.47	0.09	0.00	7.56	10.00
B162	5.28	1.05	0.00	6.34	10.00
B163	5.38	4.33	0.00	9.71	10.00
B164	3.23	0.00	0.00	3.23	10.00
B165	6.56	3.07	0.00	9.63	10.00
B166	4.05	0.00	0.00	4.05	10.00
B167	5.64	0.18	0.00	5.81	10.00
B168	3.30	7.02	0.00	10.32	10.32
B169	4.10	3.16	0.00	7.26	10.00
B170	4.36	0.94	0.00	5.30	10.00
B171	14.21	12.08	0.00	26.29	26.29
B172	13.49	24.02	0.00	37.51	37.51
B173	5.75	2.00	0.00	7.74	10.00
B174	13.53	0.31	0.00	13.84	13.84
B175	0.00	0.00	0.00	0.00	10.00
B176	5.51	0.00	0.00	5.51	10.00
B177	6.14	0.92	0.00	7.06	10.00
B178	8.53	0.31	0.00	8.84	10.00
B179	7.68	0.46	0.00	8.14	10.00
B180	6.52	0.33	0.00	6.84	10.00
B181	7.52	0.36	0.00	7.88	10.00
B182	8.58	0.56	0.00	9.14	10.00

** Default Tc of 10 minutes were used in these basins, due to smaller size of basin and very short initial Tc flow path length Smaller basins were assigned a minimum Tc value of 10 minutes based on industry standards*

Peaking Factor

The SCS Unit Hydrograph Method requires a unit hydrograph peak attenuation factor (peaking factor). This parameter affects the shape and peak flow rate of the unit hydrograph and is typically considered constant throughout a watershed. A peaking factor of 484 was set for majority of model basins based on SFWMD ERP Part III, Section 3 of References and Design Aids (SFWMD, 2020). WSP recommends this value as the standard peak rate factor for watersheds with little to no storage based on the SJRWMD's procedures for selection of SCS Peak Rate Factors for use in MSSW Permit Applications (SJRWMD, 1990). Remaining basins consisting of undeveloped properties with flat terrains were assigned peaking factors of 323 or 256 based on their site specific attributes (SJRWMD, 1990).

Hydraulics

Conveyance features for the project primarily include roadway drainage pipes, cross drains, and overland flow weirs. Roadway drainage and cross-drain pipe inverts were entered into the model based on database information provided by Marathon. Overland flow weir cross sections were drawn between sub-basins and populated using the DEM to generate station-elevation information.

It was noted that most stormwater structures based on the existing inventory were inaccessible likely due to lack of maintenance, causing the structures to fill with muck or water. These structures were generally not included in the model, as they are not functional in the existing conditions. Additionally, a lack of directly surveyed stormwater outfall structures to the coast resulted in exercising engineering judgement based on adjacent survey data and LiDAR data to determine where certain stormwater infrastructure discharged and connected to the remaining system.

Despite the parameterization of the existing stormwater structures in the ICPR model, it was observed that the majority of stormwater inventory along US-1 were placed on elevations higher than the residential areas most at risk of inundation from higher intensity rainfall events and sea level rise. Consequently, the impacts of the existing stormwater structures on the current conditions within these lower lying residential and commercial areas were determined to be negligible.

Rainfall is distributed through the model domain via sub-basin nodes. The stage-area relationship of each sub-basin is represented in these nodes and developed from the DEM within ICPR. Nodes are connected by the link system described above that distributes the water throughout the model domain. When analyzing model results, nodes provide information on maximum stages within the simulation at specific locations while the links provide information about maximum flows. **Figures 15-17** illustrate the ICPR node link schematic. Please note that all weirs, and pipe

links connected to the boundary condition, representing coastal sea level, were schematically displayed and do not represent an at-scale length of those respective links. Overland flow weir labels and select pipe labels were also masked for legibility at scale.

Boundary Conditions

NOAA's 2017 intermediate high (Int-High) projections (NOAA 2017) were independently assessed for a direct sea level rise projection in feet (ft) NAVD88, presenting a base condition NOAA intermediate high projection that will be used for the initial proposed project setups. A summary of the sea level rise projections from NOAA's Intermediate High projection is listed in **Table 10**. For legibility and ease of comparison, only the 25-yr 24-hr inundation was displayed in the respective inundation maps as a base of comparison. Please visit the following ArcGIS online link for more information on the detailed figures: Marathon Inundation Map (arcgis.com)

Table 10 - Boundary Condition Elevations based on Sea Level Rise Projections for Marathon from NOAA Intermediate High, 2017

SLR scenario for Marathon using the Key West Tide Gauge (NOAA station 8724580)	*Elevation for Boundary condition based NOAA 2017 Int High (ft NAVD88)*
2025	0.0
2040	0.6
2070	2.53
2100	5.35

Source: NOAA Intermediate High, 2017

It was determined that the King Tides and Normal Wind setup levels in the analysis were recommended to be used in conjunction to the future sea level rise projections to provide a baseline for high water level for inundation analysis. A study conducted by John Wood Group plc, *King Tide and Normal Wind Setup Analysis for Monroe County, Florida (King Tide, 2020)*, assessed 3 active tide gage stations located in Monroe County, Florida. The study derived King Tides (highest astronomical tides within a minimum period of 19 years) and Normal Wind setup levels that were then added to the recommended sea level rise projections (from NOAA, 2017). Results of the study concluded the most conservative tide gauge at the highest tidal range and Normal Wind setup levels, the Naples location, be the basis of Stillwater levels during non-storm conditions along the coastline of the Florida Keys within Monroe County. However, to maintain consistency with the ongoing Vulnerability Assessment and to comply with Section 380.093(3), F.S. requirements to conduct Vulnerability Assessments, the sea level rise projection for the Key West Tide gage was used for the overall boundary condition (Boundary in the ICPR model). Additionally, consistent with Section 404 of the Coordinator's Manual, the NOAA Intermediate

High Sea level rise projection was utilized. This time-stage boundary condition represents the coastal fluctuation for each event, including the adjustment factor of 1.93 ft for King Tides projections used in the King Tide Study. A summary of the sea level rise projection for each modeled storm event is listed in **Table 11** based on a NAVD88 zero datum adjustment from Key West gauge 8724580.

Table 11 - Boundary Condition Elevations based on Sea Level Rise Projections for Marathon from King Tides

SLR scenario for Marathon using the Key West Tide Gauge (station 8724580)	*Elevation for Boundary condition in NAVD88 (ft)*
2025	0 + 1.93 = 1.93
2040	0.6 + 1.93 = 2.53
2070	2.5 + 1.93 = 4.43
2100	5.35 + 1.93 = 7.28

Source: NOAA Intermediate High, 2017 & King Tide and Normal Wind Setup Analysis for Monroe County, Florida, 2020

It is important to note that based on the overall delineation approach to the Marathon watershed, resulting basins were mostly classified as open basins with direct overland flow connections to the coastal boundary node, leading to limited storage volume within the basins themselves. The maximum stage for each basin is primarily determined by the coastal boundary condition elevation rather than the intensity of the rainfall event. This is the primary cause of similar maximum stages for varying storm events within the same time scenario (e.g., Excon_2025_MA_24Hr and Excon_2025_100Y_24Hr).

The City of Marathon Future Land Use Map indicates that the current land use pattern will be maintained in the future. The City of Marathon anticipates that most of the future development will be residential in nature.

Since the existing conditions Florida Land Use and Cover Classification System (FLUCCS) map includes areas of future development, the corresponding existing land use also serves as the future land use as presented in **Table 12**. Land use data representing land cover conditions was derived from the Future Land Use Maps (FLUM) as provided by the City of Marathon. Most of the watershed is classified as conservation (47.47%), residential, divided into low, medium, and high residential (25.8%), and commercial, recreational, industrial and airport (21.95%), and public (4.77%).

A total of 10 land use categories are present in the Marathon Watershed based on the City of Marathon's FLUM. The provided FLUM was individually matched to the most appropriate FLUCCS Land Use Code and is summarized by the data in **Table 12** and is illustrated in **Figures 9-11**.

Table 12 - Existing/Future Land Use Summary Aggregated

FLUCC SERIES SUMMARY	Land Use Description	Area (acres)	Impervious Percent of Total Area	Percent of Total Area
1100	RESIDENTIAL LOW	117.54	0.37	2.47
1200	INDUSTRIAL	49.49	0.36	1.04
1200	PUBLIC	226.96	1.67	4.77
1200	RECREATION	217.06	1.60	4.56
1200	RESIDENTIAL MEDIUM	830.15	6.11	17.46
1300	MIXED USE COMMERCIAL	585.23	10.21	12.31
1300	RESIDENTIAL HIGH	279.24	4.87	5.87
3200	CONSERVATION	2257.40	0.00	47.47
8100	AIRPORT	192.35	3.64	4.04
Grand Total		**4755.42**	**28.84%**	**100%**

Source: City of Marathon FLUM, FLUCCS, 2019 & SJRWMD 2012, Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports

b. For currently fully developed watersheds: studies of existing development and the potential impact of any redevelopment

The existing ICPR model was assessed for the Marathon watershed on an overall basis. Localized inundation on a subbasin level was not assessed on a granular level due to limited survey and stormwater infrastructure data. Since most basins within Marathon were classified as open basins with direct overland connections to the coast, most flood inundation is a result of the coastal tides and sea level rise compared to the localized runoff from subbasins. Therefore, most of the future inundation is expected to be a result of the SLR rather than future planned redevelopment.

c. Evaluations of different management scenarios for at least the 100-year rainfall event for a fully developed watershed at a scale sufficient to determine local problems.

The ICPR model was set up to address the current 2025 scenario, as well as to represent future conditions in 2040, 2070, and 2100 to assess impacts of SLR when compared to the existing conditions 2025 scenario. Each scenario was assessed based on two projected SLR sources as previously stated (i.e. 1) NOAA Int-High 2017 & 2) NOAA Int-High 2017 + King Tides Study). The difference in those projections is the inclusion of the largest astronomical tides for the King Tides study into the boundary condition elevations. Most of the basins in the Marathon Watershed

were classified as open basins with direct connections to the coast and therefore are less influenced by the intensity of the rainfall events compared to the projected elevations of the SLR and King Tide events.

d. Determinations of the change in runoff from current to future, fully developed conditions.

Differences in runoff from current to future conditions were determined to be minimal based on the available existing conditions and future land use classifications for the Marathon watershed. Existing vacant parcels with a designated land use were conservatively modeled in the existing conditions with the designated current land use in place. Additionally, it was determined based on Marathon's Building Permit Allocation System (BPAS) that there are only 5 allocated units and 12 for admin relief remaining. These units will not make a significant difference on the flooding extents for the project locations identified later in this Plan as the adjacent parcels were originally designed assuming full build out. Additionally, Marathon consists of primarily open basins. Consequently, any discharge that would contribute to local flooding generally discharges towards the coast. Therefore, the minor change between the existing land use/future land use classifications would result in minimal overall increases to runoff and flood risks due to the direct surface connection to the coast.

e. Recommendations for managing at least the 10-year, the 25-year, and 100-year rainfall events.

The scope for this Plan includes recommendations for the 10-year, 25-year, and 100-year 24-hour rainfall events. The extent of this analysis was limited to scenarios up to and including the 2040, 10-year, 25-year, and 100-year 24-hour event in intensity. The analysis focuses on proposed recommendations through 2040 as the 2070 and 2100 scenarios carry greater uncertainty in projected inundation, risk in infrastructural lifespan for design projects implemented presently, and result in significantly more inundation areas requiring costly installation and upkeep in the interim. A summary of the proposed projects is provided in Section 6.

Each proposed project area was evaluated for its hydrologic implications and flood impacts under the 10 year, 25 year, and 100 year storm events:

- Project Area 1 involves the stormwater pipe connections along 3rd Ave Gulf, discharging to the adjacent canal through proposed inlet structure connection with tide flex check valves. Modeling results as indicated in **Tables 13** through **24** shows roadway inundation reduced to under 4 inches for 2025 and 2040 scenarios under the 100 year event, without adverse flood impacts to adjacent properties. The system through its direct coastal discharge connection and backflow prevention would be designed to convey runoff without increasing peak flows during the 100 year event.

- Project Area 2 includes stormwater connections along 1st Ave Gulf. While the proposed 2040 King Tides scenario, specifically during the 100 year rainfall event indicates residual inundation exceeding 4 inches, all other modeled rainfall scenarios during the 2025 and 2040 events result in a decrease in flood depth consistent with the Flood Protection Level of Service described in Section 6. It is important to note that permitting for an existing stormwater management facility was conducted in this area during the timing of this watershed management plan. As a result, projected flood depths may reflect significantly more conservative assumptions compared to in field conditions at the time of design.

- Project areas 3 addresses flooding concerns on Sombrero Boulevard. Due to the significant number of properties served by this project area, it is crucial to ensure that proposed improvements currently underway for Sombrero Blvd are being closely monitored for system's ability to facilitate appropriate drawdown of the roadway flooding during high intensity storm events. If observation post-construction indicate recurring localized inundation or insufficient drainage capacity, then further refinements such as increased roadway grades, inlet connections or supplemental pump assisted inject wells may be considered.

- Project Area 4 involves pipe connections to the westbound coastal canal with tide flex valves. All modeled 2025 and 2040 scenarios including the 10, 25, and 100 year storm result in reduced flood depths below 4 inches. Therefore, the proposed system manages tidal backflow while managing runoff to prevent adverse flood risk to adjacent properties.

- Project Area 5 includes a conceptual wet detention pond with a pump-assisted injection well at W Copa de Oro and Santa Barbara. The facility would serve the high tide and sea level rise- prone Flamingo Island Estates Neighborhood. The injection well is proposed to discharge to the surficial aquifer to avoid runoff to adjacent canals and properties. While conceptually the system would provide decrease in flood depths during the 10, 25, and 100 year events up to the 2040 scenario, it is heavily dependent on a range of localized geographic data including utility survey, geotechnical investigations on subsurface conditions, more precise modeling, permitting etc. Due to limited accessible parcels for buildout, the proposed injection well should be considered a preliminary concept and should be subjected to further studies and evaluation to determine the most beneficial and cost-effective approach for this area.

5. For communities impacted by sea level rise: evaluations of the impacts of the NOAA Intermediate 2100 sea level rise scenario on the 100-year rainfall event

a. It is highly recommended to include 2 other scenarios up to 2100, which could be based on sea level for 2-time frames into the future or several feet of sea level rise within this period.

The ICPR model was set up to address the 2025 present daytime frame representing existing conditions, as well as the 2040, 2070, and 2100 to assess impacts of SLR. Each scenario was evaluated for Mean annual 24-hour (2.33 year), 10-year 24-hour, 25-year 24-hour, and 100-year 24-hour design storm events. The results of the SLR on the overall watershed is displayed in **Figures 18-23**.

Existing Model Results

The existing model results were primarily used to determine probable level of service from areas of inundation. The corresponding inundated areas were assessed, and projects recommendations were made to reduce flood inundation and provide discharge rate control. A summary of the findings is displayed in **Tables 13-24**.

Table 13 - Project Maximum Stage Table based on NOAA's Intermediate High SLR Projection (ft, NAVD88)

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2025 SLR projection				2040 SLR projection					2025 SLR projection				2040 SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	3.49	3.64	3.75	3.9	3.51	3.68	3.81	3.97	N182	0.78	2.64	3.13	3.58	1.43	2.91	3.32	3.71
	N098	3.49	3.64	3.75	3.9	3.51	3.68	3.81	3.97	N098	1.18	2.66	3.14	3.58	1.50	2.92	3.33	3.72
2/ 1st Ave Gulf	N181	3.95	4.09	4.20	4.34	3.96	4.13	4.25	4.39	N181	0.20	2.38	3.34	3.86	0.97	3.05	3.71	4.03
	N101	3.95	4.09	4.20	4.34	3.96	4.13	4.25	4.39	N101	3.57	3.70	3.77	3.88	3.60	3.73	3.80	4.04
3/ Sombrero Blvd	N139	0.69	1.15	1.38	1.66	0.99	1.33	1.54	1.80	N139	0.69	1.15	1.38	1.66	0.99	1.33	1.54	1.80
4/ Avenida Primceria	N179	0.88	1.32	1.52	1.76	1.03	1.43	1.63	1.85	N179	0.27	0.45	0.56	0.69	0.62	0.66	0.69	0.77
	N137	0.88	1.32	1.52	1.76	1.03	1.43	1.63	1.85	N137	0.36	0.72	1.02	1.36	0.78	1.02	1.24	1.47
5/ W Copa de Oro	N143	0.71	1.00	1.22	1.44	0.93	1.18	1.35	1.52	N143	0.25	0.58	0.76	.88	0.46	0.76	0.93	1.23

Table 14 - Project Maximum Stage Table based on NOAA's Intermediate High SLR Projection (ft, NAVD88) - continued

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	3.51	3.68	3.81	3.97	5.35	5.36	5.36	5.36	N182	2.87	3.24	3.51	3.76	5.35	5.35	5.36	5.36
	N098	3.51	3.68	3.81	3.97	5.35	5.36	5.36	5.36	N098	2.88	3.25	3.52	3.77	5.35	5.36	5.36	5.36
2/ 1st Ave Gulf	N181	3.96	4.13	4.25	4.39	5.35	5.36	5.36	5.36	N181	2.87	3.68	3.89	4.14	5.35	5.35	5.36	5.36
	N101	3.96	4.13	4.25	4.39	5.35	5.36	5.36	5.36	N101	3.60	3.73	3.90	4.14	5.36	5.36	5.36	5.36
3/ Sombrero Blvd	N139	1.94	1.95	1.96	1.99	2.53	2.54	2.54	2.55	N139	1.94	1.95	1.96	1.99	2.53	2.54	2.54	2.55
4/ Avenida Primceria	N179	2.53	2.53	2.54	2.54	5.35	5.35	5.35	5.35	N179	2.53	2.53	2.53	2.54	5.35	5.35	5.35	5.35
	N137	2.53	2.53	2.54	2.54	5.35	5.35	5.35	5.35	N137	2.53	2.53	2.53	2.54	5.35	5.35	5.35	5.35
5/ W Copa de Oro	N143	1.93	1.93	1.94	1.94	2.53	2.53	2.53	2.53	N143	1.65	1.72	1.88	1.91	2.46	2.49	2.51	2.53

Table 15 - Project Maximum Stage Table Based on King Tides SLR Projection (ft, NAVD88)

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2025 King Tides projection				2040 King Tides projection					2025 King Tides projection				2040 King Tides projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100 Y 24H
1/ 3rd Ave Gulf	N182	3.49	3.64	3.75	3.90	3.51	3.68	3.81	3.97	N182	2.42	3.03	3.31	3.63	2.87	3.24	3.51	3.76
	N098	3.49	3.64	3.75	3.90	3.51	3.68	3.81	3.97	N098	2.44	3.04	3.32	3.64	2.88	3.25	3.52	3.77
2/ 1st Ave Gulf	N181	3.95	4.09	4.20	4.34	3.96	4.13	4.25	4.39	N181	2.15	3.31	3.73	3.98	2.87	3.68	3.89	4.14
	N101	3.95	4.09	4.20	4.34	3.96	4.13	4.25	4.39	N101	3.57	3.70	3.77	3.99	3.60	3.73	3.90	4.14
3/ Sombrero Blvd	N139	2.53	2.54	2.54	2.55	5.35	5.35	5.35	5.35	N139	2.53	2.54	2.54	2.55	5.35	5.35	5.35	5.35
4/ Avenida Primceria	N179	1.94	1.95	1.96	1.99	2.53	2.53	2.54	2.54	N179	1.93	1.93	1.93	1.94	2.53	2.53	2.53	2.54
	N137	1.94	1.95	1.96	1.99	2.53	2.53	2.54	2.54	N137	1.93	1.94	1.94	1.94	2.53	2.53	2.53	2.54
5/ W Copa de Oro	N143	2.53	2.53	2.53	2.53	5.35	5.35	5.35	5.35	N143	1.93	2.03	2.21	2.33	5.01	5.25	5.30	5.35

Table 16 - Project Maximum Stage Table Based on King Tides SLR projection (ft, NAVD88) - continued

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 King Tides projection				2100 King Tides projection					2070 King Tides projection				2100 King Tides projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	4.44	4.44	4.44	4.45	7.28	7.28	7.28	7.29	N182	4.43	4.44	4.44	4.45	7.28	7.28	7.28	7.29
	N098	4.44	4.44	4.44	4.45	7.28	7.28	7.28	7.29	N098	4.44	4.44	4.44	4.45	7.28	7.28	7.28	7.29
2/ 1st Ave Gulf	N181	4.44	4.45	4.46	4.48	7.28	7.28	7.28	7.29	N181	4.44	4.45	4.45	4.47	7.28	7.28	7.28	7.29
	N101	4.44	4.45	4.46	4.48	7.28	7.28	7.28	7.29	N101	4.44	4.45	4.46	4.48	7.28	7.28	7.29	7.29
3/ Sombrero Blvd	N139	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N139	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28
4/ Avenida Primceria	N179	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N179	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28
	N137	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N137	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28
5/ W Copa de Oro	N143	4.43	4.43	4.43	4.43	7.28	7.28	7.28	7.28	N143	4.21	4.34	4.37	4.43	7.28	7.28	7.28	7.28

Table 17 - Project Flood Depth Table based on NOAA's Intermediate High SLR Projection (inches, NAVD88)

Project/ Location	Existing Node	Existing Conditions Flood Depth (in, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (in, NAVD88)							
		2025 w/ SFRCC SLR projection				2040 w/ SFRCC SLR projection					2025 w/ SFRCC SLR projection				2040 w/ SFRCC SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	8.4	10.2	11.5	13.3	8.6	10.7	12.2	14.2	N182	0.0	0.0	4.1	9.5	0.0	1.4	6.4	11.0
	N098	8.4	10.2	11.5	13.3	8.6	10.7	12.2	14.2	N098	0.0	0.0	4.2	9.5	0.0	1.6	6.5	11.2
2/ 1st Ave Gulf	N181	21.2	22.9	24.2	25.9	21.4	23.4	24.8	26.5	N181	0.0	2.4	13.9	20.2	0.0	10.4	18.4	22.2
	N101	21.2	22.9	24.2	25.9	21.4	23.4	24.8	26.5	N101	16.7	18.2	19.1	20.4	17.0	18.6	19.4	22.3
3/ Sombrero Blvd	N139	0.0	4.1	6.8	10.2	2.2	6.2	8.8	11.9	N139	0.0	4.1	6.8	10.2	2.2	6.2	8.8	11.9
4/ Avenida Primceria	N179	0.0	1.4	3.8	6.7	0.0	2.8	5.2	7.8	N179	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	N137	0.0	1.4	3.8	6.7	0.0	2.8	5.2	7.8	N137	0.0	0.0	0.0	1.9	0.0	0.0	0.5	3.2
5/ W Copa de Oro	N143	0.0	0.0	0.4	3.0	0.0	0.0	1.9	4.0	N143	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3

**Red values indicate flooding on the lowest edge of the roadway has exceeded 6 inches for that project area during the specified storm event with blue indicating 4-6 inches of max flood depth.*

Table 18 - Project Flood Depth Table based on NOAA's Intermediate High SLR Projection (inches, NAVD88) - continued

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 w/ SFRCC SLR projection				2100 w/ SFRCC SLR projection					2070 w/ SFRCC SLR projection				2100 w/ SFRCC SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	8.6	10.7	12.2	14.2	30.7	30.8	30.8	30.8	N182	1.0	5.4	8.6	11.6	30.7	30.7	30.8	30.8
	N098	8.6	10.7	12.2	14.2	30.7	30.8	30.8	30.8	N098	1.1	5.5	8.8	11.8	30.7	30.8	30.8	30.8
2/ 1st Ave Gulf	N181	21.4	23.4	24.8	26.5	38.0	38.2	38.2	38.2	N181	8.3	18.0	20.5	23.5	38.0	38.0	38.2	38.2
	N101	21.4	23.4	24.8	26.5	38.0	38.2	38.2	38.2	N101	17.0	18.6	20.6	23.5	38.2	38.2	38.2	38.2
3/ Sombrero Blvd	N139	13.6	13.7	13.8	14.2	20.6	20.8	20.8	20.9	N139	13.6	13.7	13.8	14.2	20.6	20.8	20.8	20.9
4/ Avenida Primceria	N179	16.0	16.0	16.1	16.1	49.8	49.8	49.8	49.8	N179	16.0	16.0	16.0	16.1	49.8	49.8	49.8	49.8
	N137	16.0	16.0	16.1	16.1	49.8	49.8	49.8	49.8	N137	16.0	16.0	16.0	16.1	49.8	49.8	49.8	49.8
5/ W Copa de Oro	N143	8.9	8.9	9.0	9.0	16.1	16.1	16.1	16.1	N143	5.5	6.4	8.3	8.6	15.3	15.6	15.9	16.1

**Red values indicate flooding on the lowest edge of the roadway has exceeded 6 inches for that project area during the specified storm event with blue indicating 4-6 inches of max flood depth.*

Table 19 - Project Flood Depth Table Based on King Tides SLR projection (inches, NAVD88)

Project/ Location	Existing Node	Existing Conditions Flood Depth (ft, NAVD88)								Proposed Node	Proposed Conditions Flood Depth (ft, NAVD88)							
		2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection					2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	8.4	10.2	11.5	13.3	8.6	10.7	12.2	14.2	N182	0.0	1.4	4.8	8.6	0.0	4.0	7.2	10.2
	N098	8.4	10.2	11.5	13.3	8.6	10.7	12.2	14.2	N098	0.0	1.6	4.9	8.8	0.0	4.1	7.3	10.3
2/ 1st Ave Gulf	N181	21.2	22.9	24.2	25.9	21.4	23.4	24.8	26.5	N181	0.0	13.6	18.6	21.6	8.3	18.0	20.5	23.5
	N101	21.2	22.9	24.2	25.9	21.4	23.4	24.8	26.5	N101	16.7	18.2	19.1	21.7	17.0	18.6	20.6	23.5
3/ Sombrero Blvd	N139	20.6	20.8	20.8	20.9	54.5	54.5	54.5	54.5	N139	8.8	8.8	8.8	8.9	16.0	16.0	16.0	16.1
4/ Avenida Primceria	N179	8.9	9.0	9.1	9.5	16.0	16.0	16.1	16.1	N179	8.8	8.9	8.9	8.9	16.0	16.0	16.0	16.1
	N137	8.9	9.0	9.1	9.5	16.0	16.0	16.1	16.1	N137	0.0	1.3	3.0	5.4	4.7	5.4	6.0	7.2
5/ W Copa de Oro	N143	16.1	16.1	16.1	16.1	49.9	49.9	49.9	49.9	N143	12.7	13.6	15.4	15.7	49.1	49.4	49.7	49.9

**Red values indicate flooding on the lowest edge of the roadway has exceeded 6 inches for that project area during the specified storm event with blue indicating 4-6 inches of max flood depth.*

Table 20 - Project Flood Depth Table Based on King Tides SLR projection (inches, NAVD88) - continued

Project/ Location	Existing Node	Existing Conditions Maximum Stage (ft, NAVD88)								Proposed Node	Proposed Conditions Maximum Stage (ft, NAVD88)							
		2070 King Tides projection				2100 King Tides projection					2070 King Tides projection				2100 King Tides projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	N182	18.4	18.4	18.4	18.5	52.4	52.4	52.4	52.6	N182	18.2	18.4	18.4	18.5	52.4	52.4	52.4	52.6
	N098	18.4	18.4	18.4	18.5	52.4	52.4	52.4	52.6	N098	18.4	18.4	18.4	18.5	52.4	52.4	52.4	52.6
2/ 1st Ave Gulf	N181	27.1	27.2	27.4	27.6	61.2	61.2	61.2	61.3	N181	27.1	27.2	27.2	27.5	61.2	61.2	61.2	61.3
	N101	27.1	27.2	27.4	27.6	61.2	61.2	61.2	61.3	N101	27.1	27.2	27.4	27.6	61.2	61.2	61.3	61.3
3/ Sombrero Blvd	N139	38.8	38.8	38.8	38.8	73.0	73.0	73.0	73.0	N139	38.8	38.8	38.8	38.8	73.0	73.0	73.0	73.0
4/ Avenida Primceria	N179	38.8	38.8	38.8	38.8	73.0	73.0	73.0	73.0	N179	38.8	38.8	38.8	38.8	73.0	73.0	73.0	73.0
	N137	26.9	26.9	26.9	27.0	61.1	61.1	61.1	61.1	N137	26.9	26.9	26.9	27.0	61.1	61.1	61.1	61.1
5/ W Copa de Oro	N143	18.4	18.4	18.4	18.5	52.4	52.4	52.4	52.6	N143	15.6	17.3	17.7	18.5	52.4	52.4	52.4	52.6

**Red values indicate flooding on the lowest edge of the roadway has exceeded 6 inches for that project area during the specified storm event with blue indicating 4-6 inches of max flood depth.*

Table 21 - Project Maximum Flow Table based on NOAA's Intermediate High SLR Projection (cfs)

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2025 SLR projection				2040 SLR projection					2025 SLR projection				2040 SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	L-0800WBC	6.0	32.5	51.8	77.0	8.7	39.7	61.6	92.5	L-0800WBC	0.0	0.0	0.0	4.6	0.0	0.0	0.0	21.1
	L-2020P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-2020P	26.6	52.1	60.5	71.6	32.0	60.2	71.6	82.6
	L-1900P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1900P	21.9	39.7	45.2	49.4	25.6	41.1	46.8	48.9
2/ 1st Ave Gulf	L-2780W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L-2780W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	L-1910P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1910P	9.6	31.9	37.7	40.6	12.7	33.0	37.2	39.0
4/ Avenida Primceria	L-1120WBC	6.3	48.9	129.7	294.7	12.6	84.3	195.4	389.4	L-1120WBC	0.0	0.4	13.0	109.8	1.1	13.1	55.3	189.2
	L-1840WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1840WA	29.3	76.7	115.4	164.7	53.2	97.5	121.5	165.9
	L-1850W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L-1850W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	L-1860WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1860WA	31.1	83.0	128.2	196.5	60.0	120.1	168.3	238.7
	L-1950DS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1950DS	2.3	4.8	6.7	9.1	1.4	3.0	4.2	6.3

Table 22 - Project Maximum Flow Table based on NOAA's Intermediate High SLR Projection (cfs) - continued

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 SLR projection				2100 SLR projection					2070 SLR projection				2100 SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	L-0800WBC	18.5	40.1	61.0	92.4	28.8	64.5	114.5	159.9	L-0800WBC	25.3	46.1	61.8	87.7	28.8	105.8	102.4	152.9
	L-2020P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-2020P	8.6	13.0	16.3	22.1	0.8	2.6	2.6	3.5
	L-1900P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1900P	19.5	28.2	33.1	36.3	0.2	1.1	1.1	1.7
2/ 1st Ave Gulf	L-2780W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L-2780W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	L-1910P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1910P	12.3	22.6	24.5	26.7	1.0	1.5	1.5	1.7
4/ Avenida Primceria	L-1120WBC	67.0	147.6	231.4	400.2	51.3	112.7	176.3	303.8	L-1120WBC	60.2	132.0	206.2	352.9	41.5	90.7	141.6	243.8
	L-1840WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1840WA	0.0	0.1	0.3	3.8	0.0	0.0	0.0	0.0
	L-1850W	0.0	0.0	0.0	0.0	0.5	0.8	1.3	2.8	L-1850W	2.6	5.6	8.7	14.8	4.4	9.7	15.1	26.1
	L-1860WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1860WA	9.7	21.9	34.8	63.4	9.4	17.2	23.5	37.5
	L-1950DS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1950DS	0.0	0.1	0.2	0.5	0.1	0.2	0.3	0.5

Table 23 - Project Maximum Flow Table based on NOAA's Intermediate High SLR Projection with King Tides (cfs)

Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection					2025 w/ King Tides SLR projection				2040 w/ King Tides SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	L-0800WBC	5.95	32.5	51.8	77.0	18.5	40.1	61.0	92.4	L-0800WBC	0.1	8.4	20.4	46.4	25.3	38.1	51.8	87.7
	L-2020P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-2020P	23.8	35.8	40.8	46.4	8.6	13.0	16.3	22.1
	L-1900P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1900P	20.2	29.7	33.5	36.7	19.5	28.2	33.1	36.3
2/ 1st Ave Gulf	L-2780W	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L-2780W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	L-1910P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1910P	9.8	24.7	28.2	30.2	12.3	22.6	24.5	26.7
4/ Avenida Primceria	L-1120WBC	60.06	131.8	198.7	330.1	67.0	147.6	231.4	400.2	L-1120WBC	55.1	117.3	170.6	280.4	60.2	132.0	206.2	352.9
	L-1840WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1840WA	0.4	4.0	12.1	22.7	0.0	0.1	0.3	3.8
	L-1850W	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	L-1850W	0.2	0.5	0.7	1.0	2.6	5.6	8.7	14.8
	L-1860WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1860WA	8.5	12.5	15.1	25.2	9.7	13.9	17.8	33.4
	L-1950DS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1950DS	0.0	0.1	0.3	0.8	0.0	0.1	0.2	0.5

Table 24 - Project Maximum Flow Table based on NOAA's Intermediate High SLR Projection with King Tides (cfs) - continued

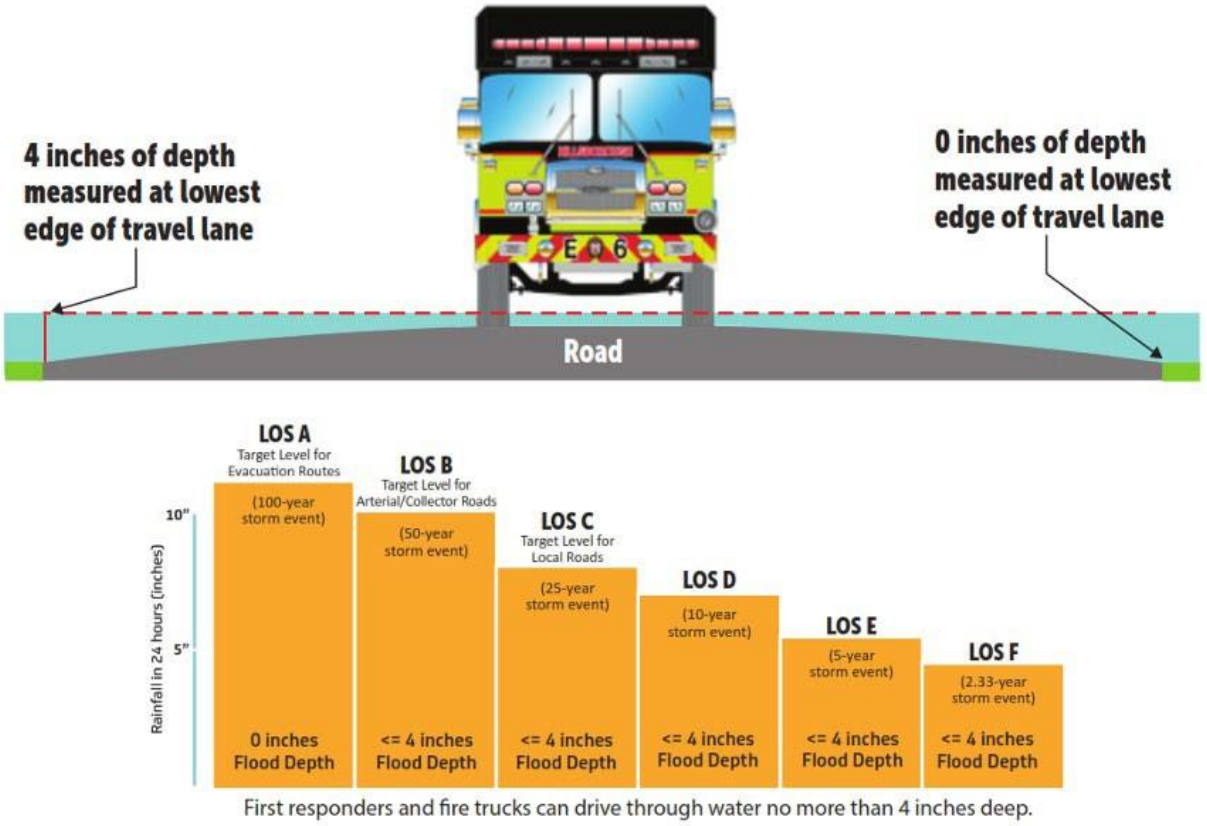
Project/ Location	Existing Link	Existing Conditions Maximum Flow Rate (cfs, NAVD88)								Proposed Link	Proposed Conditions Maximum Flow Rate (cfs, NAVD88)							
		2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection					2070 w/ King Tides SLR projection				2100 w/ King Tides SLR projection			
		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H		MA 24H	10Y 24H	25Y 24H	100Y 24H	MA 24H	10Y 24H	25Y 24H	100Y 24H
1/ 3rd Ave Gulf	L-0800WBC	27.6	55.0	81.6	129.5	25.5	54.4	185.8	251.0	L-0800WBC	24.7	52.9	82.0	134.0	25.7	131.7	180.4	202.3
	L-2020P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-2020P	1.1	2.2	3.1	4.5	0.4	2.1	2.9	3.0
	L-1900P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1900P	0.7	1.8	2.7	3.8	0.1	1.2	1.1	1.2
2/ 1st Ave Gulf	L-2780W	0.0	0.0	0.0	0.0	0.3	0.4	0.6	1.1	L-2780W	0.0	0.0	0.0	0.0	0.3	0.4	0.6	1.1
	L-1910P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1910P	2.0	2.7	3.3	4.4	0.6	1.1	1.3	1.5
4/ Avenida Primceria	L-1120WBC	52.1	114.5	179.0	308.5	51.1	112.4	175.9	303.1	L-1120WBC	42.9	93.8	146.4	252.2	41.0	89.5	139.7	240.4
	L-1840WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1840WA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	L-1850W	0.4	0.7	1.0	1.4	0.4	0.7	1.0	1.5	L-1850W	4.5	9.9	15.4	26.7	4.3	9.4	14.7	25.3
	L-1860WA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1860WA	9.6	21.6	34.1	58.6	9.1	20.7	32.6	56.5
	L-1950DS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	L-1950DS	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.3

6. The plan must include a strategy and action plan to address the results of the studies for:

a. Estimated Level of Service Change

To identify areas impacted by sea level rise and rainfall design storms (later referred to as "projects" or "project areas"), an appropriate quantifiable system needs to be followed, typically a level of service guideline. As Marathon does not define flood protection level of service (FPLOS or LOS) for specific storm events with respect to roadway flooding, industry standards, namely from Hillsborough County, have been used to determine existing condition FPLOS. Hillsborough County's Comprehensive Plan details estimating FPLOS (A through F) based on the type of road under consideration and the depth of the flooding at the edge of the travel lane (**Figure 1**). Depending on the type of road, the design storm event used to estimate flooding depth at the edge of the travel lane varies from a 100-yr/24-hr design storm event to a mean-annual (2.33-yr/24-hr storm event). The target flood depth at the edge of the travel lane is 4 inches or less except for evacuation routes where no flooding is allowed.

Figure 1 - Stormwater Roadway Flood Protection Level of Service Definitions



Source: Preliminary Engineering Design for Five Intermediate Stormwater Unfunded Projects, Wood, 2021

Using this methodology from Hillsborough County, an intersection was made between the existing DEM results and the corresponding flood depth. The existing conditions results display approximately 8 inches of flooding above the lowest edge of the roadway during the mean annual storm event for Project Area 1 and 21 inches in the lowest section of parking lot for Project Area 2, as shown in **Figures 24-57**. These results assume that existing exfiltration trenches in this area are fully saturated and hydraulic conductivity is minimal. As a result of intersecting the existing DEM layer in GIS with the 2025 and 2040 existing conditions flood inundation polygons for the 25-year 24-hour storm event, many roadways and paved areas adjacent to residential and commercial structures may be at risk of inundation.

Project Areas in this Watershed Management Plan were selected based on locations where localized roadway inundation exceeds 4 inches using the Hillsborough County methodology to define FPLOS. Figures for the respective Project Areas include **Figures 24-57**. Project Areas

affected from more immediate and smaller intensity events were prioritized higher than those with longer duration less intense impacts. Additionally, inundated roadways affecting a greater number of residential properties were rated with a higher design priority. Inundated areas resulting from the 2025 and 2040 existing conditions model with NOAA's intermediate high projection were prioritized above inundated areas in the King Tides model scenarios, due to the conservative nature of the King Tide boundary conditions.

As displayed in **Tables 17-18** and **Tables 19-20**, Project Areas receiving flood inundation greater than 4 inches of roadway at the outside edge of the pavement include Project Areas 1, 2, 3, 4, and 5 during the 2025 and 2040 events (King Tides SLR projection). Project Areas 1, 4, and 5 received less than or equal to 4 inches of flooding or during the 2025 NOAA's Intermediate High Projection scenario for the 25-year 24-hour storm events.

Furthermore, it was noted that minimal outflow occurs in Project Areas 2, 3, and 4 in the existing conditions. The limited flows for these areas can be generally attributed to topographic high points including crowned roadways and berms (Project A as displayed in **Tables 21-22** and **Tables 23-24.** Note that the current stages and discharge rates for Project Area 2 may be subject to change in the near term as major improvements are currently being designed and permitted for this area, not fully captured at the time of writing. However, as the only emergency roadway connection for commercial and residential properties for Project Area 3, it remains crucial to monitor Sombrero Blvd due to recurring and persistent flooding challenges. Similarly, Project Area 4 lies adjacent to critical access roadways for the neighbouring residential units. Based on initial assessments of the low-lying topographic constraints in existing conditions, it is apparent that Project Areas 3 and 5 will require design efforts in excess of coastal stormwater connections. These elements may include roadway improvements, pumping, and deep well injection and should be considered in future design efforts.

Proposed projects for the Project Areas to alleviate flooding concerns for the Marathon watershed include the following:

- **Project Area 1**: Project includes: The connection of storm water inlets along 3rd Ave Gulf prior to discharging across Parcel 00335500-000000. Note that this project will require a utility easement (**Figures 24-33**).
- **Project Area 2**: Project includes: The addition and connection of stormwater inlets along 1st Ave Gulf prior to discharging across Parcel 00335630-000000 (**Figures 34-43**).
- **Project Area 3**: Project may benefit from additional roadway raising efforts, injection wells, and potential drainage connections to the canal within the adjacent Golf Course (**Figure 45**).

- **Project Area 4**: Project includes: adding stormwater inlets adjacent to Avenida Primceria on the following parcels: 00353990-000000. The inlets are hydraulically connected and discharge to the adjacent coastal canal (**Figures 46-55**).
- **Project Area 5**: Project includes: The addition of a wet detention facility and associated stormwater pump assisted injection well along the intersection of W Copa de Oro and Santa Barbara on Parcel 00356740-000000. (**Figure 56**).

A summary of the results of the proposed analysis for each Project Area location is provided in the following pages.

Project Area 1:

Addition and connection of stormwater inlets along 3rd Ave Gulf prior to discharging across Parcel 00335500-000000 (previously Parcel 00335630-000000).

Recommended projects in this Project Area include:

This project area includes the addition of 864 LF (total) of 24-inch double horizontal elliptical RCP connecting existing inlets along 3rd Ave Gulf to a proposed inlet south of Parcel 00335500-000000 prior to discharging to the adjacent canal.

This project will include one proposed inlet structure with tide flex check valves to prevent backflow at the canal outfall.

The existing inlets did not have available invert information based on data collected from the city's stormwater maps. It was assumed that the inlets were bottomless percolation structures based on the provided "horizontal perc" field in the city's "Storm Catch Basin" attribute table.

Note that the proposed connection to the canal will require a utility easement.

Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).

To measure the level of adverse impacts for this project area, nodes N182 and N099 were selected to represent the maximum stage of the existing and proposed inlets and elevation of roadway inundation along 3rd Avenue Gulf.

Existing conditions inundation results indicate more than four inches of inundation during the mean annual 24-hour event. Note that the infiltration was excluded as the existing stormwater inlets were conservatively assumed to be poorly drained. The proposed model results for Project Area 1 (**Figures 24-33**) indicates that associated roadway inundation are projected to be decreased to under 4 inches for all modeled 2025 and 2040 scenarios under the 25 year-24-hour event.

Project Area 2:

Addition and connection of stormwater inlets within the parking lot and along 1st Ave Gulf prior to discharging across Parcel 00335630-000000.

Recommended projects in this Project Area include:

The addition of 1,158 LF (total) of double 24-inch elliptical RCP connecting the northwest intersection of 113th St and US-1 to inlets along 1st Ave Gulf prior to discharge across Parcel 00335630-000000.

This project area will include two proposed inlet structures with tide flex check valves to prevent backflow at the canal outfall.

Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed for level of service criteria. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).

To measure the level of adverse impacts for this project area, nodes N181 and N101 were selected to represent the maximum stage of roadway inundation along 1st Ave Gulf and within the parking lot behind the commercial gas station south of 1st Ave.

Based on the existing conditions inundation results for Project Area 2, flood depth exceeded 4 inches during the mean annual 24-hour storm event. It's important to note that these conservative inundation results assume no infiltration occurs in pervious areas located within the basin along with saturated inlets. The proposed model results for Project Area 2 in **Figures 34-43** indicates that roadway inundation will be reduced to below 4 inches for all modeled 2025 and 2040 storm events except for the 100 year-24-hour events and the 2040 25 year-24-hour event with King Tides projection.

At the time of evaluation, the stormwater management facility south of 1st Ave Gulf at the Circle K located at 11100 Overseas Highway was under construction. The existing digital elevation model (DEM) used in this conceptual modeling effort may not fully capture recent or ongoing site modifications. As this analysis was intended to assess potential drainage improvements conceptually rather than for construction design, some discrepancies between modeled and actual conditions are anticipated. Nonetheless, the results still indicate that future improvements in this area could have favorable drainage impacts.

Project Area 3:

Additional roadway elevating efforts, injection wells, and stormwater inlet connections in local low spots (Figure 56).

Based on the City of Marathon's workshop discussion held on June 25, 2024, and data from WSP's public GIS sharing platform, the segment of Sombrero Boulevard between 53rd Street and the west end of Skipjack Resort has been identified as a frequent flooding hotspot. The most recent event, occurring on May 19–20, 2024, brought over 8.5 inches of rainfall in just 8 hours, corresponding to a 100-year storm event. Residents have reported increasingly frequent high-intensity storms, with prolonged roadway flooding becoming a recurring issue.

Existing assessments by Weiler Engineering Corp indicate that the current drainage infrastructure—primarily composed of exfiltration trenches—is underperforming, likely due to poor hydraulic conductivity of the surrounding soils.

To address these deficiencies, proposed improvements include raising and regrading sections of Sombrero Boulevard to direct runoff toward a curb and gutter system, which will convey stormwater to a pump-assisted injection well. This system is designed to rapidly remove stormwater from the roadway, similar to the successful performance of the injection well on 39th Street, which facilitated quick drawdown following the May 19th storm.

Importantly, plans for this pump-assisted system have already been completed, and construction is anticipated to begin and be completed in the near future.

However, due to the severity of flooding in this area, the critical role of Sombrero Boulevard as the only vehicular evacuation route during high tides and storm events, and numerous complaints from both commercial and residential property owners, it is recommended that this area continue to be monitored. Future assessments should focus on identifying localized low spots that may not adequately drain and could benefit from additional stormwater inlet connections to the injection well system or targeted grading adjustments to improve drainage in this area.

If localized inundation persists, additional injection wells and roadway modifications may be warranted and should be evaluated on a case-by-case basis.

Project Area 4:

Addition of stormwater inlets adjacent to Avenida Primceria, hydraulically connected to the adjacent coastal canal

Recommended projects in this Project Area include:

The addition of stormwater inlets adjacent to Avenida Primceria on parcel 00353990-000000 and one on a potential utility easement between parcels 00353250-000000 and 00353240-000000.

The proposed improvements for Project Area 4 include the installation of two FDOT Type H stormwater inlets. One inlet will be located on parcel 00353990-000000, and the second will be situated within a proposed drainage easement between parcels 00353250-000000 and 00353240-000000, terminating at the canal outfall.

These inlets will be connected by approximately 220 linear feet of double horizontal elliptical reinforced concrete pipe (RCP). The system will discharge into the adjacent coastal canal through a double headwall. To prevent tidal backflow into the stormwater system, two tide flex check valves are proposed to be installed at the discharge point.

Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed for level of service criteria. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).

To measure the level of adverse impacts for this project area, nodes N137 and N179 were selected to represent the maximum stage of roadway inundation along Avenida Primceria and Calle Limon.

Based on the existing conditions inundation results for Project Area 4, flood depth exceeded 4 inches during the 25 year-24-hour event and higher intensity storm events during 2040 NOAA Int High Projection. The proposed model results for Project Area 4 in **Figures 46-55** indicates that roadway inundation will be reduced to below 4 inches for all modeled 2025 and 2040 storm events with exception to the King Tides projections. This is primarily a result of the combined impacts of sea level rise and King Tides. To amend the risks of inundation, potential implementation of sea walls and other tide protection improvements can be utilized.

Project Area 5:

The addition of a wet detention facility and associated stormwater pump assisted injection well along the intersection of W Copa de Oro and Santa Barbara on Parcel 00356740-000000. The project is to discharge across lot 00356580-000000. (Figure 68).

Recommended projects in this Project Area include:

The potential addition of a wet detention pond with an associated injection well on parcel 00356740-000000 at the intersection of W Copa de Oro and Santa Barbara may be considered as part of a future conceptual effort.

Approximately 143 residential units reside within the Flamingo Island Estates south of Sombrero Blvd. These units as part of Project Area 5, are prone to inundation from sea level rise. The proposed project area intends to alleviate future inundation on W Copa de Oro, allowing for a path to emergency egress for residents.

It is important to note that the Building Permit Allocation System (BPAS) limits the number of units that can be allocated for any type of development, including stormwater management improvements. As such, the potential to rezone the parcel to create a smaller development footprint may be considered or explored in a future or subsequent planning effort, depending on feasibility and regulatory alignment.

Four design storms including the mean annual (2.33-yr/24-hr), 10-yr/24-hr, 25-yr/24-hr, and the 100-yr/24-hr event were simulated for each of the 4 proposed scenarios to be assessed. These include the 2025 (NOAA Int-High projection), 2040 (NOAA Int-High projection), 2025 (King Tides projection), and 2040 (King Tides projection).

To measure adverse impacts for this project area, node B143 was selected to represent the maximum stage of the pond and elevation of roadway inundation. Final elevation and design parameters will be determined in a future analysis effort, in accordance with local regulations for design offsets, landscaping, and other permitting requirements.

Due to limited available space, parcel constraints, and elevation challenges, traditional stormwater conveyance infrastructure is not recommended. Instead, the area is recommended for potential implementation of injection wells. To limit continued discharge from King Tides and sea level rise, barriers such as seawalls may also be considered. Future feasibility studies and cost estimates will be critical for evaluating this project and should be reviewed by the City as part of a broader cost/benefit analysis.

b. Controlling the timing of peak flows to prevent or minimize problems for the entire watershed due to new development, redevelopment, and fully developed conditions.

Differences in runoff from current to future conditions were determined to be minimal based on the available existing conditions and future land use classifications for the Marathon watershed. Existing vacant parcels with a designated land use were conservatively modeled in the existing conditions with the designated current land use in place. Therefore, there was negligible change between the existing land use/future land use classifications leading to no major changes in peak flows from new development, redevelopment, and fully developed conditions.

c. The impact of climate change and sea level rise on fully developed conditions.

Future (fully developed) scenarios account for increased rainfall through a product of SFWMD's rainfall change factors with predicted rainfall depth from NOAA Atlas 14 for Monroe County. As mentioned, the basin maximum stages are primarily a result of sea level rise determined by the coastal boundary condition (set to NOAA's intermediate high projection and NOAA's intermediate high with the addition of King Tides) rather than the rainfall event's intensity, except for a few projects discussed below.

Areas within Marathon identified as immediate closed basins due to lack of hydraulically connected stormwater infrastructure includes properties east of the Airport along 3rd Ave Gulf and the Commercial corridor on the northeast intersection of US-1 and 109th Street Gulf, these areas are particularly vulnerable to impacts of future flood risk, as the increased rainfall depths result in more localized inundation without coastally connected drainage structures for discharge. Proposed stormwater infrastructure for these regions will include stormwater pipe connections from the local low spots to the nearest coastal canals.

Areas determined to be at risk of inundation due to sea level rise include Sombrero Blvd (Project Area 3), Copa de Oro (Project Area 5), and Avenida Primceria (Project Area 4). Sombrero Blvd has historically received significant inundation due to poor hydraulic conductivities in existing stormwater exfiltration systems. This issue is compounded with lack of stormwater connections at low points, especially along the existing berm. Though stormwater conveyance and storage infrastructure were determined to provide some relief up to the 2040 25 year-24 hour NOAA intermediate high projection, these projects may receive greater benefits from stormwater pump injection wells, similar to that along 39th St.

Project Areas 1, 2, 3, 4, and 5 were assessed for the 2025, and 2040, 100-year 24-hour events in addition to the 25-year and lesser rainfall events. Based on the proposed model results, Project Areas 1, 2, and 4 displayed significant reductions in roadway inundation for all 2025 and 2040 NOAA intermediate high scenarios. LOS requirements for Project Areas 1, 2 and 4 are met for all

2025 and 2040 NOAA intermediate high scenarios and associated 25-year 24-hour storm events except the 25-yr 24-hour event for Project Area 2 in which there's a maximum of 13.9 inches of flooding along the low point within the project area. This is primarily attributed to the conservative assumption of no infiltration from saturated conditions. However, Proposed Project Areas 1, 2, and 4 were unable to meet LOS for the 2040 King Tides scenario for the 10Y-24H storm event because of increased tailwater conditions due to sea level rise, preventing positive discharge downstream. All 2070 and 2100 events were determined to adversely affect all proposed project areas by preventing positive drainage resulting from sea level rise and increased tailwater conditions.

d. At least the 25-year rainfall event in fully developed conditions, with a list of possible solutions for addressing at least the 25-year rainfall event.

As mentioned, the basin maximum stages are primarily a result of SLR determined by the coastal boundary condition rather than the rainfall event's intensity. Project Areas 1, 2, and 4 were assessed for the 2025, and 2040, 100-yr 24-hr events in addition to the 25-year and lesser rainfall events.

Since most basins in Marathon openly discharge towards the coast via overland flow, the intensity of the storm event does not induce flooding to the same extent as sea level rise. The 25-year rainfall event was primarily determined to adversely affect closed basins, particularly Project Areas 1 and 2, within the Uptown district of Marathon, east of the airport.

To address these flooding concerns, temporary storage solutions in the form of stormwater drainage structures and pipe connections that discharge across a future easement would provide hydraulic relief for Project Area 4 which is currently not known to be hydraulically connected to an outfall. Additional information on cost estimates for Project Area 4 are displayed in **Table 26** with aerial schematics on **Figures 46-55.**

Similarly for Project Areas 1 and 2, hydraulically connecting the low points across future easements and/or vacant lots would sufficiently meet LOS requirements for the 10-year 24-hour event at a minimum. Additional information on cost estimates for Project Area 1 and 2 are displayed in **Tables 26 and 27** with aerial schematics on **Figures 24-42.**

e. At least one event larger than the 25-year rainfall event, with a list of possible solutions for addressing this event.

As mentioned, the basin maximum stages are primarily a result of sea level rise determined by the boundary condition rather than the rainfall event's intensity. Project Areas 1, 2, 3, and 5 were assessed for the 2025, and 2040, 100-yr 24-hr events in addition to the 25-year and lesser rainfall events.

Similarly, to part C, the solutions for Project Areas 1 and 2 sufficiently address roadway LOS requirements up to the 2040 10-yr 24-hr event using the King Tides projection. For project areas impacted by sea level rise, alternative solutions such as raising roadway elevations and pumping/deep well injection solutions may be required for scenarios beyond 2040.

f. Ensuring that flood hazards from the 10-year and the 25-year events are not increased by future development (the 2-year storm is also recommended).

Land use for future development is currently incorporated within existing conditions based on the Future land use database provided by the City of Marathon. Proposed Project Areas 1 and 2 were determined to not increase flood hazards for existing and future development as maximum stages for the respective project basins were decreased or maintained for all 10-year storm events along with the 2-year storm (denoted by mean annual 24-hour storm in resulting tables and figures). Proposed projects in Project Areas 3 and 5 resulted in no noticeable differences in maximum stages due to potential backflow from their respective outfalls for select King Tides projections.

Engineer's Estimate of Construction Costs

The combined estimated cost of construction for the projects within the Project Areas are approximately $963,000, $1,142,000, and $601,000 respectively for Project Areas 1, 2, and 4 (**Tables 26-28**), including the base cost of property acquisition. These totals do not include costs associated with addressing utility adjustments/conflicts. In summary, the proposed improvements for the greatest value projects include the following:

- Addition of stormwater drainage infrastructure adjacent to Avenida Primceria, including on parcel 00353990-000000.
- Connection of stormwater inlets along 3rd Ave Gulf prior to discharging across Parcel 00335500-000000 for Project Area 1.
- Addition and connection of stormwater inlets within the Project Area 2 commercial parking lot to the coastal outfall across Parcel 00335630-000000.

Though proposed Project Area 1 satisfies the LOS requirements for the 10-year, 24-hour storm, challenges in obtaining utility easements may result in additional costs not accounted for in the cost projections for Project Area 1. Despite higher initial total cost estimates, the greater reduction in flood depth, along with easier access for utility installation, results in a higher recommendation rating for this project (**Tables 25–28**).

Table 25 - Summary of Engineer's Opinion of Construction Costs

Project	Summary of project	Total Costs	Ranking w/ lowest number corresponding to most desired)
Project 1	Includes connection of storm water inlets along 3rd Ave Gulf prior to discharging across Parcel 00335500-000000	$963,000	3
Project 2	Includes the addition and connection of stormwater inlets along 1st Ave Gulf prior to discharging across Parcel 00335630-000000	$1,142,000	2
Project 3	May include additional roadway raising efforts, additional injection wells, and stormwater inlet connections	TBD	TBD from future efforts
Project 4	Includes stormwater drainage infrastructure adjacent to Avenida Primceria on parcel 00353990-000000	$601,000	1
Project 5	May include the addition of a wet detention facility and associated stormwater injection well	TBD	TBD from future efforts

Proposed pump/injection well station costs for Project Areas 3 and 5 would require a material take-off based on existing supplier quotes on major equipment such as pumps, drivers, switchgear, instrumentation, labor costs, etc. An approximate cost for a pump station would be $1500 per horsepower (HP) based on *E. Shahsi Menon's in Transmission Pipeline Calculations and Simulations Manual, 2015*. This approximation would account for all material, labor, and equipment costs based on historical data. Additional future efforts for feasibility of these options shall be considered by the City and their respective engineering team.

Table 26 - Engineer's Opinion of Construction Cost for Project 1

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	2615	$31,585.17
Grading	CY	$2.41	498	$1,199.18
Compaction	CCY	$2.52	622	$1,567.40
Hauling	LCY	$6.30	2823	$17,783.47
Silt Fence	LF	$2.60	2708	$7,029.97
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0	$732.50
Sod	SY	$4.40	747	$3,288.76
Water Truck	HR	$75.80	10	$758.00
24" x 38" RCP	LF	$447.68	864	$386,795.52
Bedding Stone	CY	$172.17	43	$7,345.92
Geotextile Fabric	SY	$2.37	512	$1,210.88
FDOT Type H Inlet	EA	$10,990.00	1	$10,990.00
FDOT Concrete Endwall	EA	$3,300.00	2	$6,600.00
Roadway Demolition	SY	$4.47	576	$2,572.73
Roadway Base	SY	$21.41	576	$12,322.64
Asphalt Pavement	TN	$147.90	7	$1,064.06
Stabilized Subgrade	SY	$7.44	576	$4,282.13
Real Estate/Easement	EA	$3.00	1100	$3,300.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$50,205.88	1	$50,205.88
Construction Surveys	EA	$50,205.88	1	$50,205.88
Design and Permitting	EA	$100,411.77	1	$100,411.77
		SUB-TOTAL		**$713,682.38**
		Contingency Concept Level - 35%		**$249,788.83**
		TOTAL		**$963,471.22**

Table 27 - Engineer's Opinion of Construction Cost for Project 2

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	2829	$34,168.28
Grading	CY	$2.41	658	$1,585.71
Compaction	CCY	$2.52	822	$2,072.60
Hauling	LCY	$6.30	2894	$18,232.45
Silt Fence	LF	$2.60	3296	$8,556.42
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	0.03	$147.73
Sod	SY	$4.40	151	$663.26
Water Truck	HR	$75.80	10	$758.00
24" x 38" RCP	LF	$447.68	1158.0	$518,413.44
Bedding Stone	CY	$172.17	57	$9,845.57
Geotextile Fabric	SY	$2.37	686	$1,622.92
FDOT Concrete Endwall	EA	$3,300.00	2	$6,600.00
FDOT Type H Inlet	EA	$10,990.00	2	$21,980.00
Roadway Demolition	SY	$4.47	870	$3,889.73
Roadway Base	SY	$21.41	870	$18,630.66
Asphalt Pavement	TN	$147.90	10.9	$1,608.75
Stabilized Subgrade	SY	$7.44	870	$6,474.18
Easement Area	SF	$3	2200	$6,600
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$52,814.42	1	$52,814.42
Construction Surveys	EA	$52,814.42	1	$52,814.42
Design and Permitting	EA	$66,018.02	1	$66,018.02
		SUB-TOTAL		**$845,927.07**
		Contingency Concept Level - 35%		**$296,074.47**
		TOTAL		**$1,142,001.54**

Table 28 - Engineer's Opinion of Construction Cost for Project 4

Line	Unit	Price	Quantity	Total Cost
Excavation	CY	$12.08	2138	$25,831.07
Grading	CY	$2.41	138	$333.39
Compaction	CCY	$2.52	173	$435.76
Hauling	LCY	$6.30	2667	$16,799.98

Line	Unit	Price	Quantity	Total Cost
Silt Fence	LF	$2.60	1420	$3,686.32
Soil Tracking Prevention Device	EA	$4,680.51	1	$4,680.51
NPDES Fee	EA	$250.00	1	$250.00
Clear and Grub Area	AC	$4,743.20	1.06	$5,008.89
Sod	SY	$4.40	5111	$22,488.89
Water Truck	HR	$75.80	10	$758.00
24" x 38" RCP	LF	$447.68	220.0	$98,489.60
Bedding Stone	CY	$172.17	11	$1,870.49
Geotextile Fabric	SY	$2.37	130	$308.33
FDOT Type H Inlet	EA	$10,990.00	2	$21,980.00
FDOT Concrete Endwall	EA	$3,300.00	2	$6,600.00
Roadway Demolition	SY	$4.47	34	$153.14
Roadway Base	SY	$21.41	34	$733.49
Asphalt Pavement	TN	$147.90	0.4	$63.34
Stabilized Subgrade	SY	$7.44	34	$254.89
Property and Parcel 00353990-000000	EA	$135,945.00	1	$135,945.00
Easement Area	SF	3	2200	$6,600.00
Maintenance of Traffic	EA	$7,500.00	1	$7,500.00
Mobilization and Demobilization	EA	$21,072.61	1	$21,072.61
Construction Surveys	EA	$21,072.61	1	$21,072.61
Design and Permitting	EA	$42,145.21	1	$42,145.21
		SUB-TOTAL		**$445,061.50**
		Contingency Concept Level - 35%		**$155,771.52**
		TOTAL		**$600,833.02**

The implementation of projects in Project Areas 1 and 2 will require installation of new storm sewer and drainage structures, associated excavation and grading, and roadway demolition and repair.

Figure 2 - Location Map

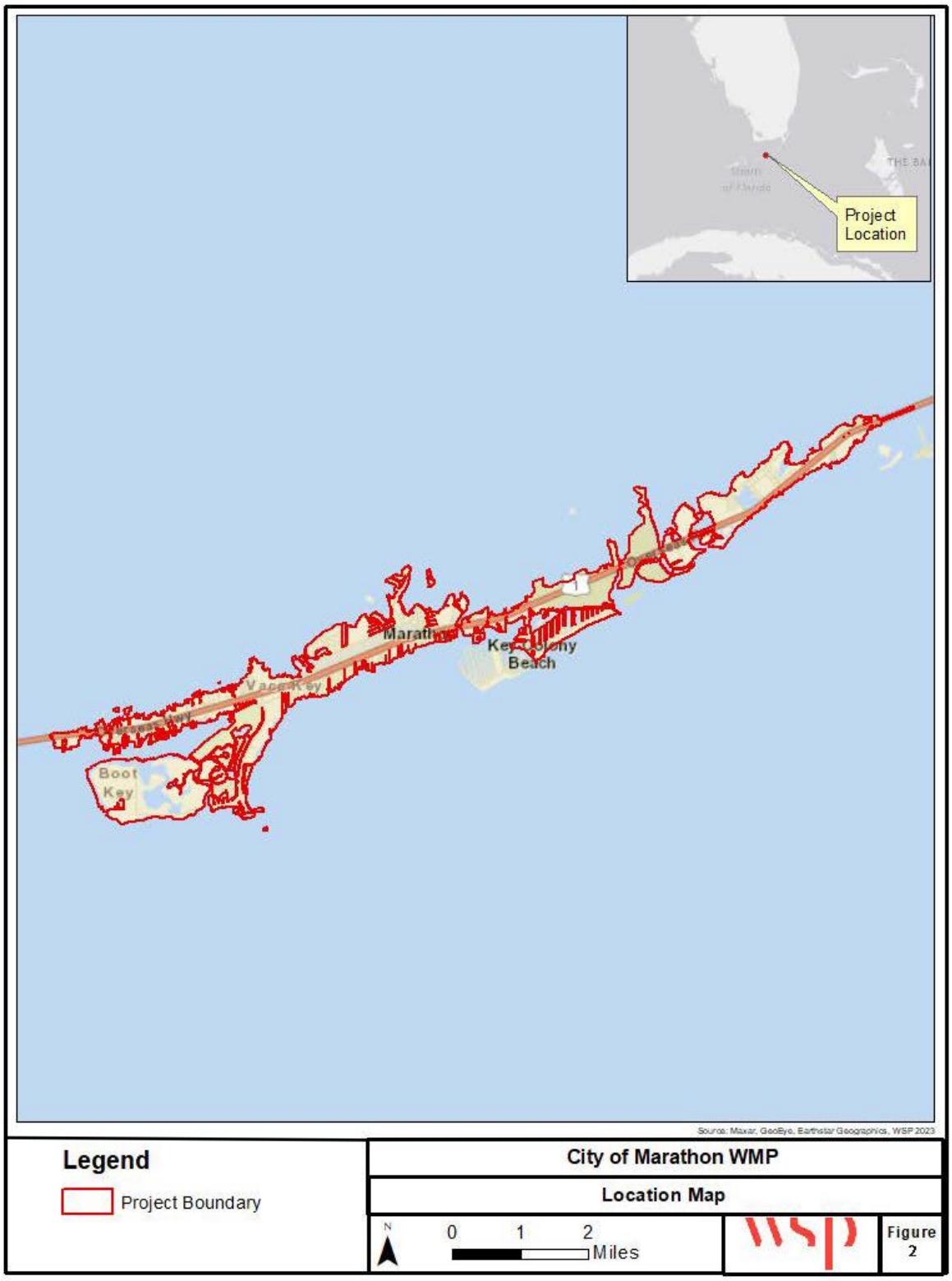


Figure 3 - LiDAR Topography Map - Gateway and Uptown District

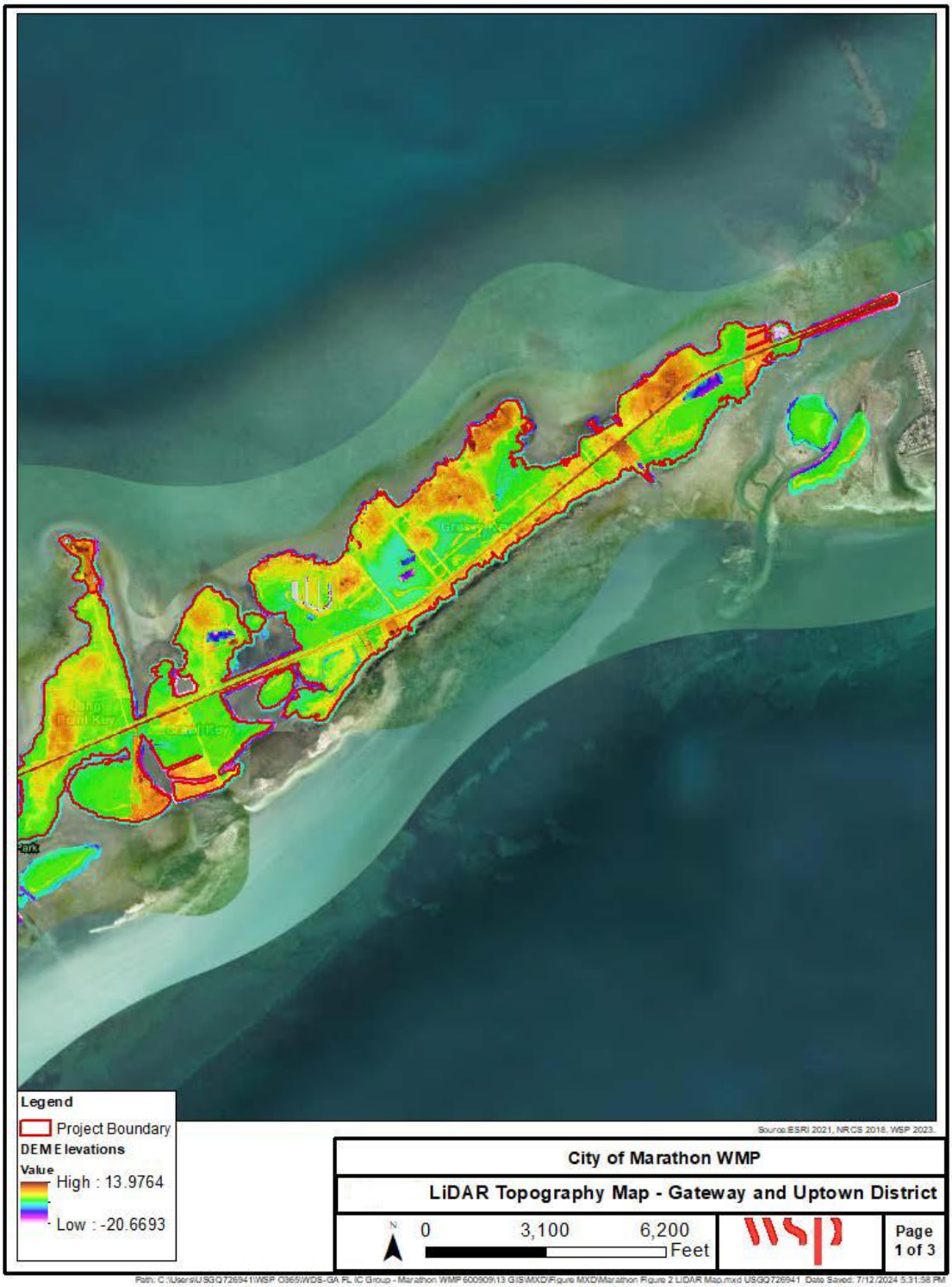


Figure 4 - LiDAR Topography Map - Airport District



Figure 5 - LiDAR Topography Map - Midtown and Oldtown District

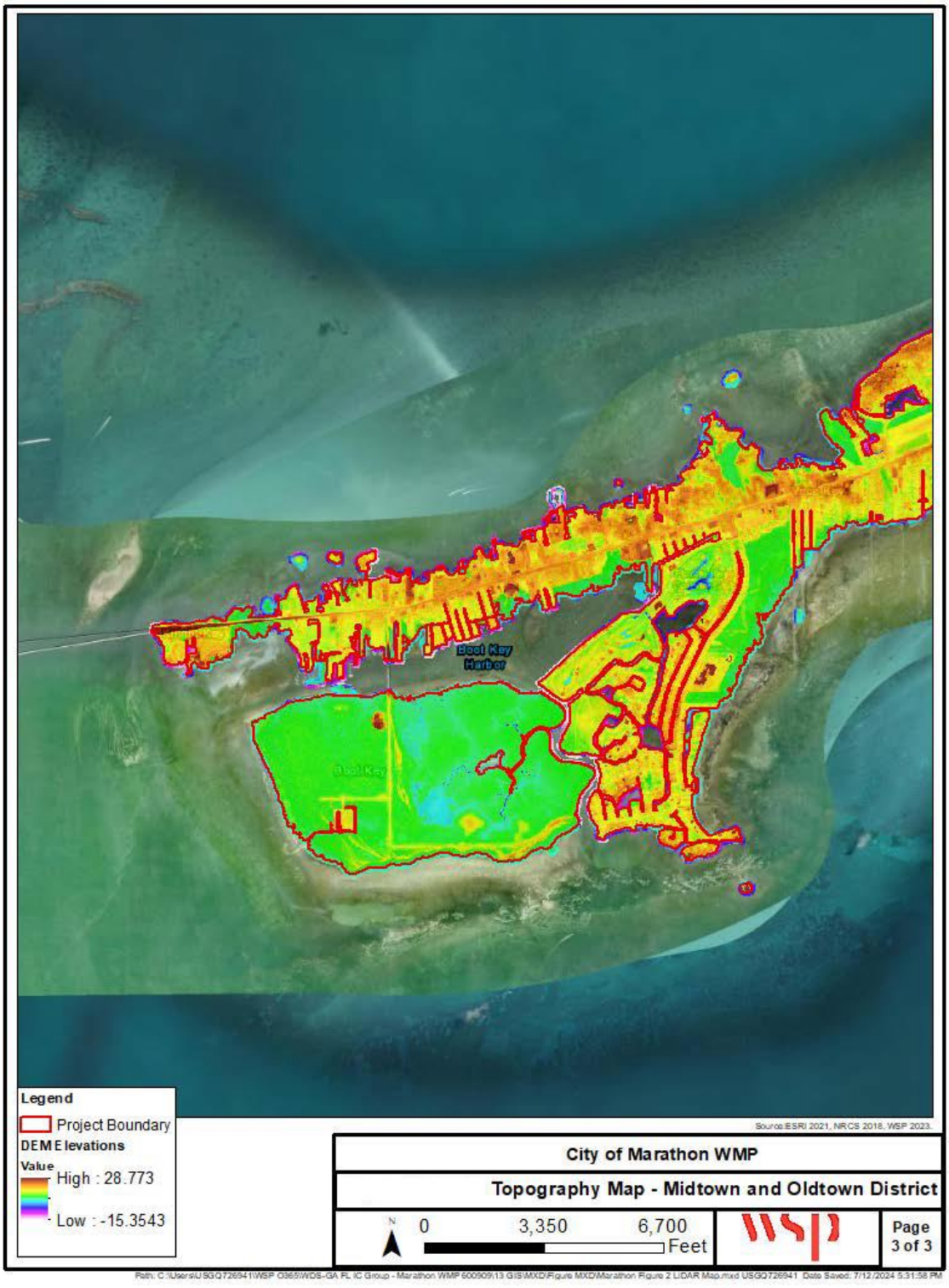


Figure 6 - NRCS Soils Map - Gateway and Uptown District



Figure 7 - NRCS Soils Map - Airport District



Figure 8 - NRCS Soils Map - Midtown and Oldtown District

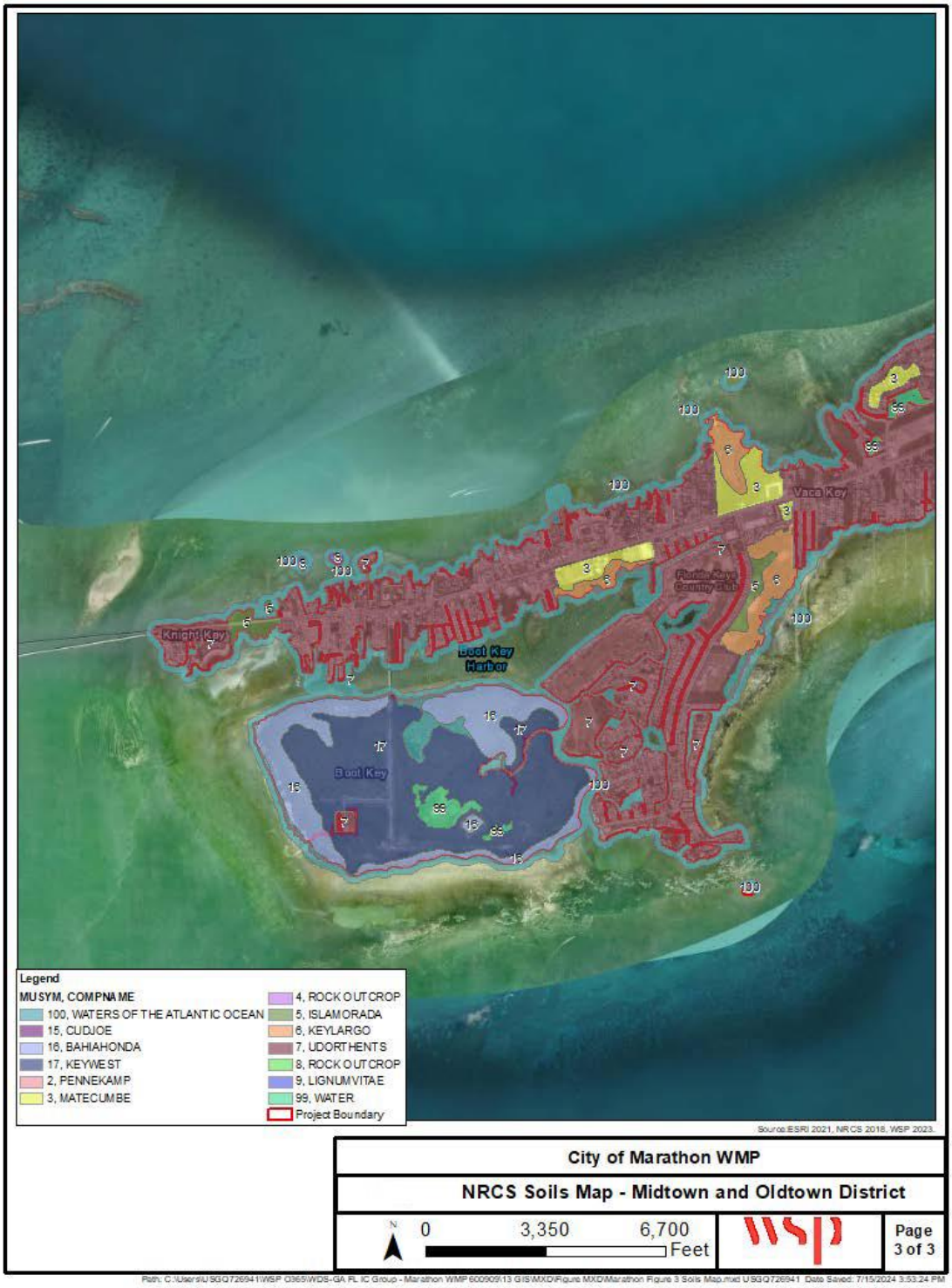


Figure 9 - Future Land Use (FLUM) Map - Gateway and Uptown District



Figure 10 - Future Land Use (FLUM) Map - Airport District



Figure 11 - Future Land Use (FLUM) Map - Midtown and Oldtown District



Figure 12 - Basin Map - Gateway and Uptown District



Figure 13 - Basin Map - Airport District



Figure 14 - Basin Map - Midtown and Oldtown District



Figure 15 - ICPR Model Node-Link Schematic - Gateway and Uptown District



Figure 16 - ICPR Model Node-Link Schematic - Airport District

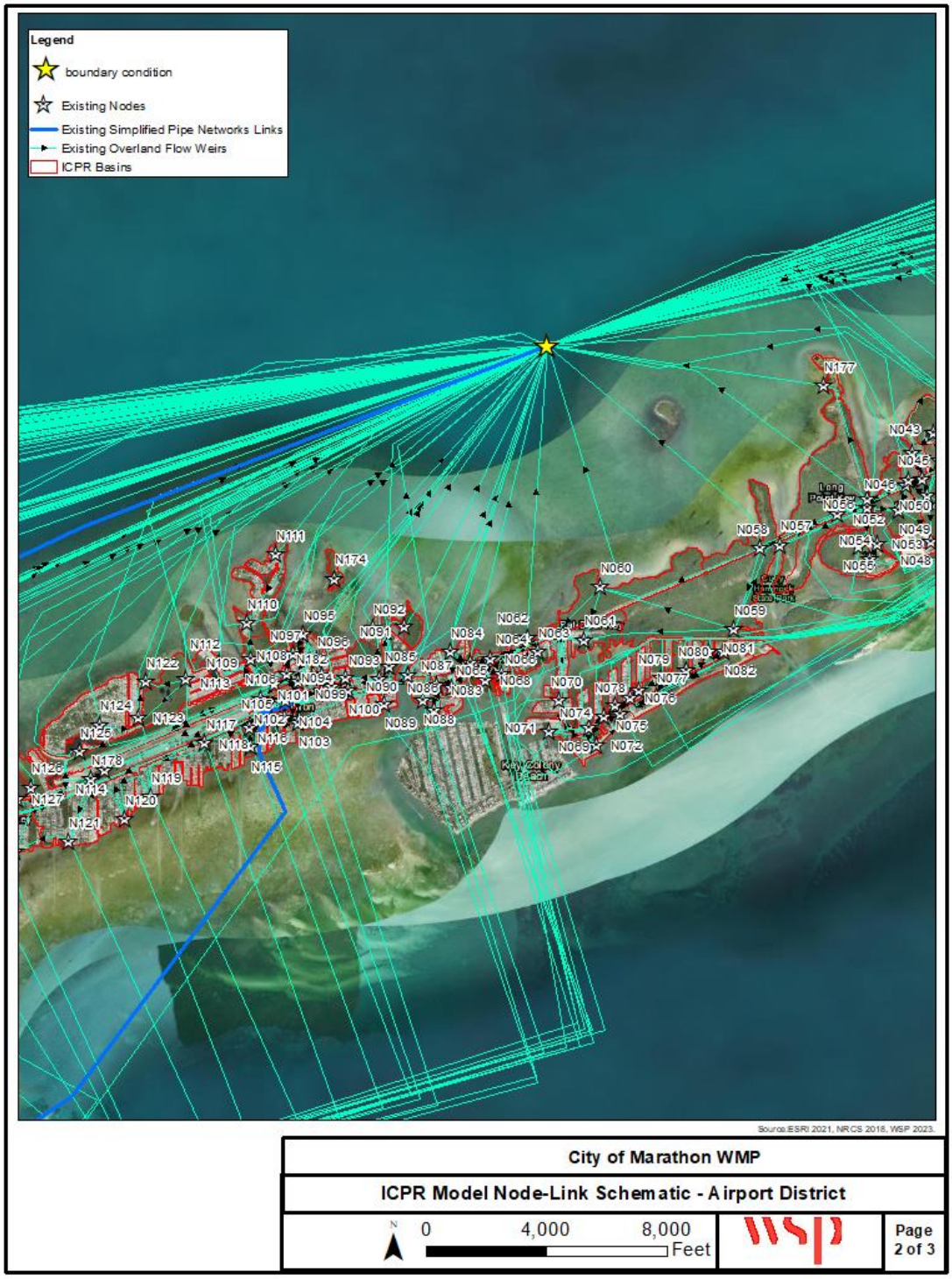


Figure 17 – ICPR Model Node-Link Schematic - Midtown and Oldtown District



Figure 18 - NOAA Intermediate-High 25Y Inundation Map - Gateway and Uptown District



Figure 19 - NOAA Intermediate-High 25Y Inundation Map - Airport District



Figure 20 - NOAA Intermediate-High 25Y Inundation Map - Midtown and Oldtown District

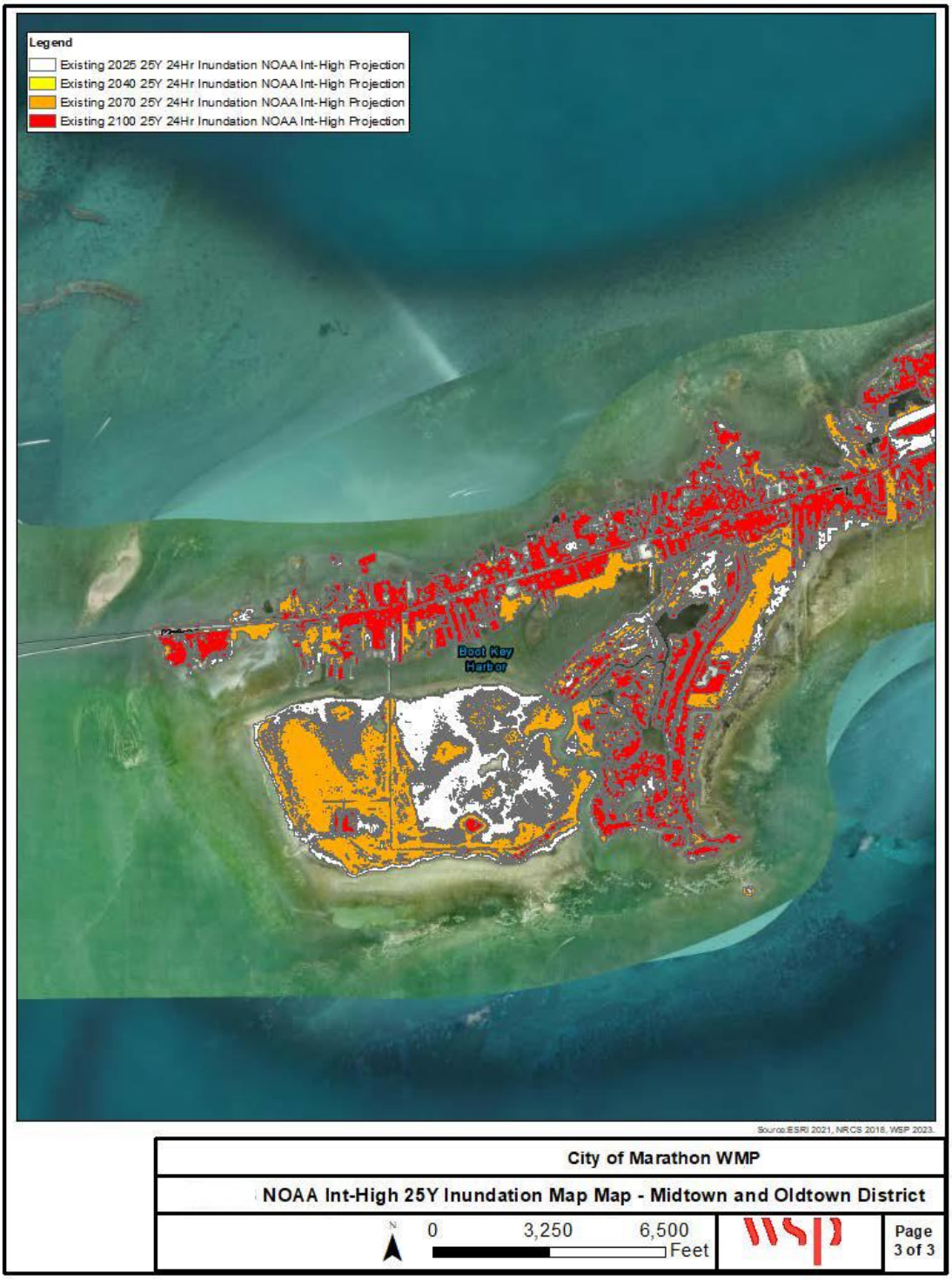


Figure 21 - King Tides 25Y Inundation Map - Gateway and Uptown District



Figure 22 - King Tides 25Y Inundation Map - Airport District



Figure 23 - King Tides 25Y Inundation Map - Midtown and Oldtown District

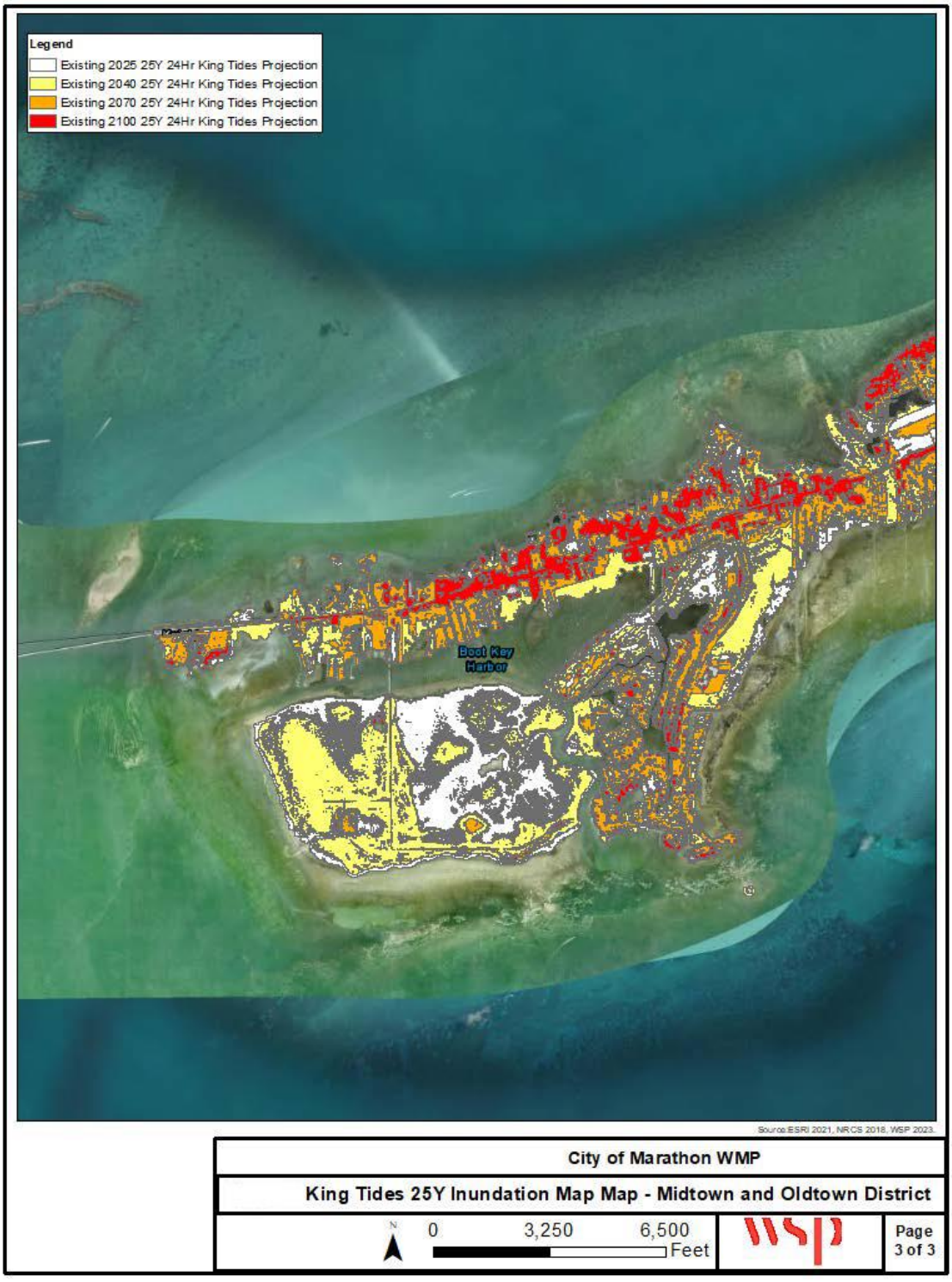


Figure 24 - Project 1 - Existing Conditions 2040 NOAA-Int High Projection Inundation

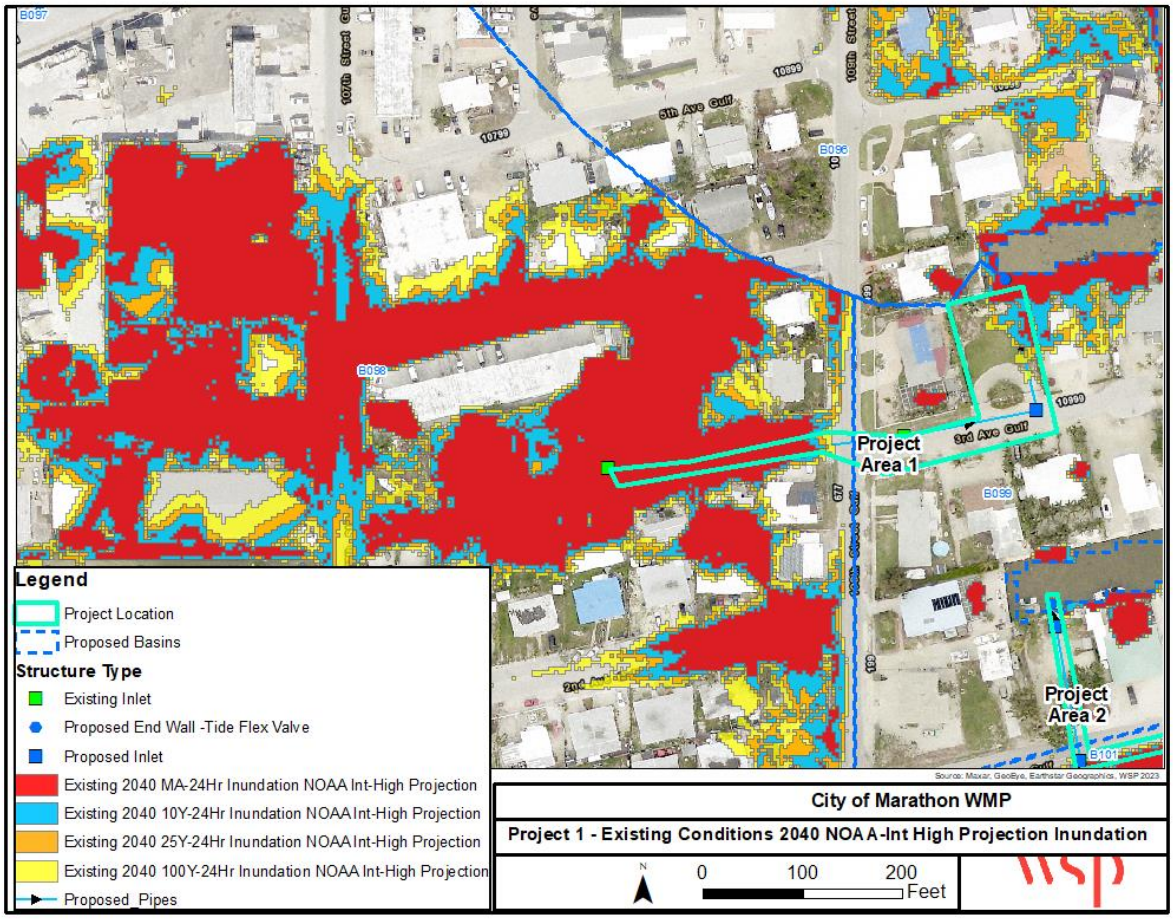


Figure 25 - Project 1 - 2040 25Y-24H Inundation Comparison: NOAA Intermediate-High Projection

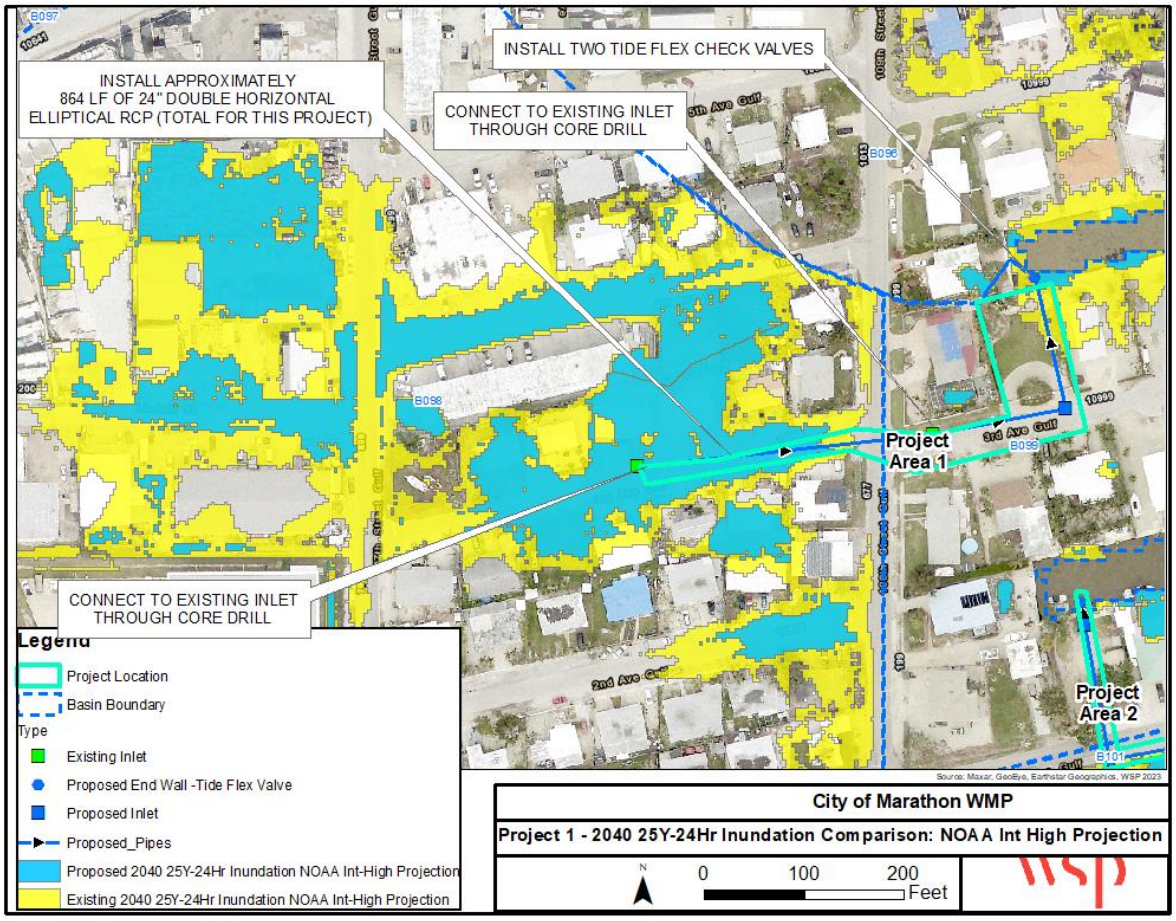


Figure 26 - Project 1 - 2040 MA-24H Inundation Comparison: NOAA Intermediate-High Projection

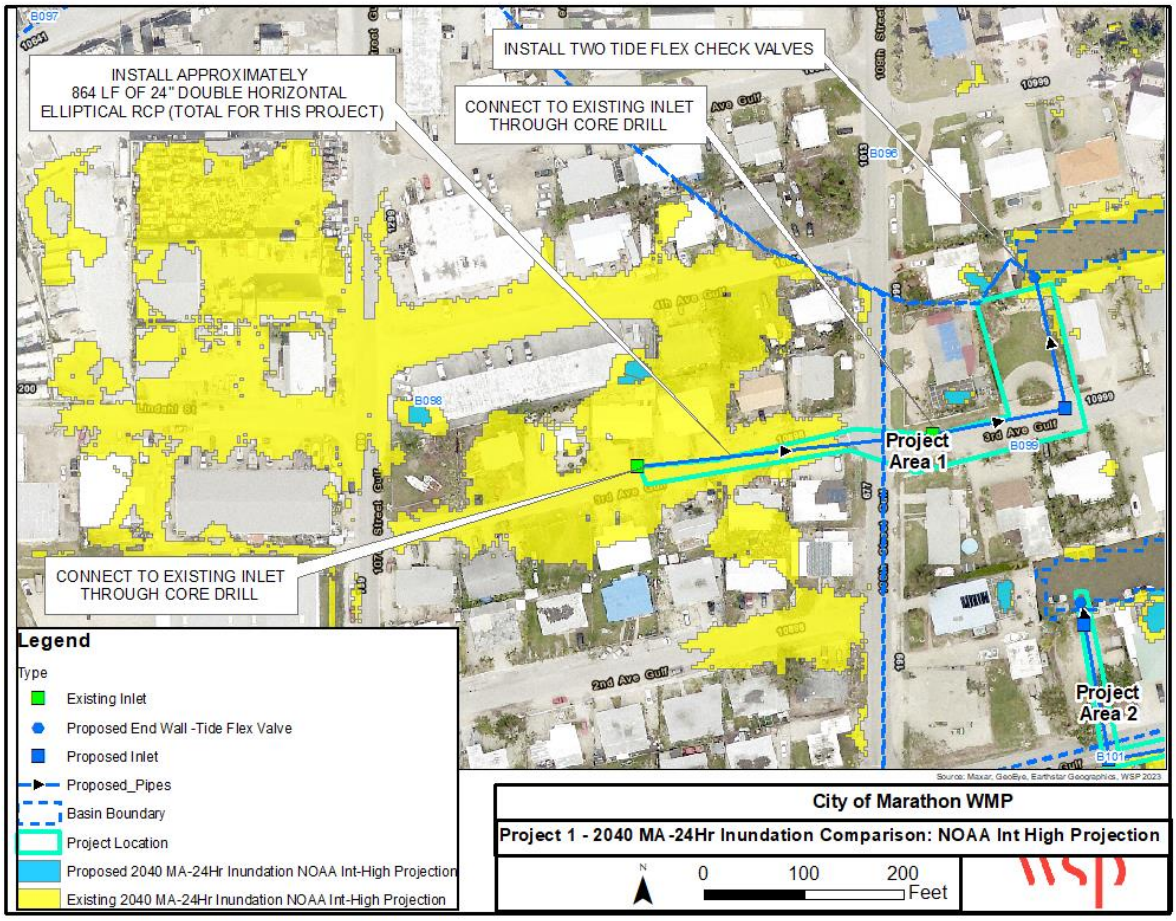


Figure 27 - Project 1 - 2040 10Y-24H Inundation Comparison: NOAA Intermediate-High Projection

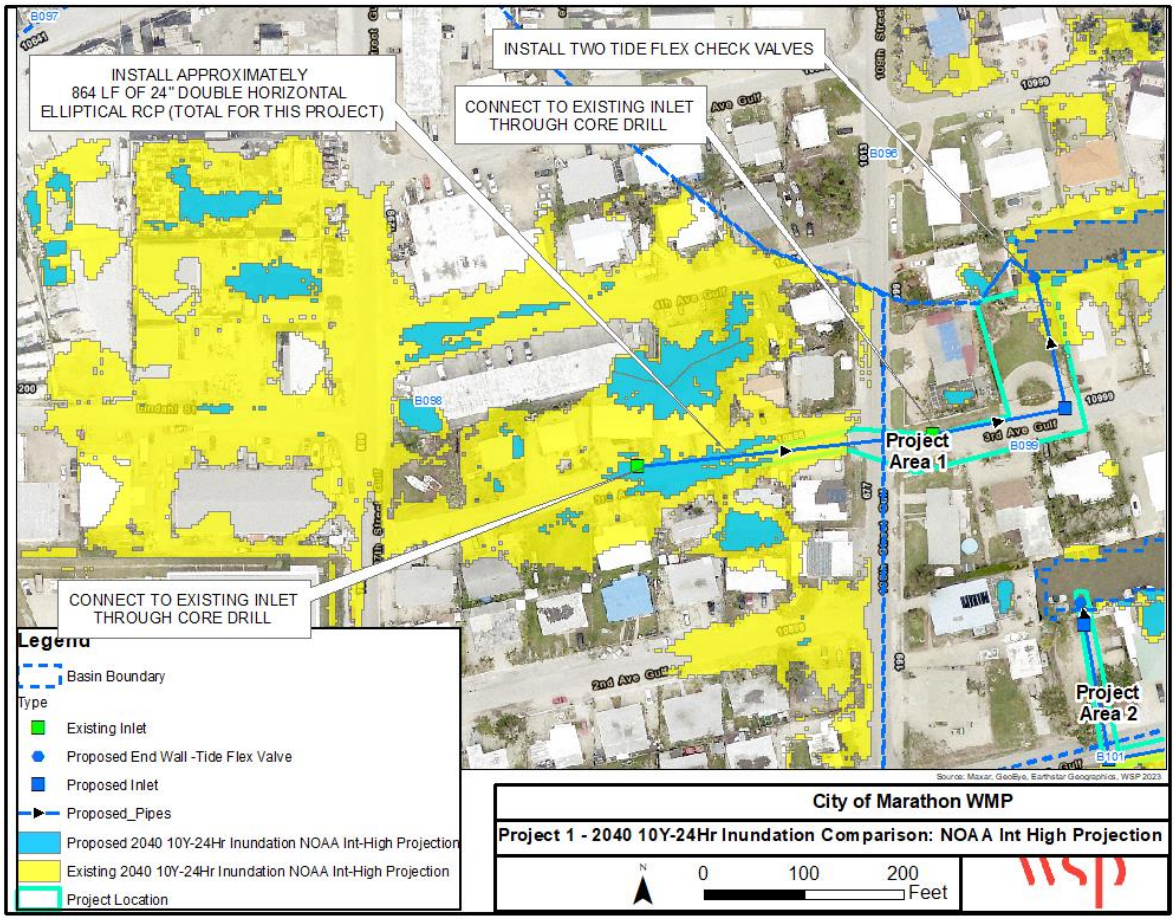


Figure 28 - Project 1 - 2040 100Y-24H Inundation Comparison: NOAA Intermediate-High Projection

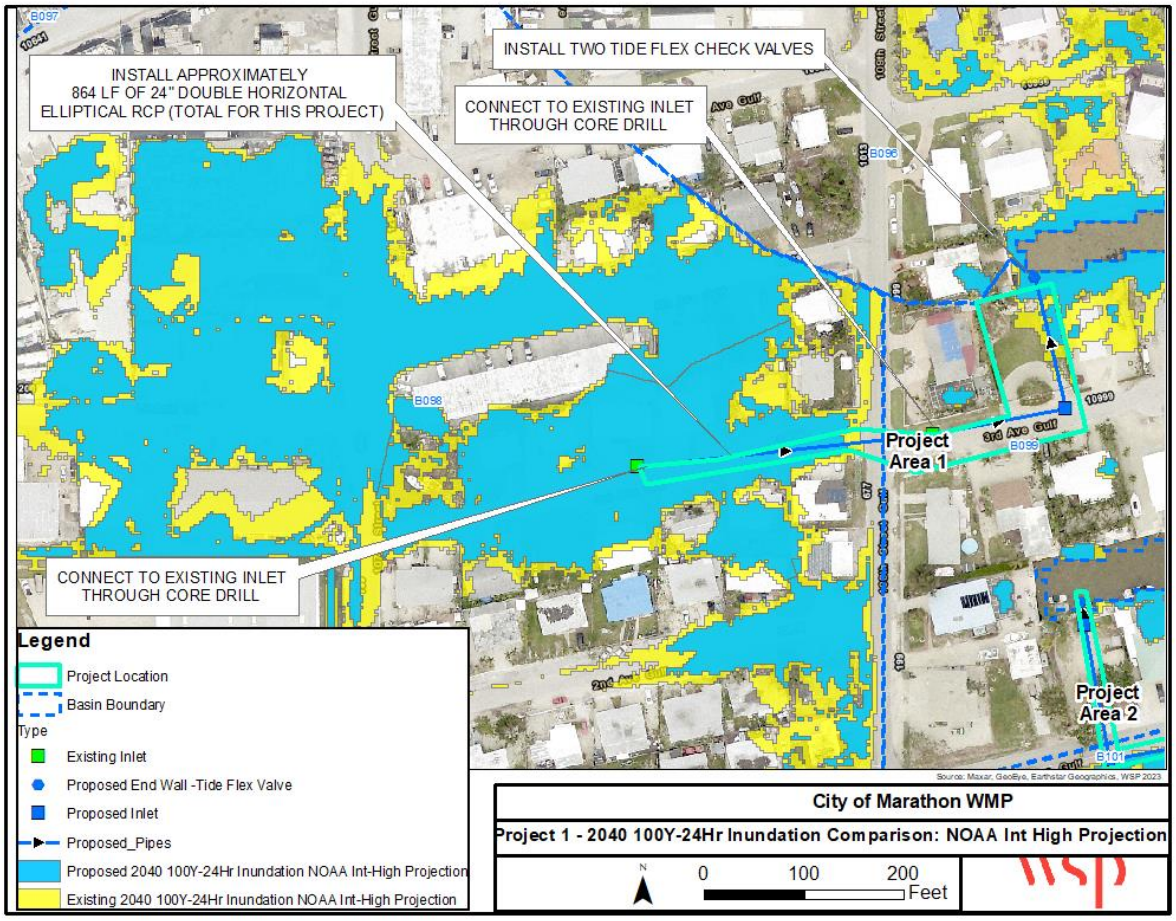


Figure 29 - Project 1 - Proposed 2040 Inundation: NOAA Intermediate-High Projection

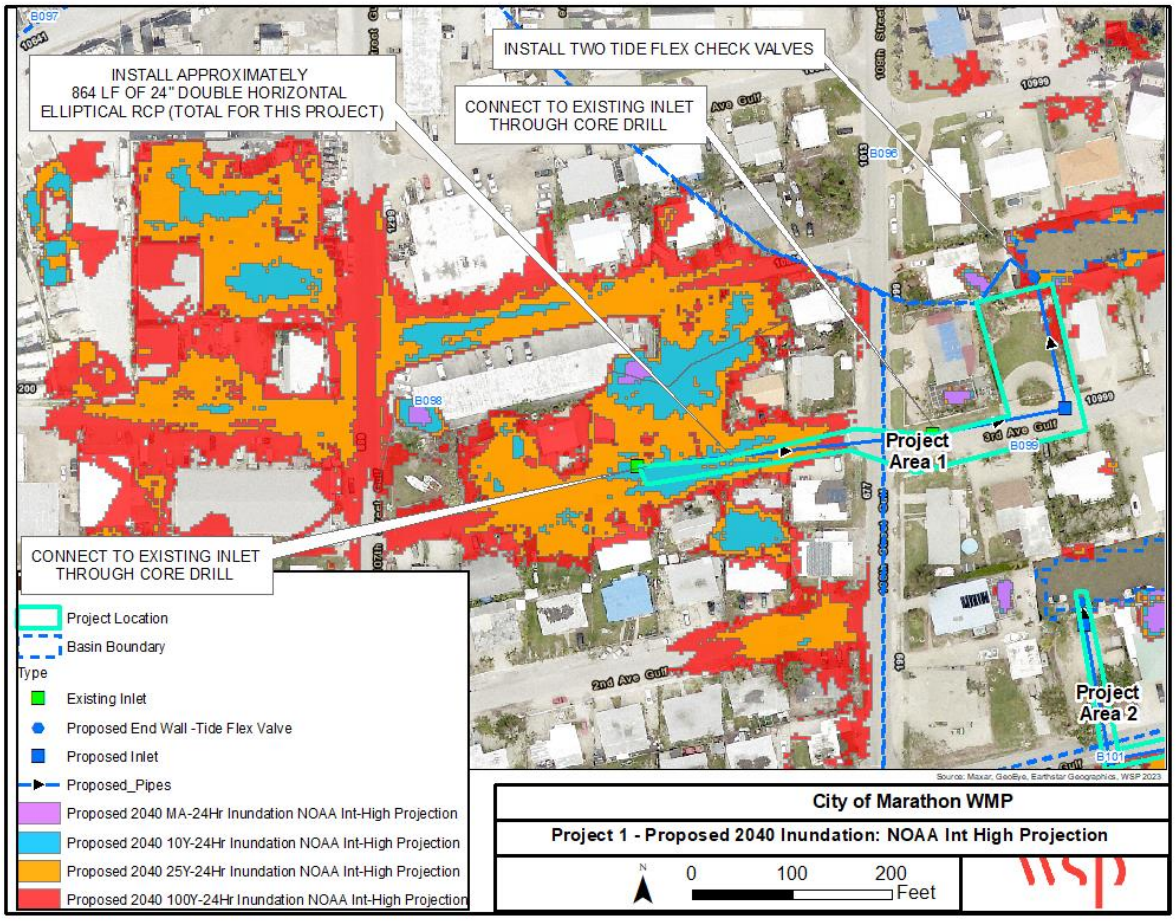


Figure 30 - Project 1 - Proposed 2025 Inundation: NOAA Intermediate-High Projection

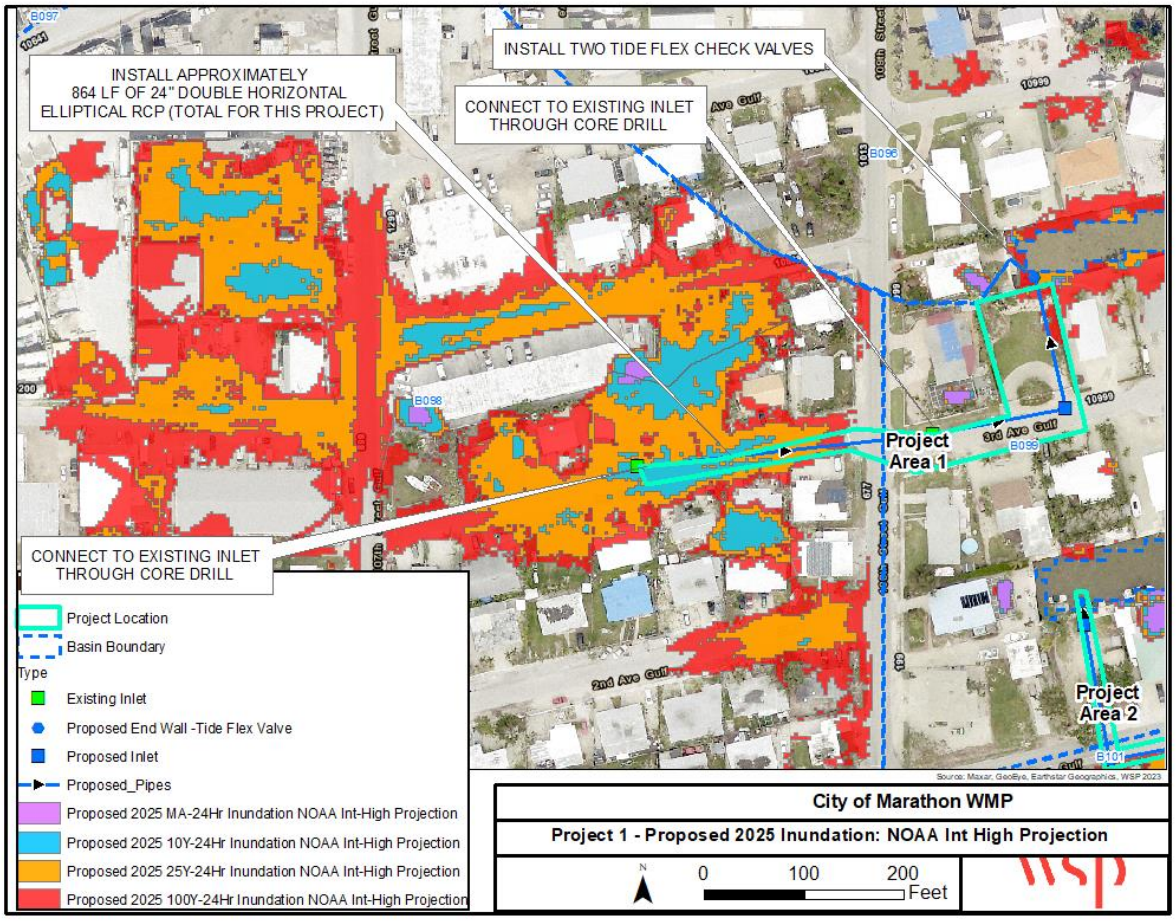


Figure 31 - Project 1 - Proposed 2025 Inundation: King Tides Projection

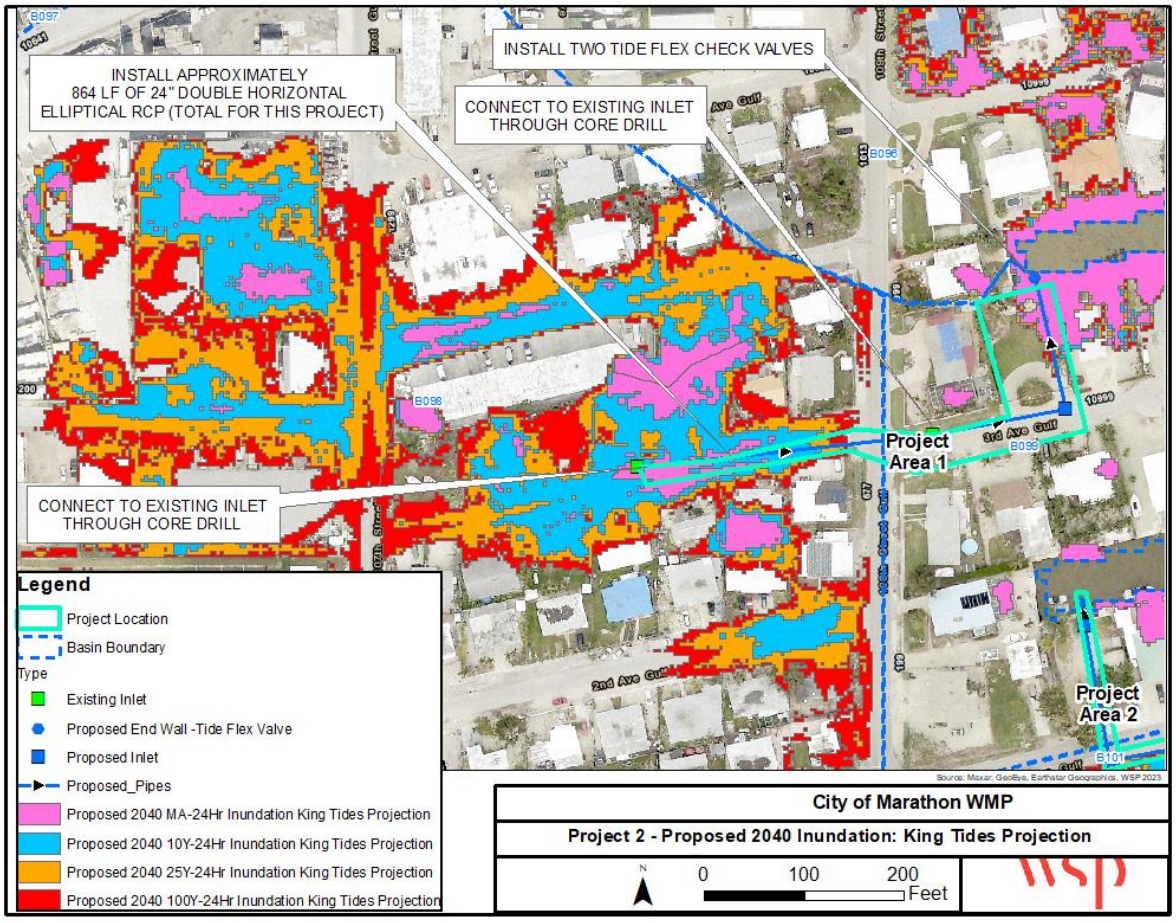


Figure 32 - Project 1 - Proposed 2040 Inundation: King Tides Projection

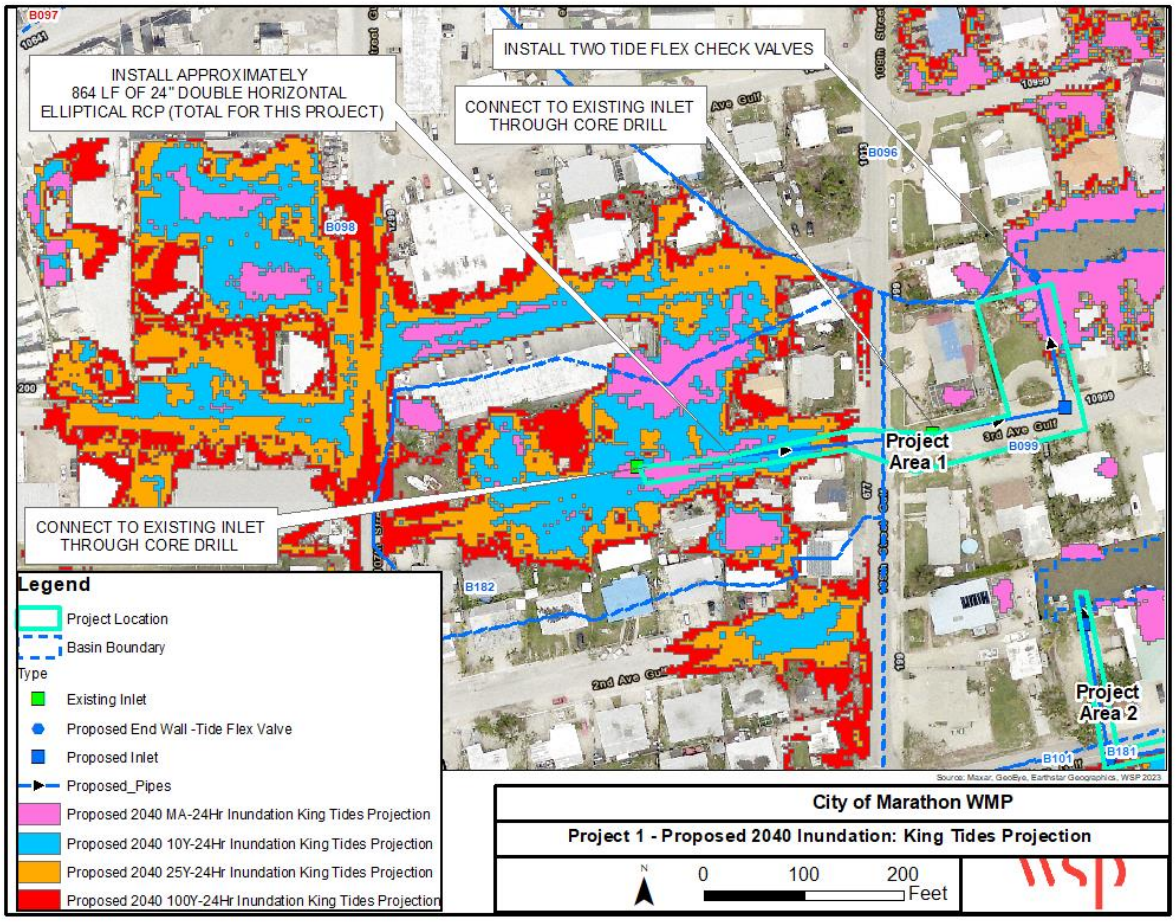


Figure 33 - Project 1 - LiDAR Map

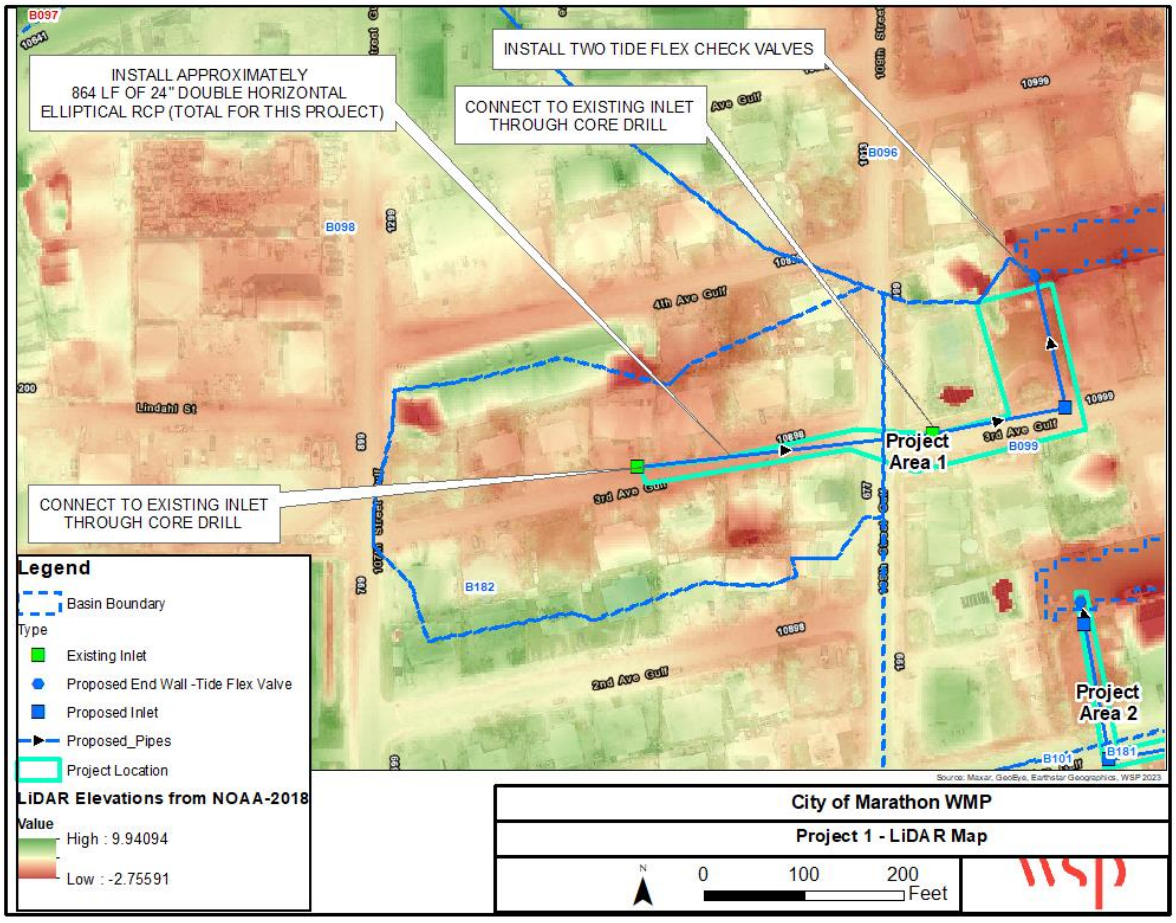


Figure 34 - Project 2 - Existing Conditions 25Y-24H Inundation

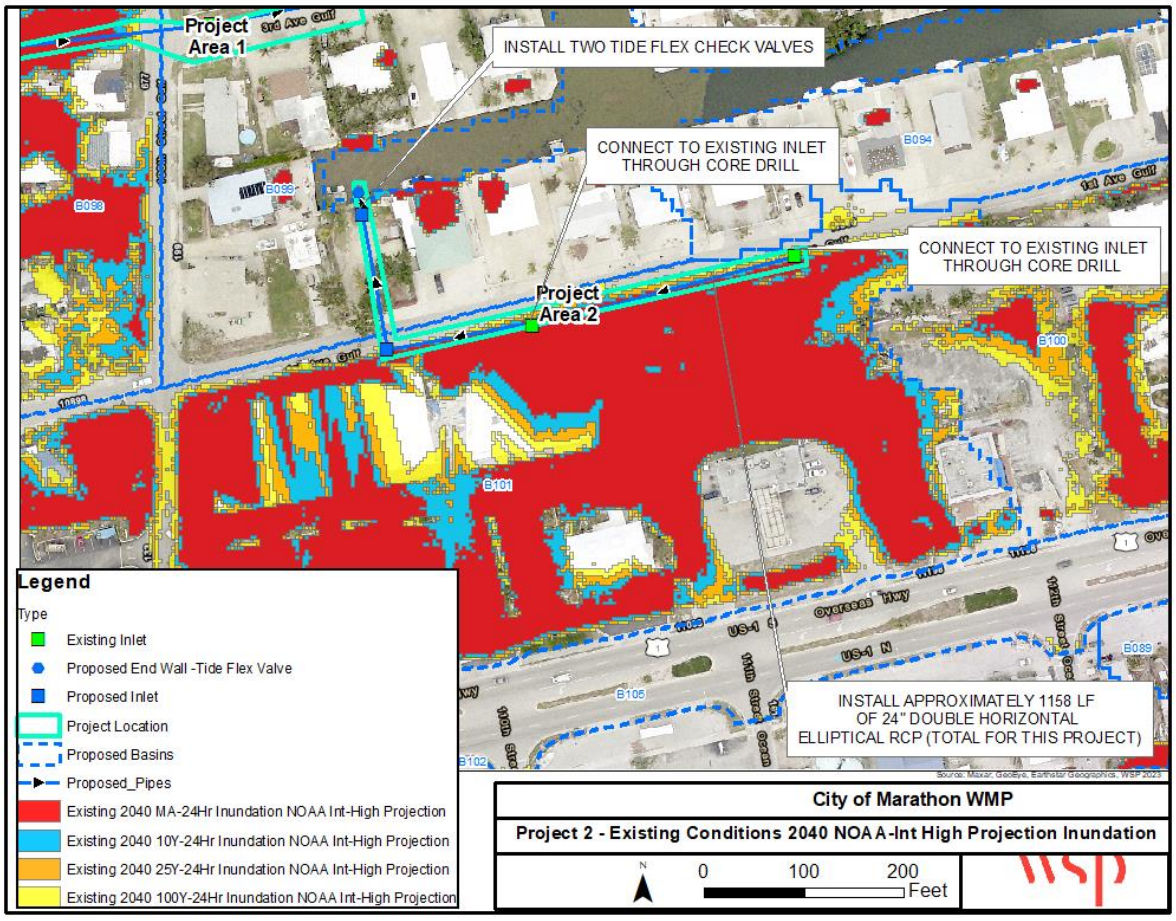


Figure 35 - Project 2 - 2040 25Y-24H Inundation Comparison: NOAA Intermediate-High Projection

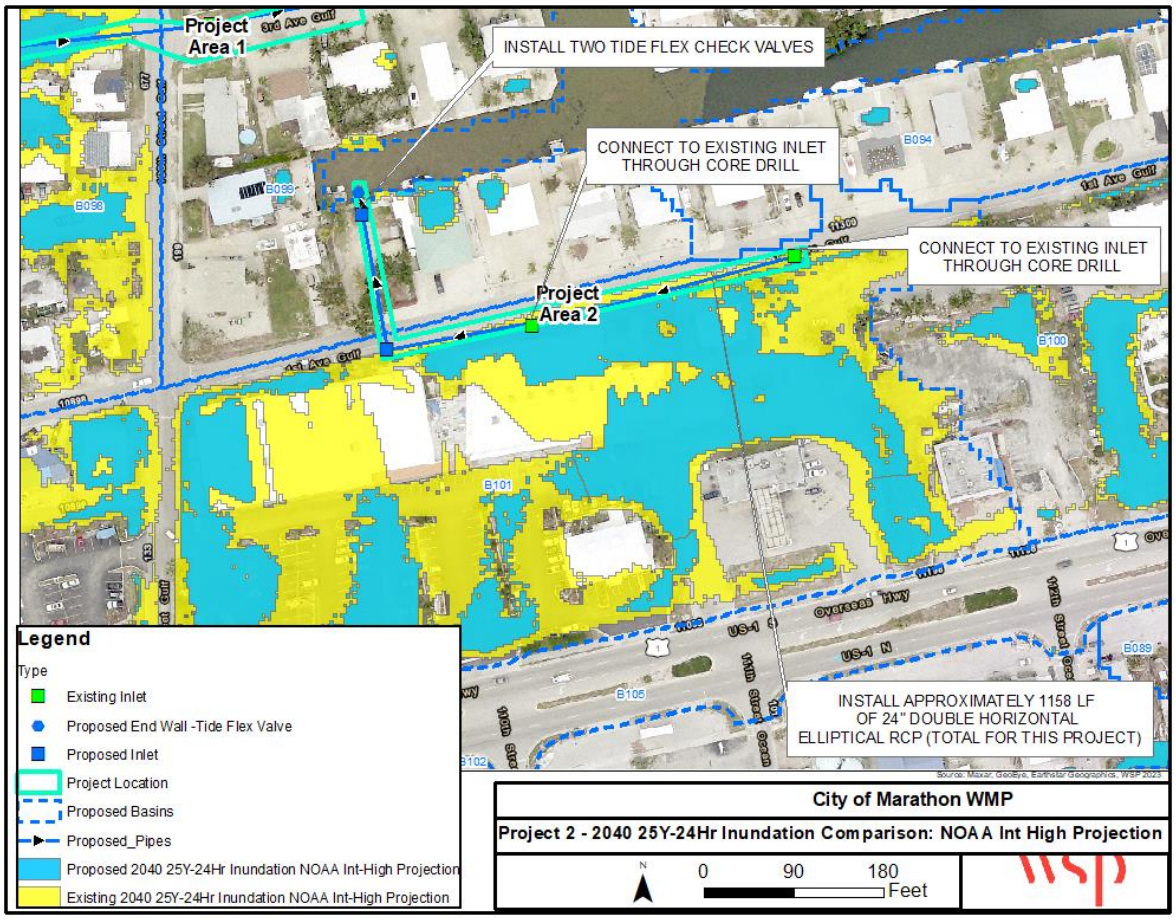


Figure 36 - Project 2 - MA-24H Inundation Comparison: NOAA Intermediate-High Projection

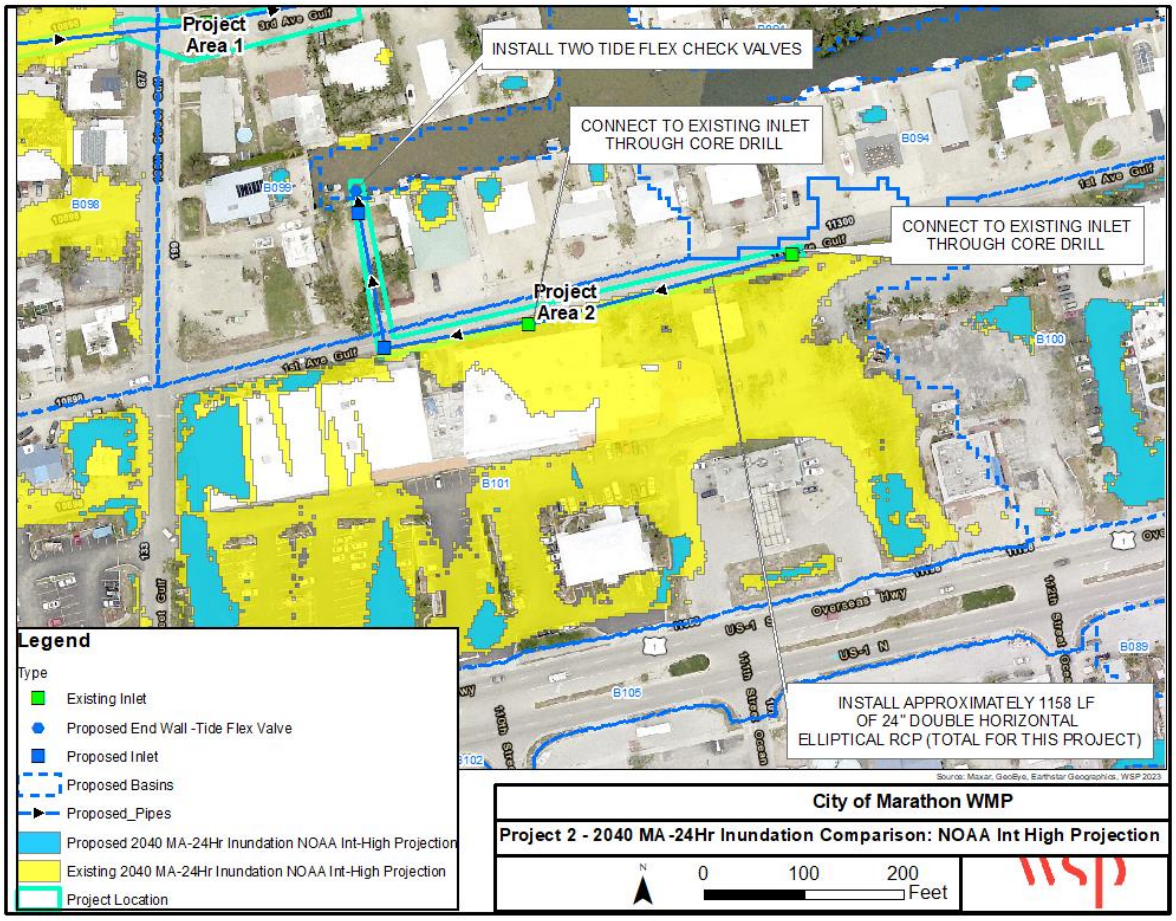


Figure 37 - Project 2 - 2040 10Y-24H Inundation Comparison: NOAA Intermediate-High Projection

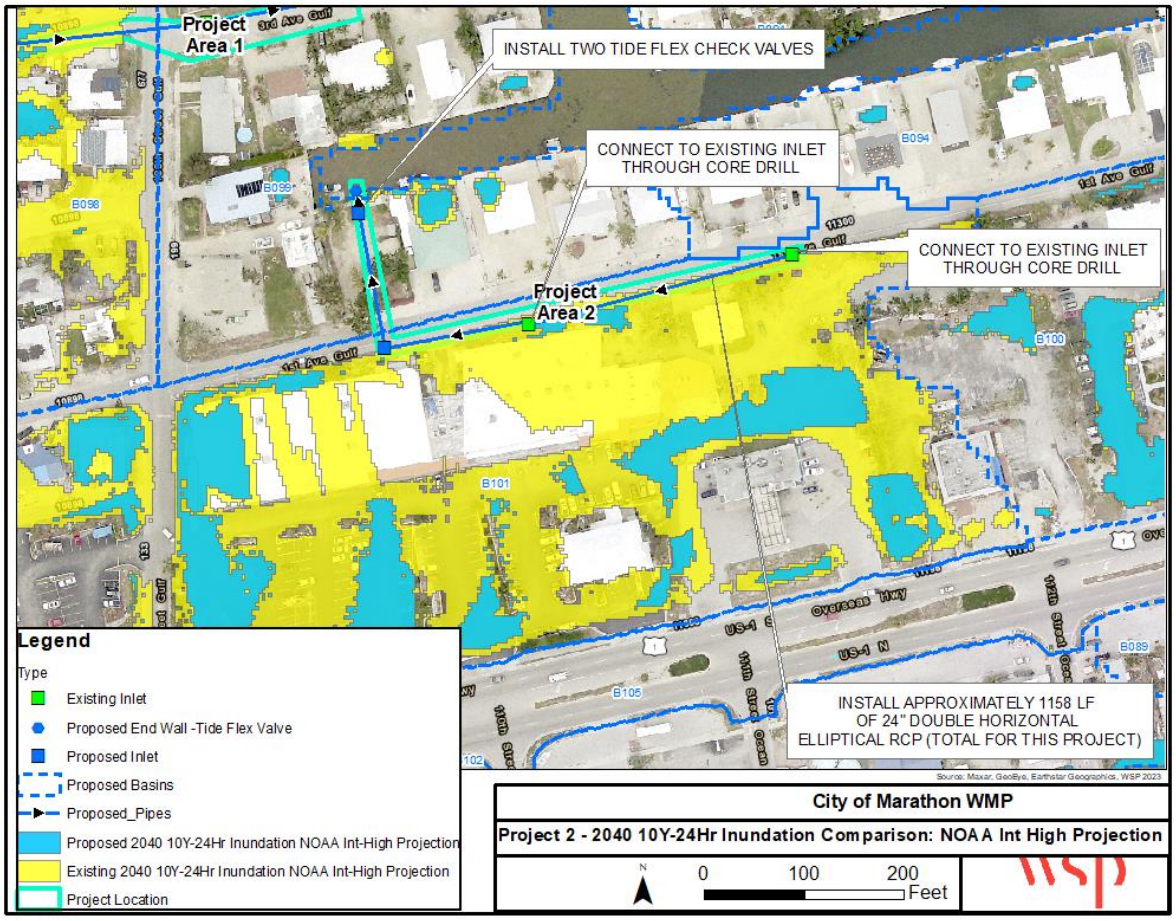


Figure 38 - Project 2 - 2040 100Y-24H Inundation Comparison: NOAA Intermediate-High Projection

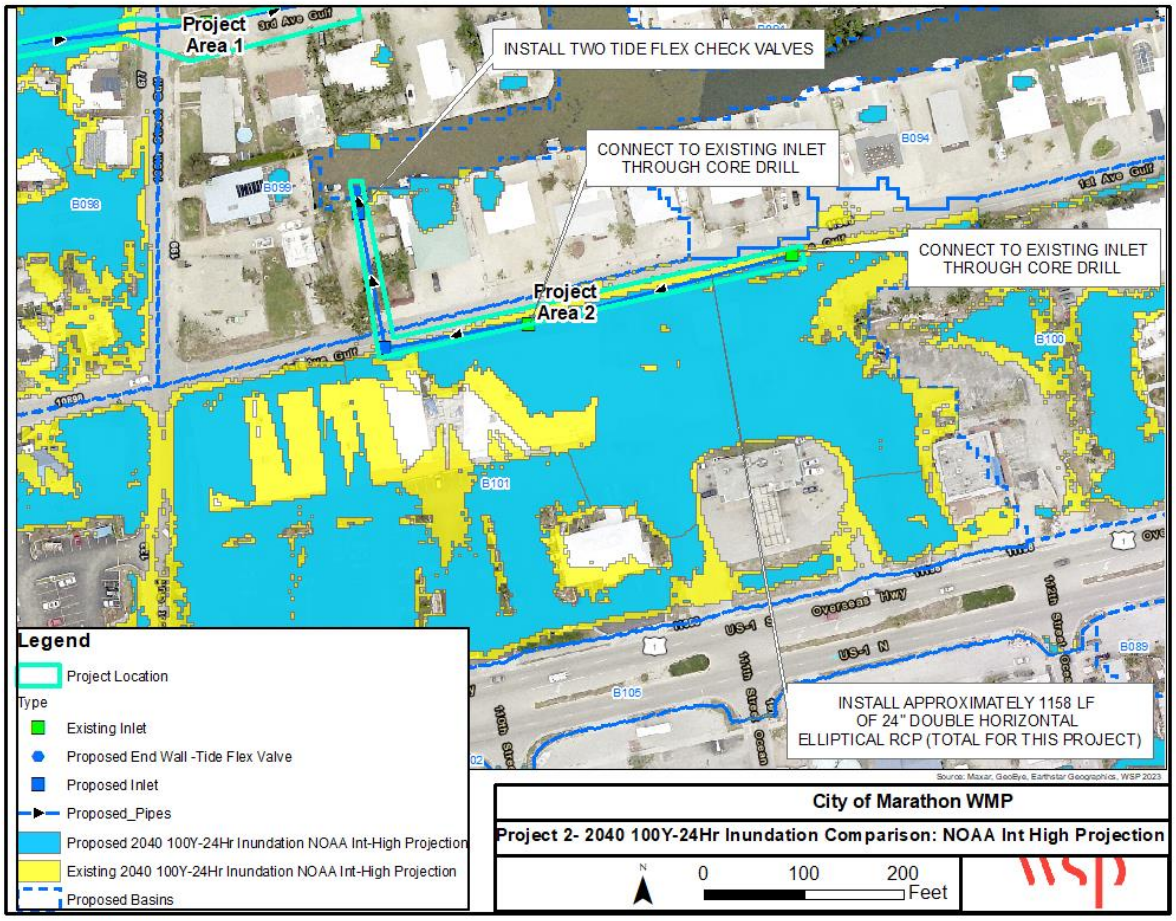


Figure 39 - Project 2 - Proposed 2040 Inundation: NOAA Intermediate-High Projection

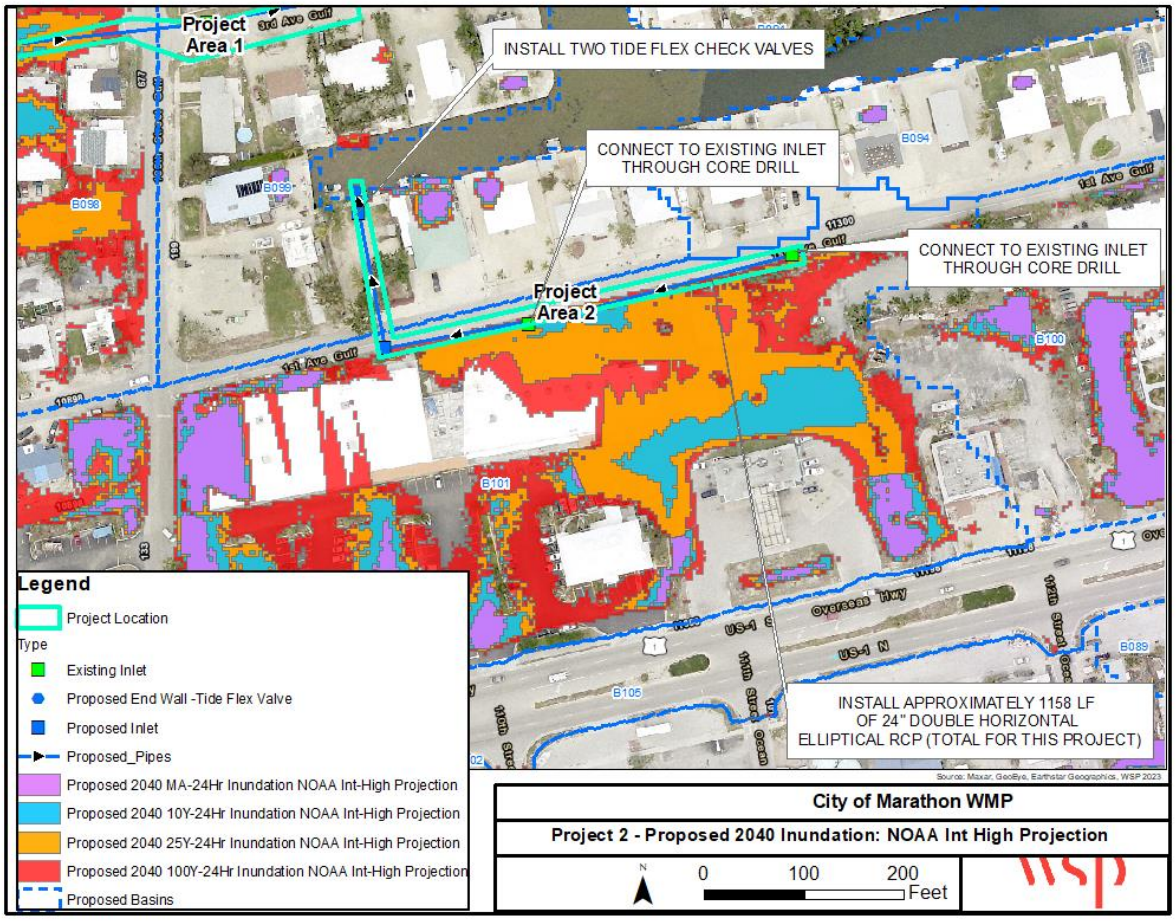


Figure 40 - Project 2 - Proposed 2025 Inundation: NOAA Intermediate-High Projection

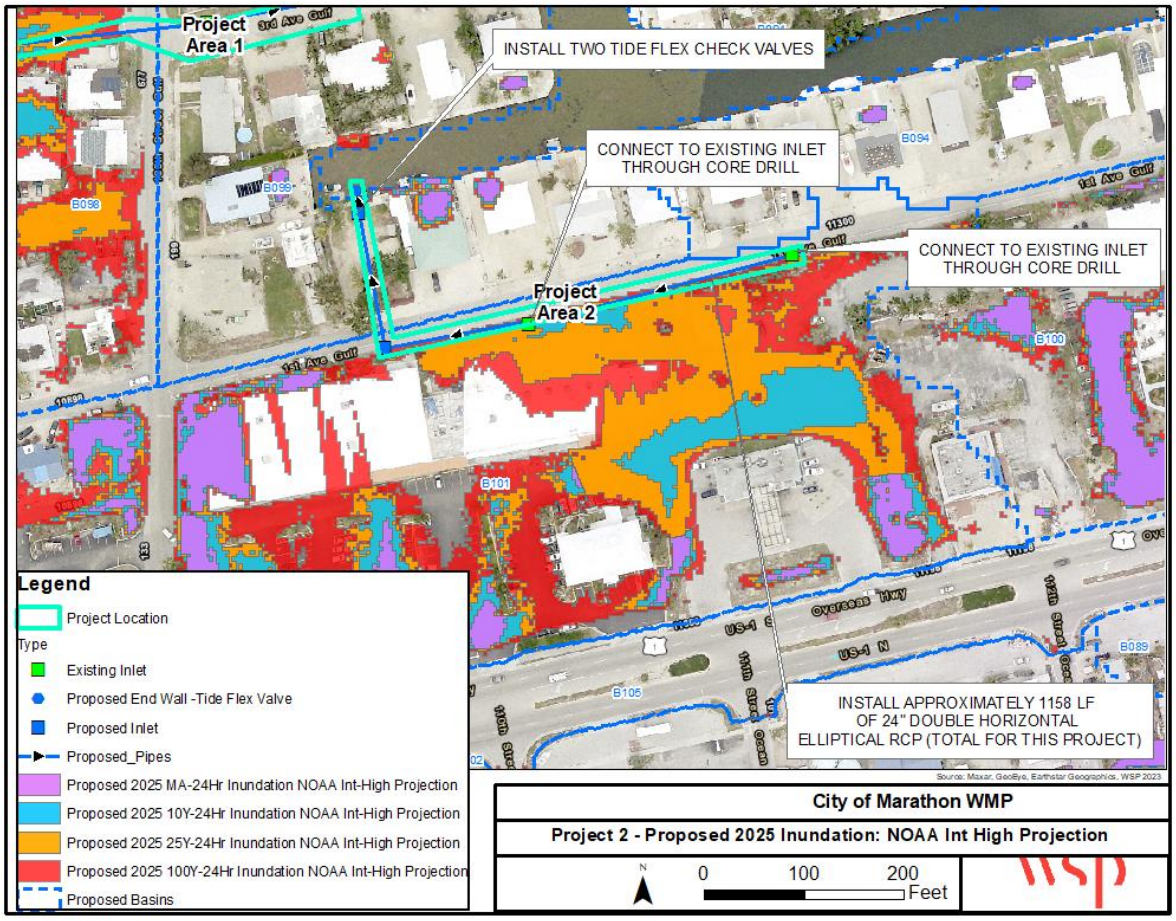


Figure 41 - Project 2 - Proposed 2040 Inundation: King Tides Projection

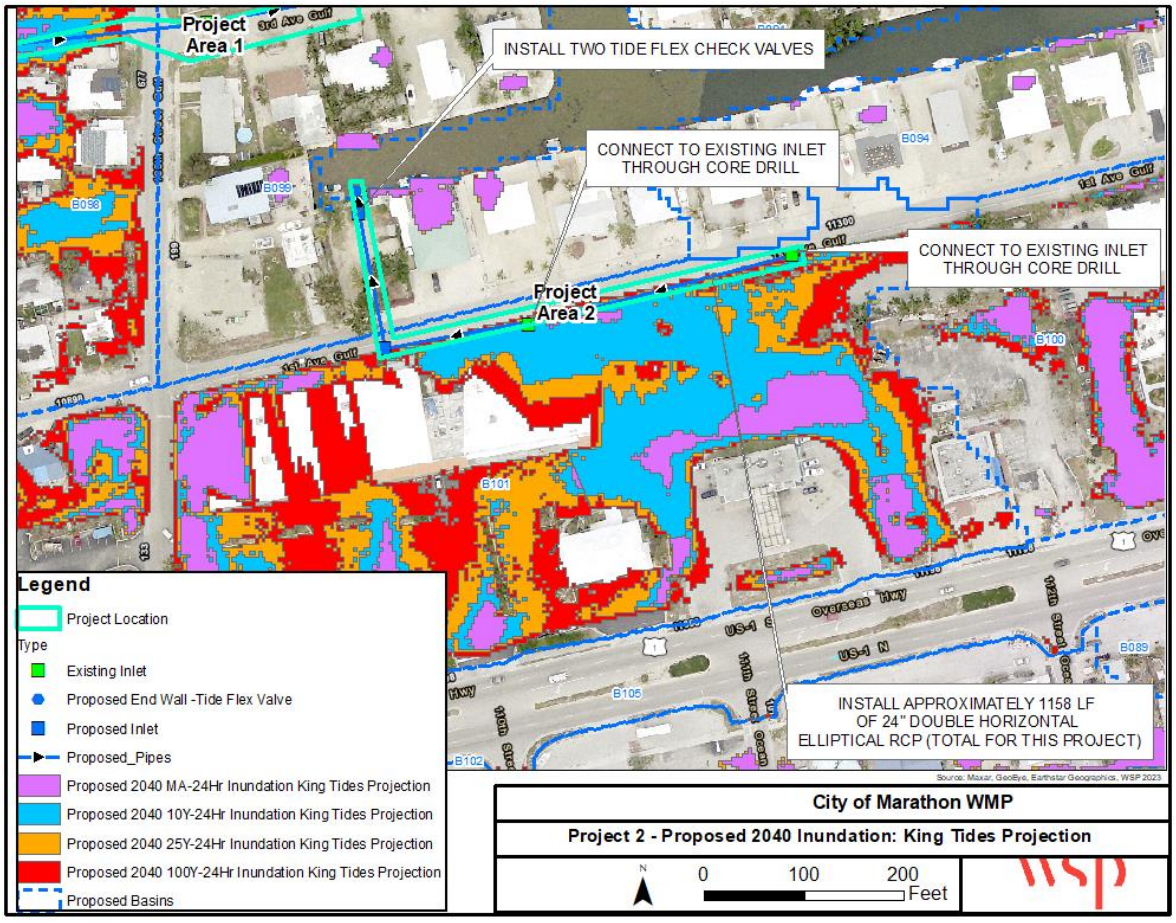


Figure 42 - Project 2 - Proposed 2025 Inundation: King Tides Projection

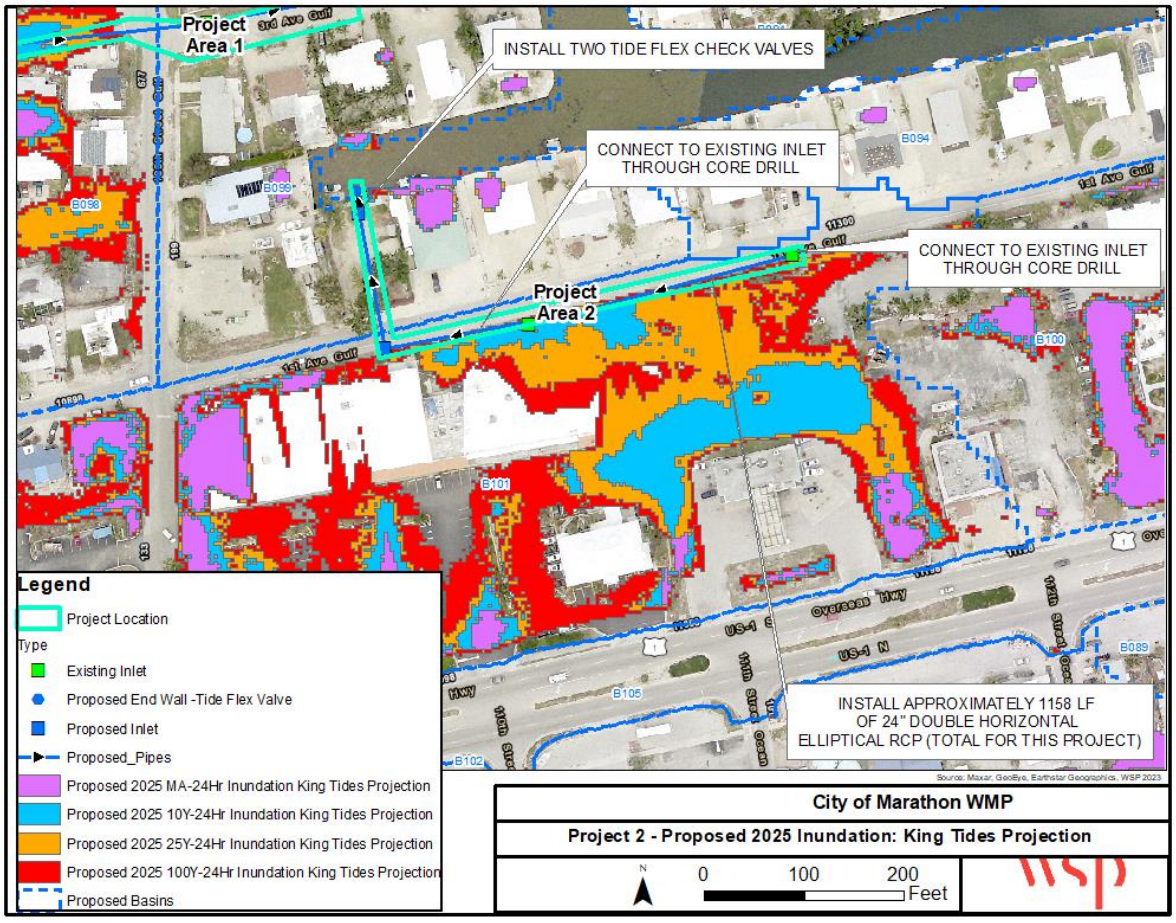


Figure 43 - Project 2 - LiDAR Map

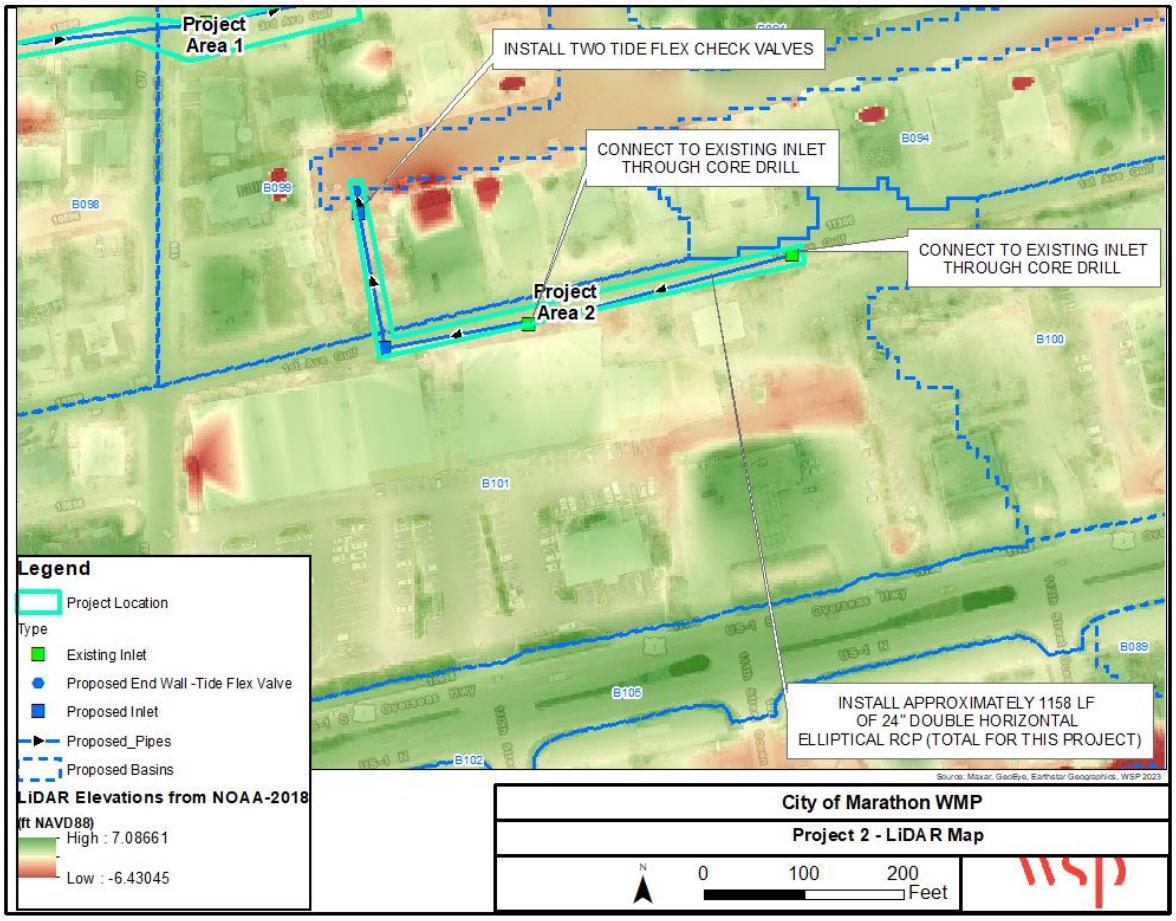


Figure 44 - Project 3 - Existing Condition 2040 Inundation NOAA Intermediate-High Projection

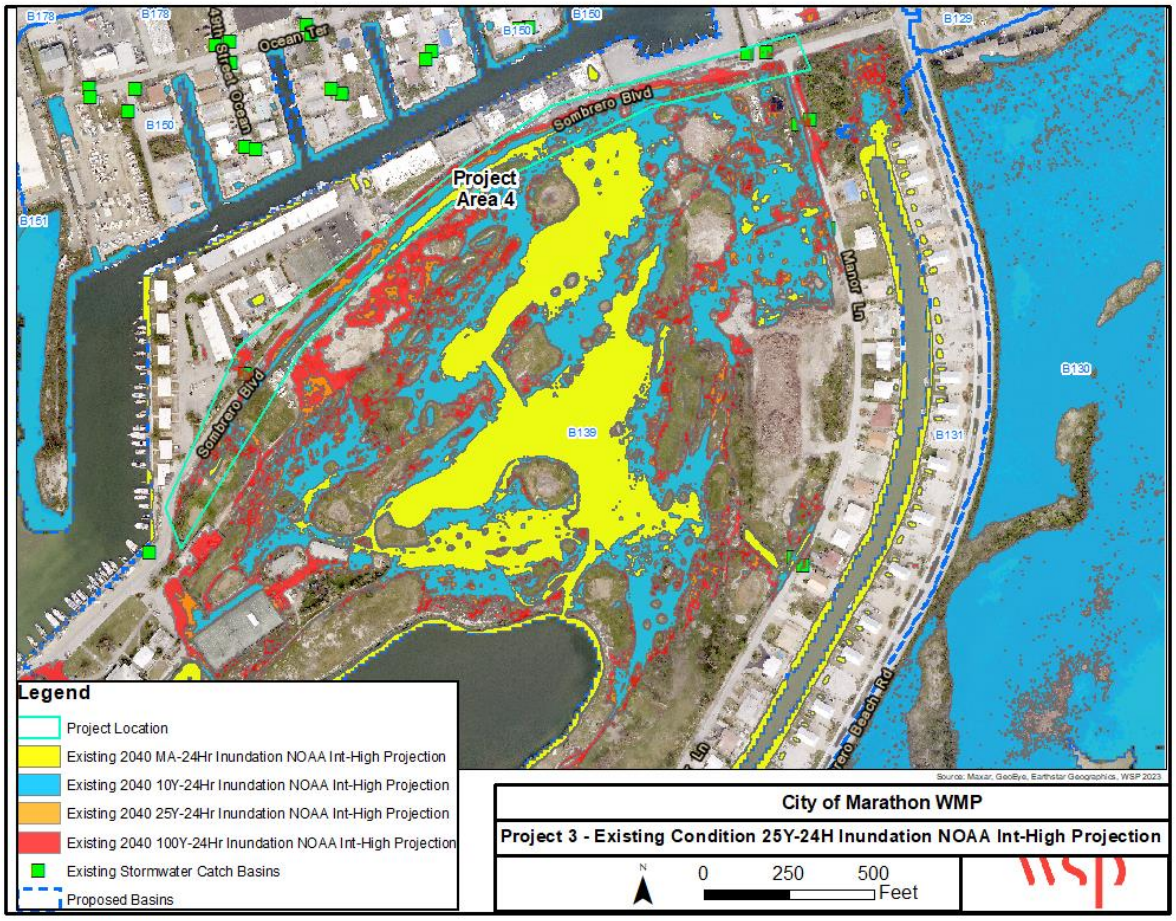


Figure 45 - Project 3 - LiDAR Map

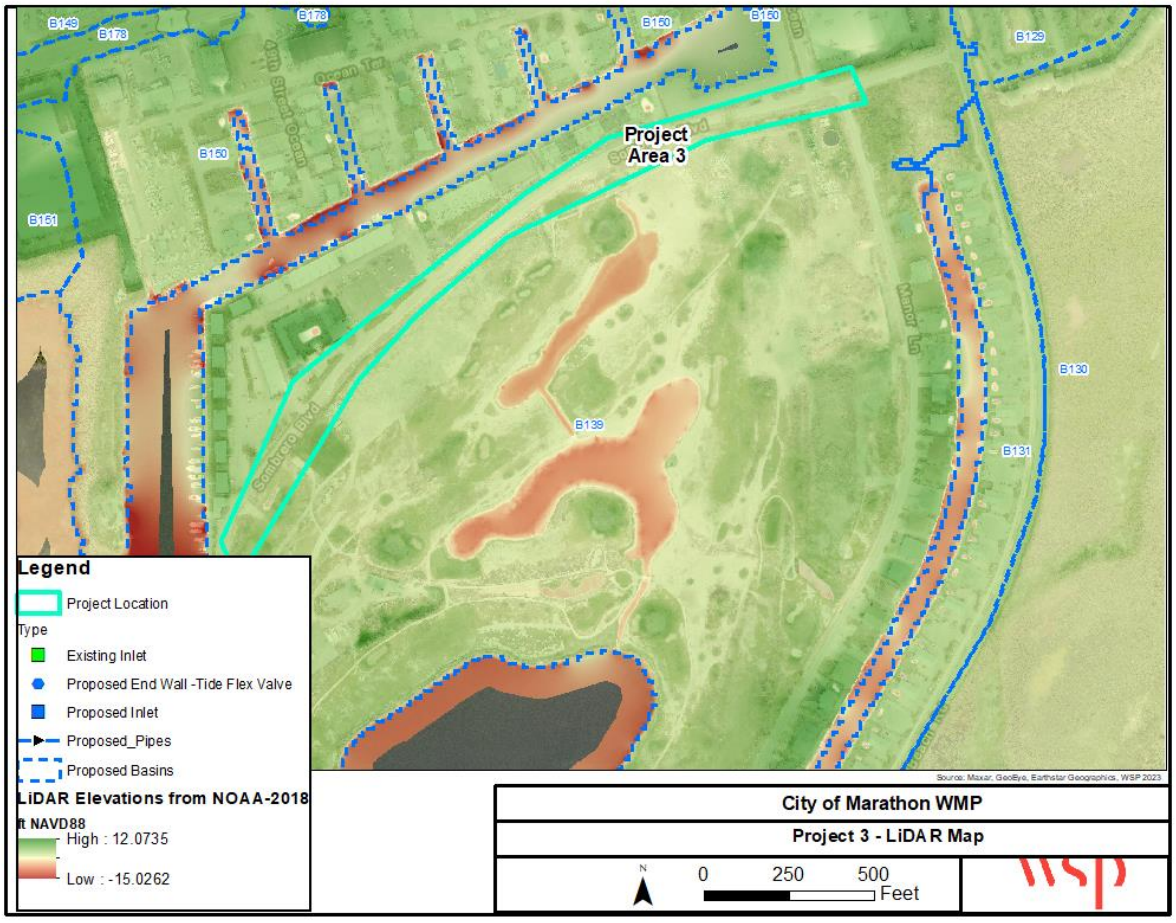


Figure 46 - Project 4 - Existing Conditions 25Y-24H Inundation Map

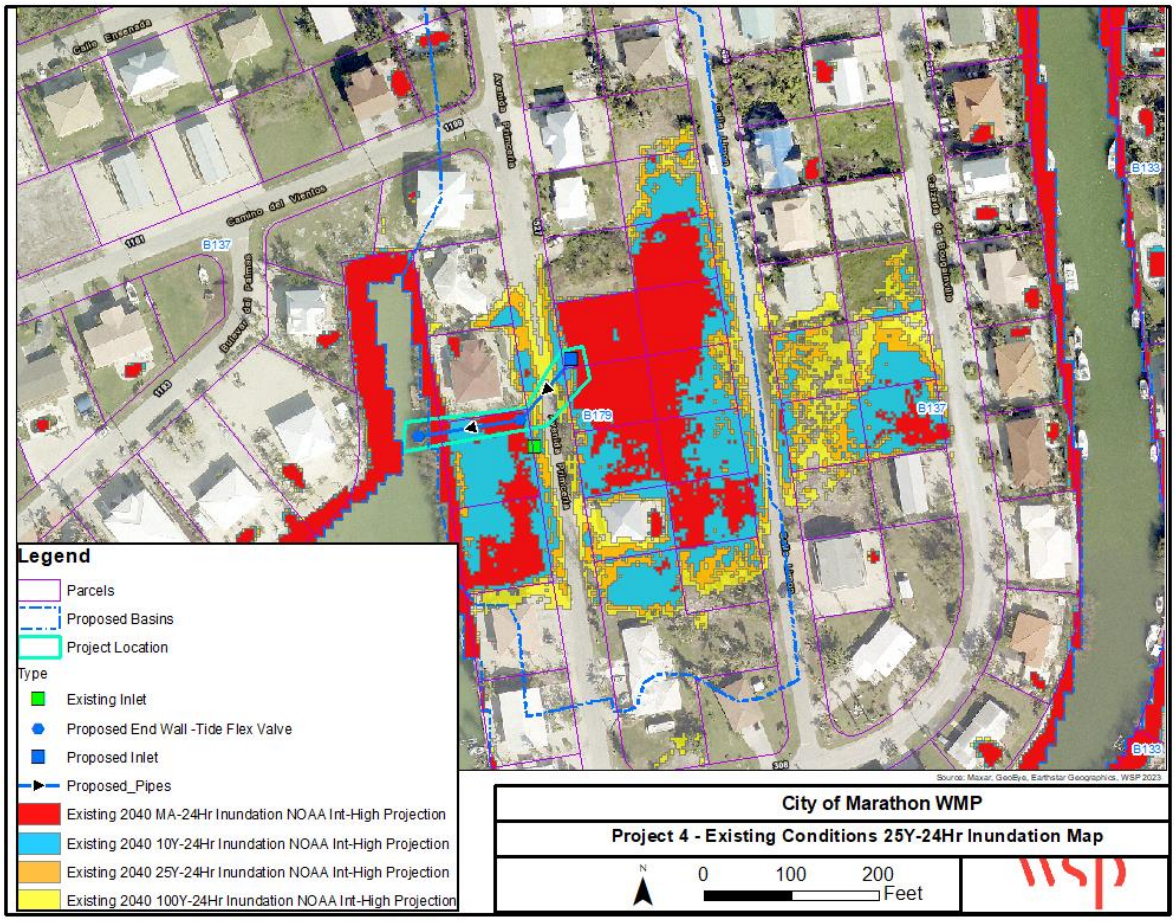


Figure 47 - Project 4 - 2040 25Y-24H Inundation Comparison: NOAA Intermediate-High Projection

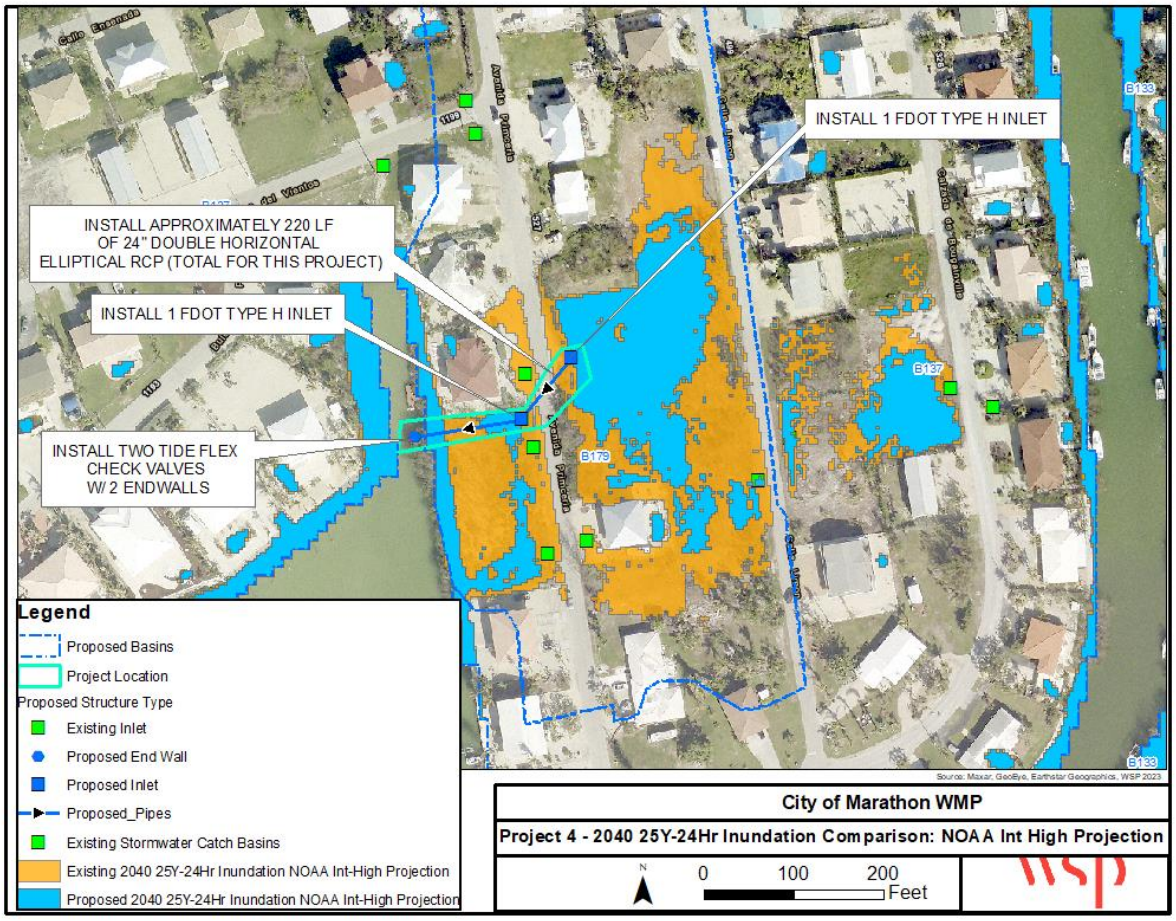


Figure 48 - Project 4 - 2040 MA-24H Inundation Comparison: NOAA Intermediate-High Projection

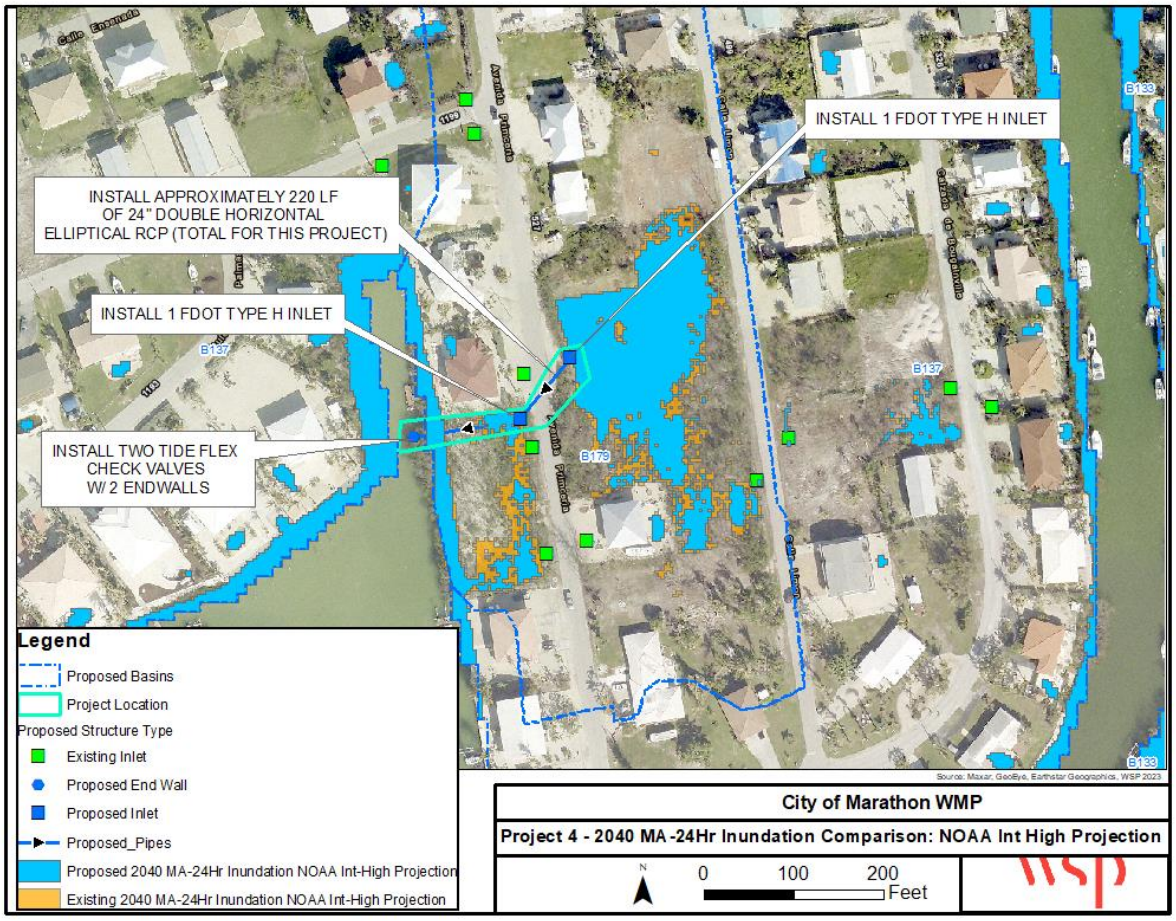


Figure 49 - Project 4 - 2040 10Y-24H Inundation Comparison: King Tides Projection

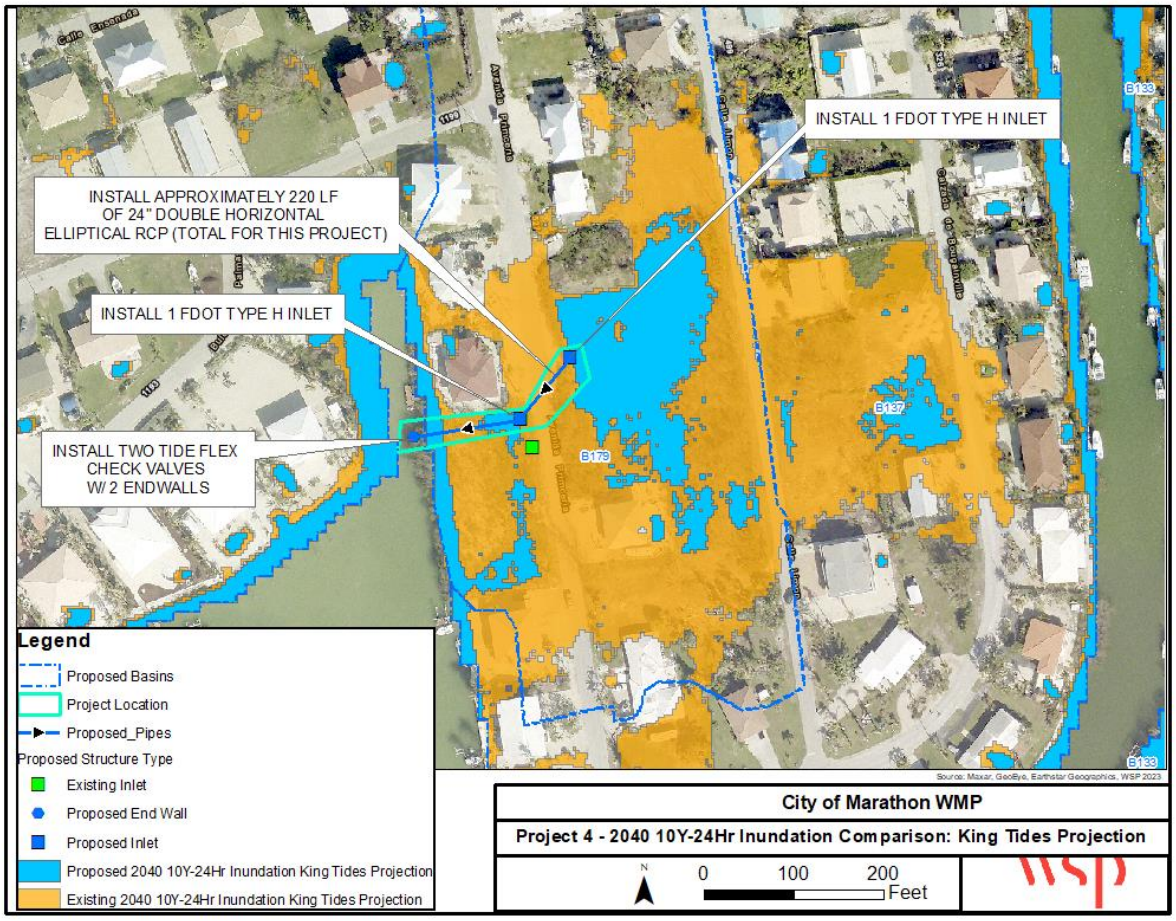


Figure 50 - Project 4 - 2025 25Y-24H Inundation Comparison: King Tides Projection

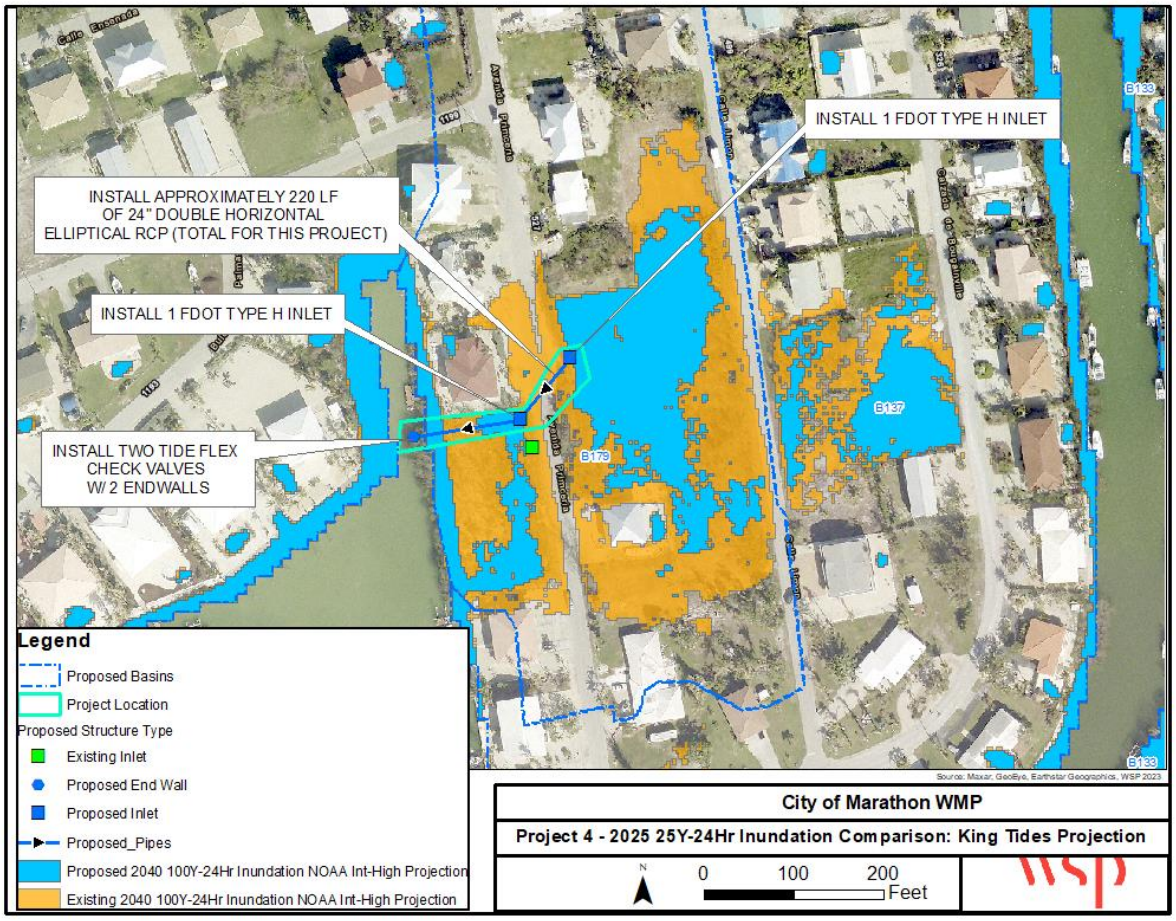


Figure 51 - Project 4 - Proposed 2040 Inundation: NOAA Intermediate-High Projection

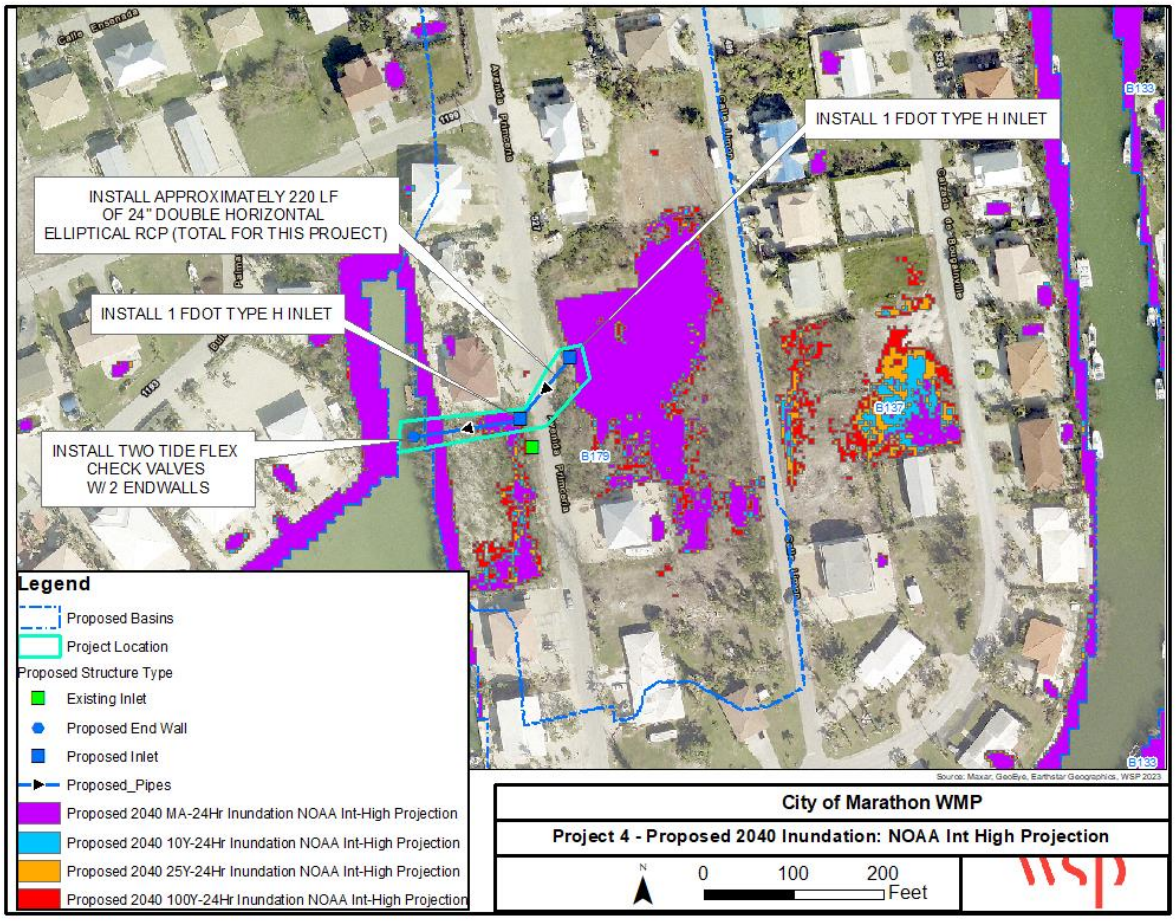


Figure 52 - Project 4 - Proposed 2025 Inundation: NOAA Intermediate-High Projection

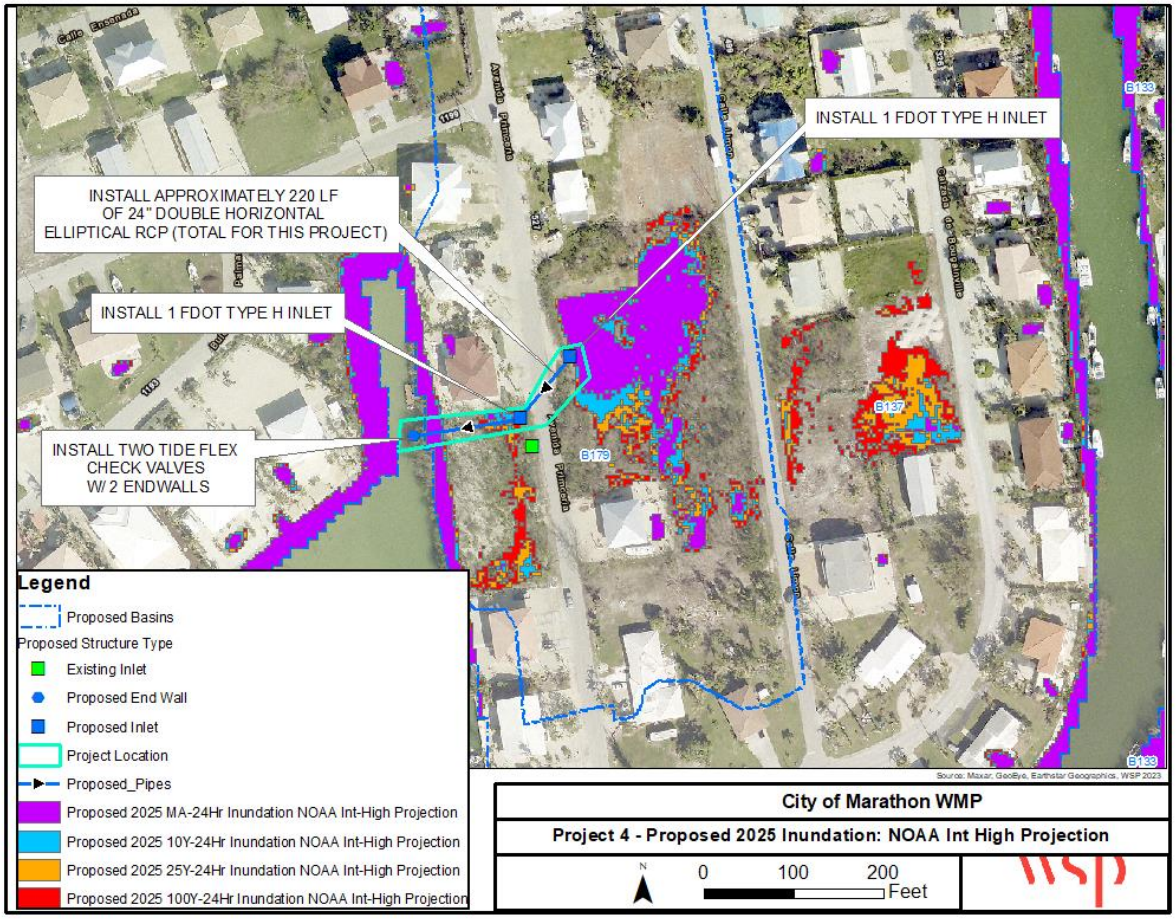


Figure 53 - Project 4 - Proposed 2040 Inundation: King Tides Projection

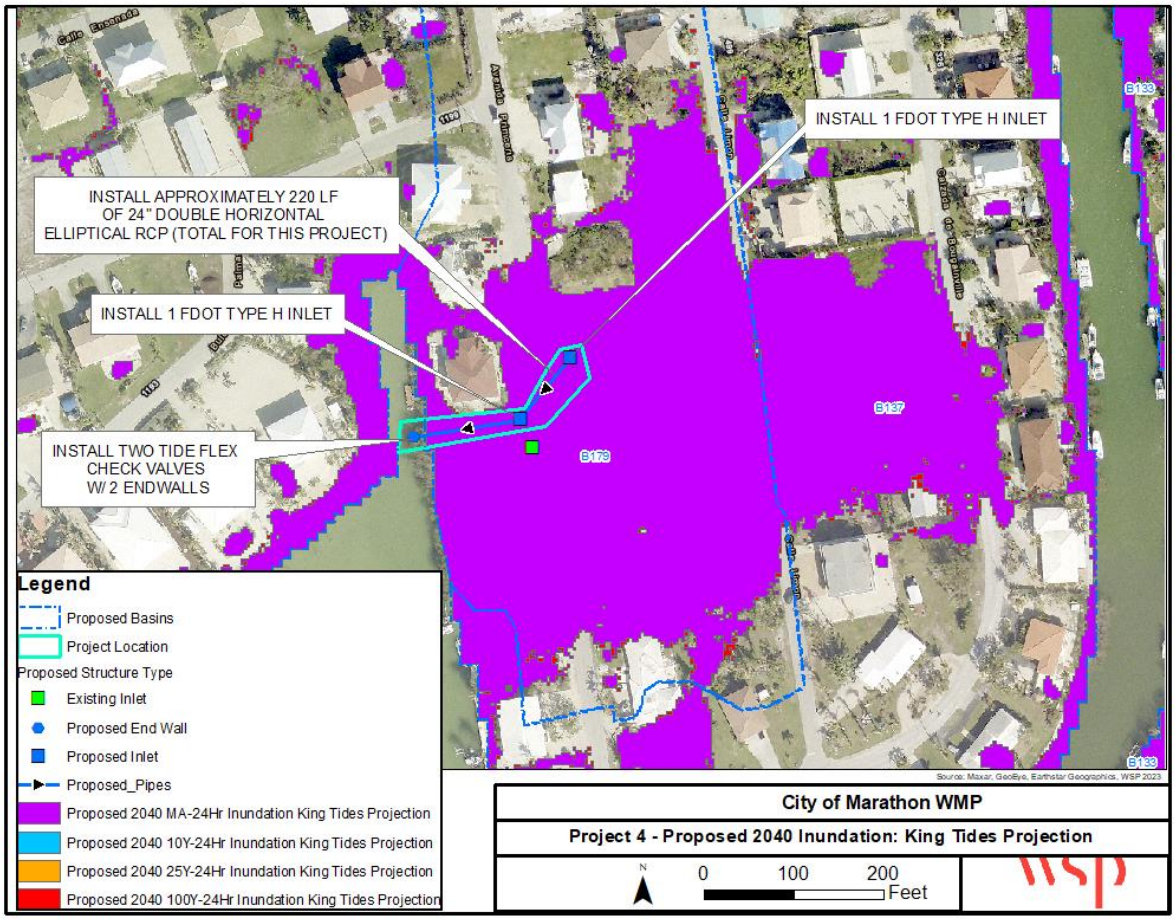


Figure 54 - Project 4 - Proposed 2025 Inundation: King Tides Projection

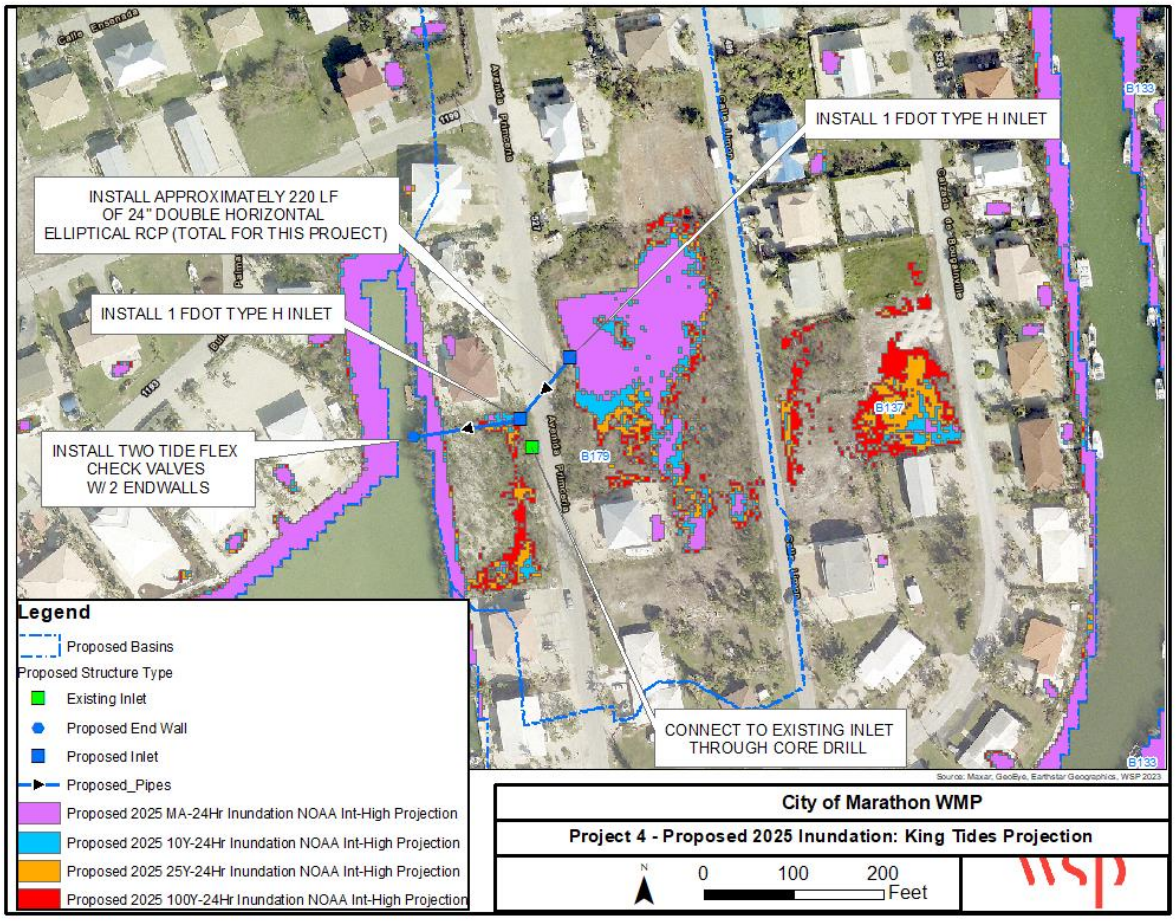


Figure 55 - Project 4 – LiDAR Map

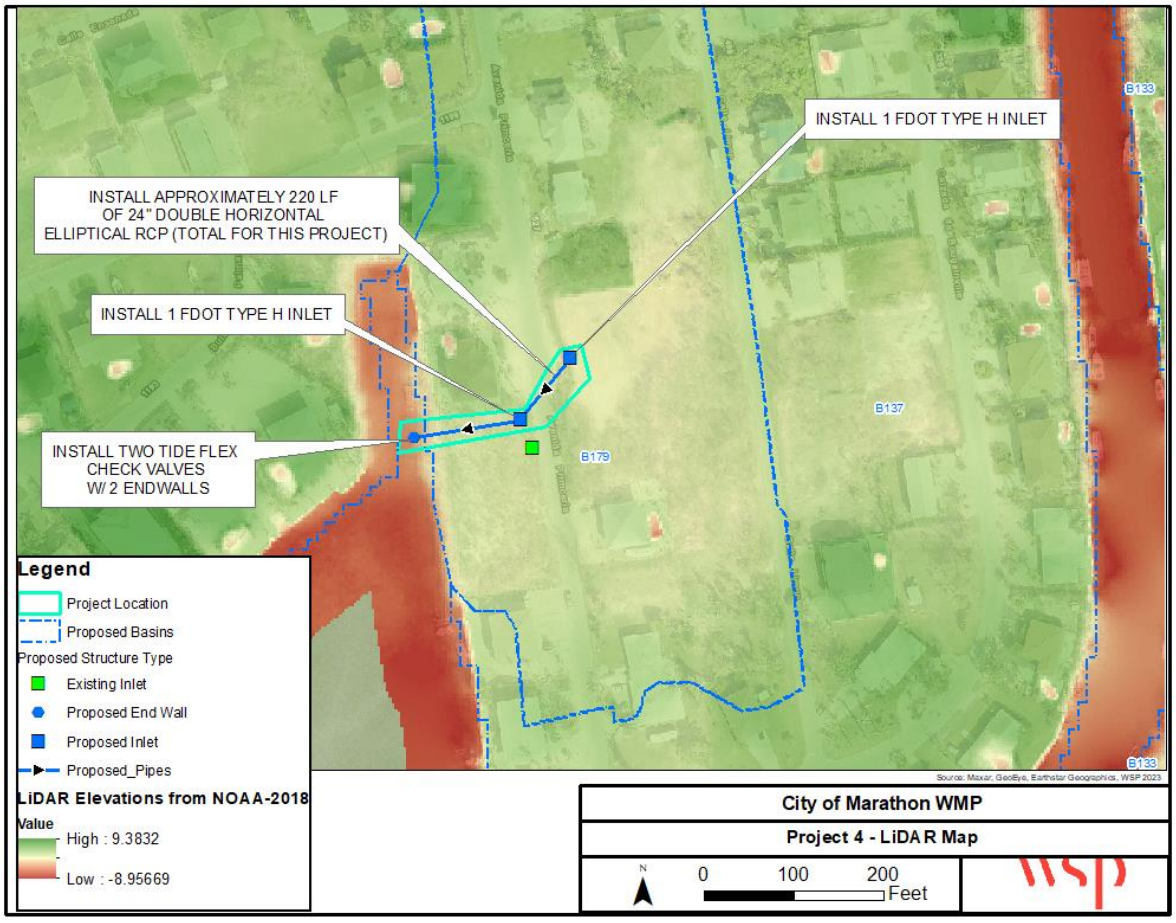


Figure 56 - Project 5 - Existing Condition 25Y-24H Inundation NOAA Intermediate-High Projection

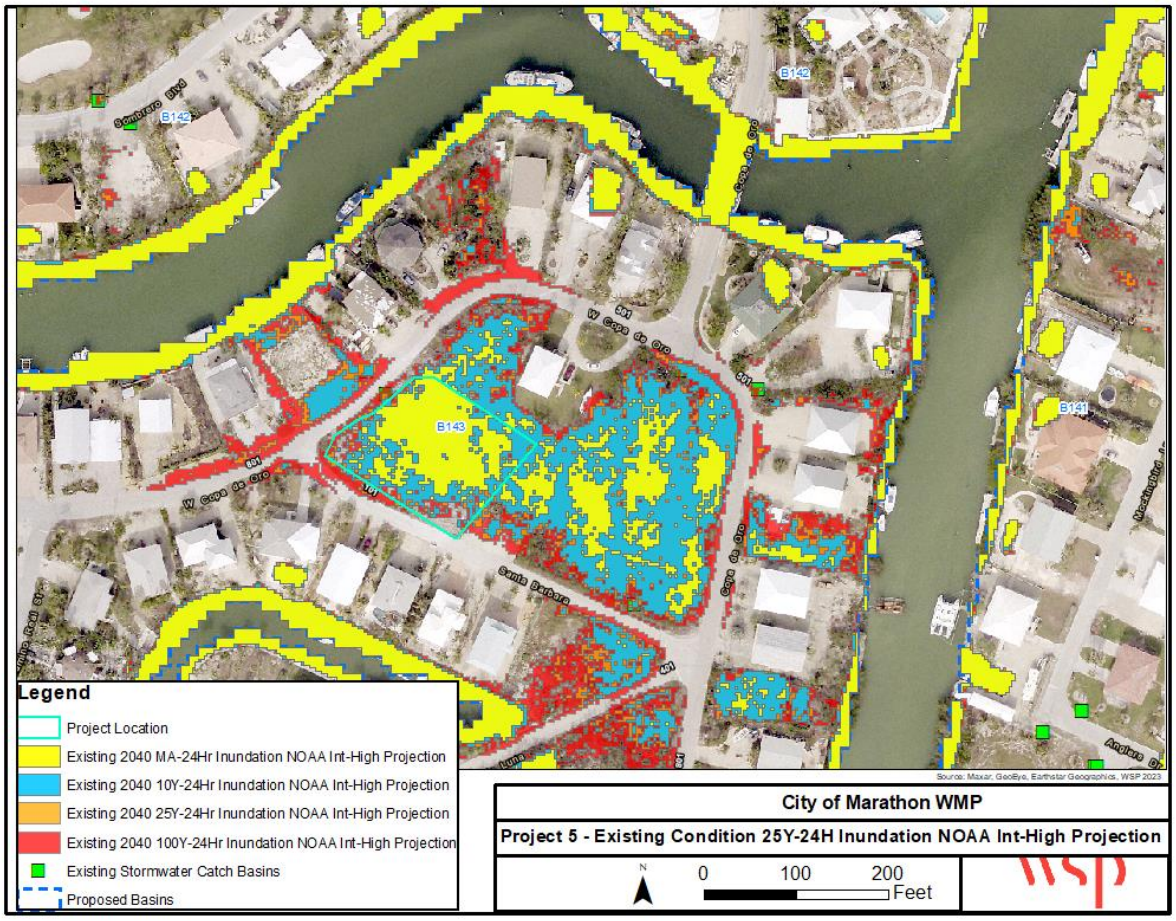
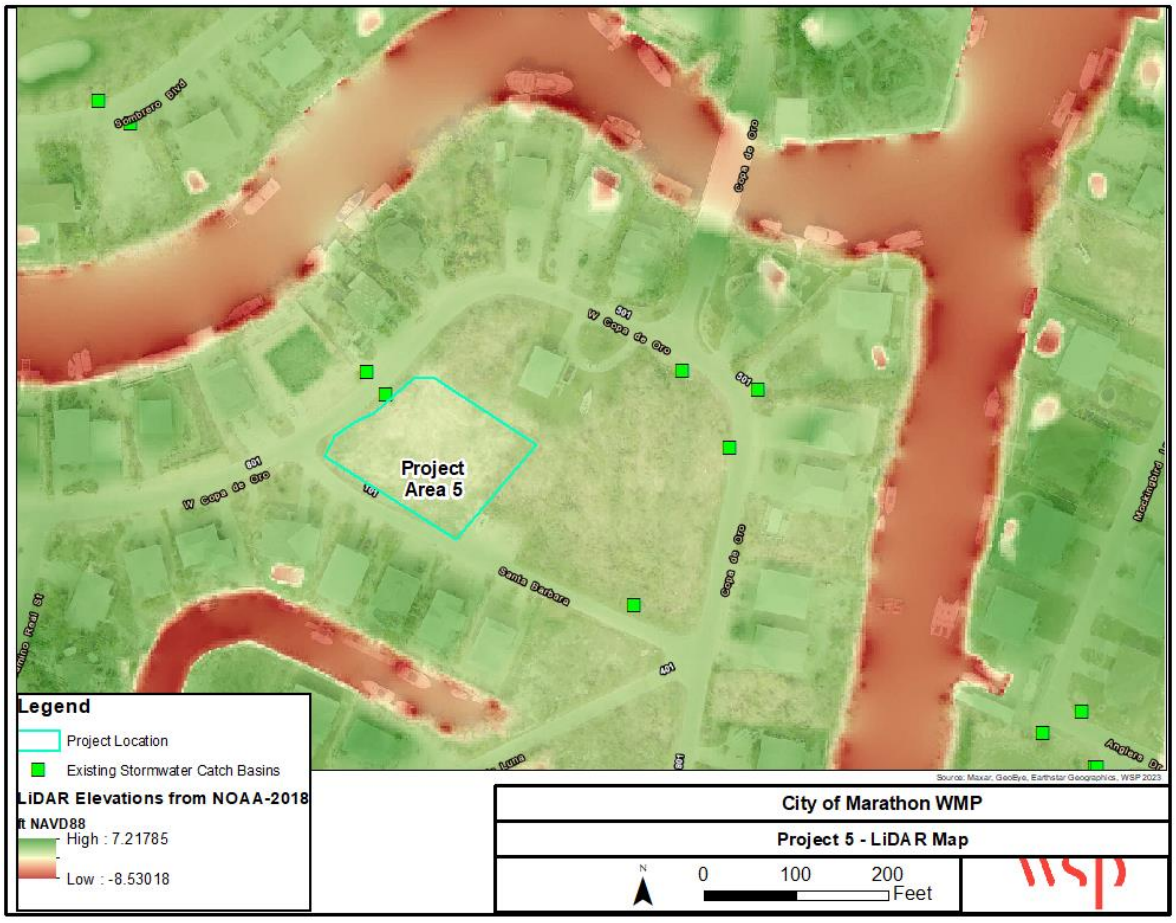


Figure 57 - Project 5 - LIDAR Map



III. Conclusions and Recommendations

This Watershed Management Plan has been developed with the specific intent of improving the City's participation in the CRS program. That said, the City is engaged in multiple current and near-term projects that are companion to this effort that will truly assist the City in prioritizing capital project planning based on specific types of flood risk. These efforts include:

1. Marathon Vulnerability Assessment (reviewing and analyzing all critical assets)
2. Securing mobile LiDAR elevation data
3. Stormwater Master Plan
4. Road Elevation and Adaptation Planning
5. Project specific adaptation projects (in partnership and individually)

Combined, these efforts can help the City identify the types of flooding risk that it is vulnerable to, understand the timeframes associated with those risks and help prioritize projects and funding sources to implement projects to address those risks. Some of those projects are identified in this Watershed Management Plan that provide an initial start in that direction. Some of these initiatives are partnerships across the Keys, some are individual to the City.

Additionally, at key intervals throughout the completion of these projects, the City should review its policy framework to ensure that appropriate levels of service and design standards are reflective of those project priorities.

When designing infrastructure in the City, there are two basic concepts: the actual design of a project and the level of service it provides. A couple of examples with the City's Code and Comprehensive Plan are evident to demonstrate this concept and how this vulnerability assessment can help shape those policies based on its outcomes. The City's Stormwater Design standards are included within this document and referenced throughout.

In terms of utilizing outcomes from this Watershed Management Plan, relevant to these existing design standards, the City should consider the following:

(1) How will stormwater systems have to manage for different conditions over the next 50 years due to changing rainfall conditions, or in some areas, how will sea level rise impact those operations throughout a rising tailwater condition? A recommendation may be to include a "useful life" threshold to include future conditions related to changing rainfall conditions and a reduced tailwater condition due to sea level rise. Pinellas County has incorporated tailwater conditions into its Code to address this issue.

(2) Is the 25-year duration storm event enough for design knowing that we are seeing more frequent higher duration events? In certain parts of the City, this design standard may not be enough or may be compromised by increased tidal flooding from sea level rise. A recommendation may be to incorporate higher frequency critical duration storm events in more advanced stormwater modeling. To note, the City is currently undergoing such a modeling process in pursuit of a CRS Watershed Management Plan under a separate grant and in its forthcoming Stormwater Master Plan Update that can help define these parameters. This information could help inform areas of the City where the stormwater system may be compromised by more frequent, higher volume rain or storm events.

In the City's Comprehensive Plan found online, the level of service for drainage is as follows in Policy 3-1.1.2 Adopt Stormwater Management Level of Service Standards: The City hereby adopts LOS standards for stormwater management as currently mandated by State agencies, as defined in the City's adopted Stormwater Management Master Plan as follows:

A. Post development runoff shall not exceed the pre-development runoff rate for a 25 year storm event, up to and including an event with 24 hour duration;

B. Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in Chapter 62-25, Section 25.025, FAC, with treatment of the runoff from the first one inch of rainfall on-site to meet the water quality standards required by Chapter 62, Section -302.500, F.A.C; and

C. Stormwater facilities which directly discharge into 'Outstanding Florida Waters' (OFW) shall provide an additional treatment pursuant to Chapter 62-25.025 (9), FAC. Stormwater facilities must be designed so as to not degrade the receiving water body below the minimum conditions necessary to assure the suitability of water for the designated use of its classification as established in Chapter 62-302, F.A.C.

The existing development level of service for a 25-year, 24-hour design storm may be a very low level of service, but since the community is essentially built out, the only opportunities to improve this level of service are going to be through new capital projects or larger redevelopment projects. Future rainfall projections reflect potentially higher volume rainfall events (1.16 times more rainfall in 2040 than present day and 1.21 times more rainfall in 2070). A recommendation may be to re-evaluate these adopted level of service standards in the Comprehensive Plan based upon the information stemming from this Watershed Management Plan and Stormwater Master Plan Update currently underway.

Land use and land development policies generally control how we develop and where. Again, the City is effectively built out, so the potential to address new development is limited in terms of large scale planned unit developments or larger projects. That said, redevelopment opportunities do exist and there are also implications for affordable housing projects when considering the outputs of the vulnerability assessment.

Overall, because of this Watershed Management Plan, the City should examine additional policies in relation to increasing flood risk include:

- The City's Floodplain Management Ordinance. Key provisions may include enhanced freeboard in certain areas of the City or for substantial improvements.
- Requiring enhanced pervious surfaces in Landscaping requirements (Sec 107.69).
- Adopting a shoreline ordinance revision that harmonizes concepts of seawall heights, promoting living or hybrid shorelines in key locations and tying useful life of shoreline improvements to future flood risk. Section 106-36 Bulkheads, Seawalls or Riprap does not currently address living shorelines or a shoreline structure height.
- Integrating recommended projects from this Watershed Management, Vulnerability Assessment and forthcoming Adaptation Plan with outcomes from the Road Elevation and Adaptation Plan as well as an Updated Stormwater Master Plan.

Before projects are implemented, the City should undertake a review of its Comprehensive Plan and Code so that there are not policy barriers to certain levels of project design and levels of service are clear and achievable based on multiple modes of flood risk.

7. The community must adopt the final plan.

The community will adopt the final Watershed Management Plan by Resolution when it is completed and submitted to the City Council.

8. If applicable, WMP plans more than 5 years old must be evaluated to ensure that they remain applicable to current conditions. For instance, are previous assumptions on hydrology, sea level rise and future land use still applicable.

This Section is not relevant because this is the first WMP for the City.

IV. Jurisdiction Specific Comments for Task 1

Task 1.1: Data collection for structures - City of Marathon shall provide a list of critical assets, including regionally significant, to be evaluated for potential impacts by flooding and sea level rise including (but not limited to) transportation assets and evacuation routes; critical infrastructure; critical community and emergency facilities; and natural, cultural, and historical resources.

Please refer to Section 2, pages 43-46 of this Preliminary Project Plan outlining the work of the Vulnerability Assessment currently being conducted. The links within that section provide an accounting of all critical and regionally significant assets to be evaluated grouped according to asset class. All assets will be evaluated for the Vulnerability Assessment using ArcGIS according to Section 380.093(3), F.S. requirements.

Additionally, City of Marathon shall include an individualized assessment with updated structures from the 2019 Watershed Management Plan, and any additional field work and analysis stemming from the Countywide Roads and Stormwater Assessment (2022).

The 2019 Watershed Management Plan refers to Monroe County's previously approved and credited Watershed Management Plan. To the extent pertinent structure or analytical data would be relevant, it has been included with the Vulnerability Assessment and ICPR Model being developed for this Watershed Management Plan for Marathon in 2023. Given that was a County plan, very little data has been extracted from that effort because this Watershed Management Plan for Marathon 2023 is based on Marathon-specific geographical boundaries, conditions, critical facilities and assets. The same holds true for the Countywide Roads and Stormwater Assessment (2022) because that effort focused on unincorporated County assets and structures, while this Watershed Management Plan for Marathon 2023 focuses on Marathon-specific structures, assets and data.

Tasks 1.2 and 1.3: Preliminary Flood Modeling and Project Plan - In addition to the above Minimum Criteria, City of Marathon shall align the Project Plan modeling effort with Section 380.093, F.S., and the approach for this assessment will include:

1) Mapping potential future regular tidal inundation from sea level rise, high tide flooding, and

This work has been conducted in the context of the Marathon Vulnerability Assessment and the initial map series has been linked earlier in this Preliminary Project Plan. All scenarios have been listed previously. Tide gauge data and

inundation levels have been coordinated between the Vulnerability Assessment and ICPR modeling effort for this Watershed Management Plan for Marathon 2025.

2) Map potential storm surge events to project multiple sea-level-adjusted designed storm events (at a minimum, the 100-year event).

This scenario was modeled as previously discussed.

Additionally, City of Marathon will clarify in writing which tasks and efforts have already been completed prior to contract execution. With the mapping efforts, City of Marathon shall provide the source and dates of data acquisition, locational accuracy, and map projection and coordinate system information of geospatial data.

References

E. Shahsi, 2015, Menon's in Transmission Pipeline Calculations and Simulations Manual.

FDOT, 2023, FDOT Resilience Action Plan Appendix A (Project List).

Monroe County 2020, King Tide and Normal Wind Setup Analysis for Monroe County, Florida.

SJRWMD 1990, Procedure for Selection of SCS Peak Rate Factors for use in MSSW Permit Applications.

SJRWMD 2012, Chapter 3: Watershed Hydrology, Appendix 3.A.: Land Use Classification/Grouping from SJRWMD Technical Reports.

South Florida Water Management District 2022, Adoption of Future Extreme Rainfall Change Factors for Flood Resiliency Planning in South Florida.

Appendix A: Floodplain Management Standards Ordinance

ARTICLE 107-12 FLOODPLAIN MANAGEMENT

Sec 107.98 General

Sec 107.99 Applicability

Sec 107.100 Duties And Powers Of The Floodplain Administrator

Sec 107.101 Permits

Sec 107.102 Protection Of Endangered Species

Sec 107.102.1 Site Plans And Construction Documents

Sec 107.102.2 Inspections

Sec 107.102.3 Variances And Appeals

Sec 107.102.4 Violations

Sec 107.102.5 Buildings And Structures

Sec 107.102.6 Subdivisions

Sec 107.102.7 Site Improvements, Utilities And Limitations

Sec 107.102.8 Manufactured Homes

Sec 107.102.9 Recreational Vehicles And Park Trailers

Sec 107.102.10 Tanks

Sec 107.102.11 Other Development

Editor's note(s)—Ord. No. 2018-05, § 2, adopted August 14, 2018, repealed the former Article 12, §§ 107.98—107.102.5, and enacted a new Article 12 as set out herein. The former Article 12 pertained to similar subject matter and derived from Ord. No. 2012-01, § 3, adopted January 24, 2012

HISTORY

Repealed & Replaced by Ord. 2012-02 on 1/24/2012

Sec 107.98 General

Title. These regulations shall be known as the Floodplain Management Ordinance of the City of Marathon, hereinafter referred to as "this ordinance."

Scope. The provisions of this ordinance shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement, improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the Florida Building Code; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development.

Intent. The purposes of this ordinance and the flood load and flood resistant construction requirements of the Florida Building Code are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to:

Minimize unnecessary disruption of commerce, access and public service during times of flooding;

Require the use of appropriate construction practices in order to prevent or minimize future flood damage;

Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential;

Manage the alteration of flood hazard areas and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain;

Minimize damage to public and private facilities and utilities;

Help maintain a stable tax base by providing for the sound use and development of flood hazard areas;

Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and

Meet the requirements of the National Flood Insurance Program for community participation as set forth in Title 44 Code of Federal Regulations, Section 59.22.

Coordination with the Florida Building Code. This ordinance is intended to be administered and enforced in conjunction with the Florida Building Code. Where cited, ASCE 24 refers to the edition of the standard that is referenced by the Florida Building Code.

Warning. The degree of flood protection required by this ordinance and the Florida Building Code, as amended by this community, is considered the minimum reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside of mapped special flood hazard areas, or that uses permitted within such flood hazard areas, will be free from flooding or flood damage. The flood hazard areas and base flood elevations contained in the Flood Insurance Study and shown on Flood Insurance Rate Maps and the requirements of Title 44 Code of Federal Regulations, Sections 59 and 60 may be revised by the Federal Emergency Management Agency, requiring this community to revise these regulations to remain eligible for participation in the National Flood Insurance Program. No guaranty of vested use, existing use, or future use is implied or expressed by compliance with this ordinance.

Disclaimer of Liability. This ordinance shall not create liability on the part of the City Council of the City of Marathon or by any officer or employee thereof for any flood damage that results from reliance on this ordinance or any administrative decision lawfully made thereunder.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Sec 107.99 Applicability

General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

Areas to which this ordinance applies. This ordinance shall apply to all flood hazard areas within the City of Marathon, as established in Section 107.99.C of this chapter.

Basis for establishing flood hazard areas and Species Focus Areas and Real Estate Numbers.

The Flood Insurance Study for Monroe County, Florida and Incorporated Areas dated February 18, 2005, and all subsequent amendments and revisions, and the accompanying Flood Insurance Rate Maps (FIRM), and all subsequent amendments and revisions to such maps, are adopted by reference as a part of this ordinance and shall serve as the minimum basis for establishing flood hazard areas. Studies and maps that establish flood hazard areas are on file at City Hall, 9805 Overseas Highway, Marathon, FL 33050.

The Species Focus Area Maps (SFAMs) and the real estate numbers of parcels (RE List) that are within the SFAMs identified by the U.S. Fish and Wildlife Service in accordance with the Biological Opinion, dated April 30, 2010, as amended, for the City of Marathon, and any subsequent revisions there to, are hereby declared to be a part of this ordinance. The SFAMs and RE list are on file at the city hall.

Submission of additional data to establish flood hazard areas. To establish flood hazard areas and base flood elevations, pursuant to Section 107.102.1 of this chapter the Floodplain Administrator may require submission of additional data. Where field surveyed topography prepared by a Florida licensed professional surveyor or digital topography accepted by the community indicates that ground elevations:

Are below the closest applicable base flood elevation, even in areas not delineated as a special flood hazard area on a FIRM, the area shall be considered as flood hazard area and subject to the requirements of this ordinance and, as applicable, the requirements of the Florida Building Code.

Are above the closest applicable base flood elevation, the area shall be regulated as special flood hazard area unless the applicant obtains a Letter of Map Change that removes the area from the special flood hazard area.

Other laws. The provisions of this ordinance shall not be deemed to nullify any provisions of local, state or federal law.

Abrogation and greater restrictions. This ordinance supersedes any ordinance in effect for management of development in flood hazard areas. However, it is not intended to repeal or abrogate any existing ordinances including but not limited to land development regulations, zoning ordinances, stormwater management regulations, or the Florida Building Code. In the event of a conflict between this ordinance and any other ordinance, the more restrictive shall govern. This ordinance shall not impair any deed restriction, covenant or easement, but any land that is subject to such interests shall also be governed by this ordinance.

Interpretation. In the interpretation and application of this ordinance, all provisions shall be:

Considered as minimum requirements;

Liberally construed in favor of the governing body; and

Deemed neither to limit nor repeal any other powers granted under state statutes.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.100 Duties And Powers Of The Floodplain Administrator

Designation. The City Manager is designated as the Floodplain Administrator. The Floodplain Administrator may delegate performance of certain duties to other employees, particularly the Building Official and the Certified Floodplain Manager.

General. The Floodplain Administrator is authorized and directed to administer and enforce the provisions of this ordinance. The Floodplain Administrator shall have the authority to render interpretations of this ordinance consistent with the intent and purpose of this ordinance and may establish policies and procedures in order to clarify the application of its provisions. Such interpretations, policies, and procedures shall not have the effect of waiving requirements specifically provided in this ordinance without the granting of a variance pursuant to Section 107.102.3 of this ordinance.

Applications and permits. The Floodplain Administrator, in coordination with other pertinent offices of the community, shall:

Review applications and plans to determine whether proposed new development will be located in flood hazard areas;

Review applications for modification of any existing development in flood hazard areas for compliance with the requirements of this ordinance;

Interpret flood hazard area boundaries where such interpretation is necessary to determine the exact location of boundaries; a person contesting the determination shall have the opportunity to appeal the interpretation;

Provide available flood elevation and flood hazard information;

Determine whether additional flood hazard data shall be obtained from other sources or shall be developed by an applicant;

Review applications to determine whether proposed development will be reasonably safe from flooding;

Issue development permits for development other than buildings and structures that are subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code, when compliance with this ordinance is demonstrated, or disapprove the same in the event of noncompliance; and

Coordinate with and provide comments to the Building Official to assure that applications, plan reviews, and inspections for buildings and structures in flood hazard areas comply with the applicable provisions of this ordinance.

Substantial improvement and substantial damage determinations. For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:

Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;

Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;

Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; the determination requires evaluation of previous permits issued for improvements and repairs as specified in the definition of "substantial improvement"; and

Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the Florida Building Code and this ordinance is required.

Modifications of the strict application of the requirements of the Florida Building Code. The Floodplain Administrator shall review requests submitted to the Building Official that seek approval to modify the strict application of the flood load and flood resistant construction requirements of the Florida Building Code to determine whether such requests require the granting of a variance pursuant to Section 107.102.3 of this ordinance.

Notices and orders. The Floodplain Administrator shall coordinate with appropriate local agencies for the issuance of all necessary notices or orders to ensure compliance with this ordinance.

Inspections. The Floodplain Administrator shall make the required inspections as specified in Section 107.102.2 of this chapter for development that is not subject to the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code. The Floodplain Administrator shall inspect flood hazard areas to determine if development is undertaken without issuance of a permit.

Other duties of the Floodplain Administrator. The Floodplain Administrator shall have other duties, including but not limited to:

Establish, in coordination with the Building Official, procedures for administering and documenting determinations of substantial improvement and substantial damage made pursuant to Section 107.100.D of this chapter;

Require applicants who submit hydrologic and hydraulic engineering analyses to support permit applications to submit to FEMA the data and information necessary to maintain the Flood Insurance Rate Maps if the analyses propose to change base flood elevations or flood hazard area

boundaries; such submissions shall be made within six (6) months of such data becoming available;

Review required design certifications and documentation of elevations specified by this ordinance and the Florida Building Code to determine that such certifications and documentations are complete;

Notify the Federal Emergency Management Agency when the corporate boundaries of the City of Marathon are modified; and

Advise applicants for new buildings and structures, including substantial improvements, that are located in any unit of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act (Pub. L. 97-348) and the Coastal Barrier Improvement Act of 1990 (Pub. L. 101-591) that federal flood insurance is not available on such construction; areas subject to this limitation are identified on Flood Insurance Rate Maps as "Coastal Barrier Resource System Areas" and "Otherwise Protected Areas."

Floodplain management records. Regardless of any limitation on the period required for retention of public records, the Floodplain Administrator shall maintain and permanently keep and make available for public inspection all records that are necessary for the administration of this ordinance and the flood resistant construction requirements of the Florida Building Code, including Flood Insurance Rate Maps; Letters of Map Change; records of issuance of permits and denial of permits; determinations of whether proposed work constitutes substantial improvement or repair of substantial damage; required design certifications and documentation of elevations specified by the Florida Building Code and this ordinance; documentation related to appeals and variances, including justification for issuance or denial; and records of enforcement actions taken pursuant to this ordinance and the flood resistant construction requirements of the Florida Building Code. These records shall be available for public inspection at City Hall, 9805 Overseas Highway, Marathon, FL 33050.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.101 Permits

Permits required. Any owner or owner's authorized agent (hereinafter "applicant") who intends to undertake any development activity within the scope of this ordinance, including buildings, structures and facilities exempt from the Florida Building Code, which is wholly within or partially within any flood hazard area shall first make application to the Floodplain Administrator, and the Building Official if applicable, and shall obtain the required permit(s) and approval(s). No such

permit or approval shall be issued until compliance with the requirements of this ordinance and all other applicable codes and regulations has been satisfied.

Development permits. Development permits shall be issued pursuant to this ordinance for any development activities not subject to the requirements of the Florida Building Code, including buildings, structures and facilities exempt from the Florida Building Code. Depending on the nature and extent of proposed development that includes a building or structure, the Floodplain Administrator may determine that a development permit is required in addition to a building permit.

Buildings, structures and facilities exempt from the Florida Building Code. Pursuant to the requirements of federal regulation for participation in the National Flood Insurance Program (44 C.F.R. Sections 59 and 60), development permits shall be required for the following buildings, structures and facilities that are exempt from the Florida Building Code and any further exemptions provided by law, which are subject to the requirements of this ordinance:

Railroads and ancillary facilities associated with the railroad.

Nonresidential farm buildings on farms, as provided in Fla. Stat. § 604.50.

Temporary buildings or sheds used exclusively for construction purposes.

Mobile or modular structures used as temporary offices.

Those structures or facilities of electric utilities, as defined in Fla. Stat. § 366.02, which are directly involved in the generation, transmission, or distribution of electricity.

Chickees constructed by the Miccosukee Tribe of Indians of Florida or the Seminole Tribe of Florida. As used in this paragraph, the term "chickee" means an open-sided wooden hut that has a thatched roof of palm or palmetto or other traditional materials, and that does not incorporate any electrical, plumbing, or other non-wood features.

Family mausoleums not exceeding 250 square feet in area which are prefabricated and assembled on site or preassembled and delivered on site and have walls, roofs, and a floor constructed of granite, marble, or reinforced concrete.

Temporary housing provided by the Department of Corrections to any prisoner in the state correctional system.

Structures identified in Fla. Stat. § 553.73(10)(k), are not exempt from the Florida Building Code if such structures are located in flood hazard areas established on Flood Insurance Rate Maps.

Application for a permit or approval. To obtain a development permit the applicant shall first file an application in writing on a form furnished by the community. The information provided shall:

Identify and describe the development to be covered by the permit or approval.

Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitively locate the site.

Indicate the use and occupancy for which the proposed development is intended.

Be accompanied by a site plan or construction documents as specified in Section 107.102.1 of this chapter.

State the valuation of the proposed work.

Be signed by the applicant or the applicant's authorized agent.

Give such other data and information as required by the Floodplain Administrator.

For projects proposing to enclose areas under elevated buildings, include signed Declaration of Land Restriction (Nonconversion Agreement); the agreement shall be recorded on the property deed prior to issuance of the Certificate of Occupancy.

Validity of permit or approval. The issuance of a development permit pursuant to this ordinance shall not be construed to be a permit for, or approval of, any violation of this ordinance, the Florida Building Codes, or any other ordinance of this community. The issuance of permits based on submitted applications, construction documents, and information shall not prevent the Floodplain Administrator from requiring the correction of errors and omissions.

Expiration. A development permit shall become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized is suspended or abandoned for a period of 180 days after the work commences. Extensions for periods of not more than 180 days each shall be requested in writing and justifiable cause shall be demonstrated.

Suspension or revocation. The Floodplain Administrator is authorized to suspend or revoke a development permit if the permit was issued in error, on the basis of incorrect, inaccurate or incomplete information, or in violation of this ordinance or any other ordinance, regulation or requirement of this community.

Other permits required. Floodplain development permits and building permits shall include a condition that all other applicable state or federal permits be obtained before commencement of the permitted development, including but not limited to the following:

The South Florida Water Management District; Fla. Stat. § 373.036.

Florida Department of Economic Opportunity, Fla. Stat. § 380.05, Areas of Critical State Concern, and Fla. Stat. ch. 553, Part IV, Florida Building Code.

Florida Department of Health for onsite sewage treatment and disposal systems; Fla. Stat. § 381.0065 and Chapter 64E-6, F.A.C.

Florida Department of Environmental Protection for activities subject to the Joint Coastal Permit; Fla. Stat. § 161.055.

Florida Department of Environmental Protection for activities that affect wetlands and alter surface water flows, in conjunction with the U.S. Army Corps of Engineers; Section 404 of the Clean Water Act.

Federal permits and approvals.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102 Protection Of Endangered Species

Applications with Determination of Unsuitable Habitat. Upon receipt of a floodplain development permit application for a property that is determined to be on the SFAMs and the RE list as containing unsuitable habitat, the Floodplain Administrator shall place a letter in the floodplain development permit file that indicates:

The name of the city official that made the determination;

The date of the determination; and

The date of the SFAM and RE list used to make the determination.

Once the determination has been made, the City of Marathon may take action on the floodplain development permit application without further concern for Federally threatened and endangered species and their habitat.

Species Assessment Guides and Acceptance Form. The Species Assessment Guide for the City of Marathon provided by the U.S. Fish and Service (Service), dated December 23, 2011, and any subsequent revisions there to, is hereby declared to be a part of this ordinance. The Species Assessment Guide is on file at the city hall.

The City of Marathon shall use the Species Assessment Guide to determine whether the applicant for a floodplain development permit application must seek technical assistance by the Service. For applications that require such assistance, the City of Marathon shall provide copies of the applications to the Service for review on a weekly basis.

Based on the Service's technical assistance, the City of Marathon shall condition the floodplain development permit to incorporate the Service's recommendations to avoid and/or to minimize possible impacts on Federally listed threatened and endangered species and their habitat.

The City shall maintain an Acceptance Form of the Service's recommendations in the permit file. The Acceptance Form shall be signed by the permit applicant and the building official.

The City shall use the Species Assessment Guides (SAGs) for properties that exist within the boundaries of a completed Habitat Conservation Plan and which are subject to the SFAMs. The Real Estate folio number list which accompanies the SFAMs will be utilized in combination to determine if a development permit application must be provided to the Service for technical assistance in order to meet the full requirements of the FEMA-FWS Settlement.

Avoiding Impacts on Federally Listed Species. All proposed development shall meet the conditions attached to floodplain development permits in accordance with Section 105.2(2) to avoid possible impacts to Federally threatened and endangered species and their habitat.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Sec 107.102.1 Site Plans And Construction Documents

Information for development in flood hazard areas. The site plan or construction documents for any development subject to the requirements of this ordinance shall be drawn to scale and shall include, as applicable to the proposed development:

Delineation of flood hazard areas, flood zone(s), base flood elevation(s), and ground elevations if necessary for review of the proposed development.

Location of the proposed activity and proposed structures, and locations of existing buildings and structures; in coastal high hazard areas, new buildings shall be located landward of the reach of mean high tide.

Location, extent, amount, and proposed final grades of any filling, grading, or excavation.

Where the placement of fill is proposed, the amount, type, and source of fill material; compaction specifications; a description of the intended purpose of the fill areas; and evidence that the proposed fill areas are the minimum necessary to achieve the intended purpose.

Extent of any proposed alteration of sand dunes or mangrove stands, provided such alteration is approved by the Florida Department of Environmental Protection.

Existing and proposed alignment of any proposed alteration of a watercourse.

The Floodplain Administrator is authorized to waive the submission of site plans, construction documents, and other data that are required by this ordinance but that are not required to be prepared by a registered design professional if it is found that the nature of the proposed development is such that the review of such submissions is not necessary to ascertain compliance with this ordinance.

Additional analyses and certifications. For activities that propose to alter sand dunes or mangrove stands in coastal high hazard areas (Zone V), an engineering analysis signed and sealed by a Florida licenses engineer that demonstrates that the proposed alteration will not increase the potential for flood damage shall be submitted with the site plan and construction documents.

Submission of additional data. When additional hydrologic, hydraulic or other engineering data, studies, and additional analyses are submitted to support an application, the applicant has the right to seek a Letter of Map Change from FEMA to change the base flood elevations or change boundaries of flood hazard areas shown on FIRMs, and to submit such data to FEMA for such purposes. The analyses shall be prepared by a Florida licensed engineer in a format required by FEMA. Submittal requirements and processing fees shall be the responsibility of the applicant.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Sec 107.102.2 Inspections

General. Development for which a development permit is required shall be subject to inspection.

Development other than buildings and structures. The Floodplain Administrator shall inspect all development to determine compliance with the requirements of this ordinance and the conditions of issued development permits.

Buildings, structures and facilities exempt from the Florida Building Code. The Floodplain Administrator shall inspect buildings, structures and facilities exempt from the Florida Building Code to determine compliance with the requirements of this ordinance and the conditions of issued development permits.

Buildings, structures and facilities exempt from the Florida Building Code, lowest floor inspection. Upon placement of the lowest floor, including basement, and prior to further vertical construction, the owner of a building, structure or facility exempt from the Florida Building Code, or the owner's authorized agent, shall submit to the Floodplain Administrator the certification of elevation of the lowest floor prepared and sealed by a Florida licensed professional surveyor.

Buildings, structures and facilities exempt from the Florida Building Code, final inspection. As part of the final inspection, the owner or owner's authorized agent shall submit to the Floodplain Administrator a final certification of elevation of the lowest floor or final documentation of the

height of the lowest floor above the highest adjacent grade; such certifications and documentations shall be prepared as specified in Section 107.102.2.D of this chapter.

Manufactured homes. The Floodplain Administrator shall inspect manufactured homes that are installed or replaced in flood hazard areas to determine compliance with the requirements of this ordinance and the conditions of the issued permit. Upon placement of a manufactured home, certification of the elevation of the lowest floor shall be submitted to the Floodplain Administrator.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.3 Variances And Appeals

General. The Planning Commission shall hear and decide on requests for appeals and requests for variances from the strict application of this ordinance. Pursuant to Fla. Stat. § 553.73(5), the Planning Commission shall hear and decide on requests for appeals and requests for variances from the strict application of the flood resistant construction requirements of the Florida Building Code. This section does not apply to Section 3109 of the Florida Building Code, Building.

Appeals. The Planning Commission shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the administration and enforcement of this ordinance. Any person aggrieved by the decision may appeal such decision to the Circuit Court, as provided by Florida Statutes.

Limitations on authority to grant variances. The Planning Commission shall base its decisions on variances on technical justifications submitted by applicants, the considerations for issuance in Section 107.102.3.F of this ordinance, the conditions of issuance set forth in Section 107.102.3.G of this ordinance, and the comments and recommendations of the Floodplain Administrator and the Building Official. The Planning Commission has the right to attach such conditions as it deems necessary to further the purposes and objectives of this ordinance.

Historic buildings. A variance is authorized to be issued for the repair, improvement, or rehabilitation of a historic building that is determined eligible for the exception to the flood resistant construction requirements of the Florida Building Code, Existing Building, Chapter 12 Historic Buildings, upon a determination that the proposed repair, improvement, or rehabilitation will not preclude the building's continued designation as a historic building and the variance is the minimum necessary to preserve the historic character and design of the building. If the proposed work precludes the building's continued designation as a historic building, a variance shall not be

granted and the building and any repair, improvement, and rehabilitation shall be subject to the requirements of the Florida Building Code.

Functionally dependent uses. A variance is authorized to be issued for the construction or substantial improvement necessary for the conduct of a functionally dependent use, as defined in this ordinance, is the minimum necessary considering the flood hazard, and all due consideration has been given to use of methods and materials that minimize flood damage during occurrence of the base flood.

Considerations for issuance of variances. In reviewing requests for variances, the Planning Commission shall consider all technical evaluations, all relevant factors, all other applicable provisions of the Florida Building Code, this ordinance, and the following:

The danger that materials and debris may be swept onto other lands resulting in further injury or damage;

The danger to life and property due to flooding or erosion damage;

The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners;

The importance of the services provided by the proposed development to the community;

The availability of alternate locations for the proposed development that are subject to lower risk of flooding or erosion;

The compatibility of the proposed development with existing and anticipated development;

The relationship of the proposed development to the comprehensive plan and floodplain management program for the area;

The safety of access to the property in times of flooding for ordinary and emergency vehicles;

The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and

The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

Conditions for issuance of variances. Variances shall be issued only upon:

Submission by the applicant, of a showing of good and sufficient cause that the unique characteristics of the size, configuration, or topography of the site limit compliance with any provision of this ordinance or the required elevation standards;

Determination by the Planning Commission that:

Failure to grant the variance would result in exceptional hardship due to the physical characteristics of the land that render the lot undevelopable; increased costs to satisfy the requirements or inconvenience do not constitute hardship;

The granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws and ordinances; and

The variance is the minimum necessary, considering the flood hazard, to afford relief;

Receipt of a signed statement by the applicant that the variance, if granted, shall be recorded in the Office of the Clerk of the Court in such a manner that it appears in the chain of title of the affected parcel of land; and

If the request is for a variance to allow construction of the lowest floor of a new building, or substantial improvement of a building, below the required elevation, a copy in the record of a written notice from the Floodplain Administrator to the applicant for the variance, specifying the difference between the base flood elevation and the proposed elevation of the lowest floor, stating that the cost of federal flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation (up to amounts as high as $25.00 for $100.00 of insurance coverage), and stating that construction below the base flood elevation increases risks to life and property.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.4 Violations

Violations. Any development that is not within the scope of the Florida Building Code but that is regulated by this ordinance that is performed without an issued permit, that is in conflict with an issued permit, or that does not fully comply with this ordinance or the conditions established by grants of variance, shall be deemed a violation of this ordinance and punishable as a non-criminal violation. A building or structure without the documentation of elevation of the lowest floor, other required design certifications, or other evidence of compliance required by this ordinance or the Florida Building Code is presumed to be a violation until such time as that documentation is provided.

Authority. For development that is not within the scope of the Florida Building Code but that is regulated by this ordinance and that is determined to be a violation, the Floodplain Administrator

is authorized to serve notices of violation or stop work orders to owners of the property involved, to the owner's agent, or to the person or persons performing the work. Nothing herein contained shall prevent the Floodplain Administrator from taking such other lawful actions as are necessary to prevent or remedy any violation.

Unlawful continuance; fine. Any person who shall continue any work after having been served with a notice of violation or a stop work order, except such work as that person is directed to perform to remove or remedy a violation or unsafe condition, shall be fined not more than $500.00, and in addition, shall pay all costs and expenses involved in the case. Each day such violation continues shall be considered a separate offense.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Sec 107.102.5 Buildings And Structures

Design and construction of buildings, structures and facilities exempt from the Florida Building Code. Pursuant to Section 107.101.C of this ordinance, buildings, structures, and facilities that are exempt from the Florida Building Code, including substantial improvement or repair of substantial damage of such buildings, structures and facilities, shall be designed and constructed in accordance with the flood load and flood resistant construction requirements of ASCE 24. Structures exempt from the Florida Building Code that are not walled and roofed buildings shall comply with the requirements of Section 107.102.11 of this ordinance.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.6 Subdivisions

Minimum requirements. Subdivision proposals, including proposals for manufactured home parks and subdivisions, shall be reviewed to determine that:

Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;

All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and

Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.

Subdivision plats. Where any portion of proposed subdivisions, including manufactured home parks and subdivisions, lies within a flood hazard area, the following shall be required:

Delineation of flood hazard areas and flood zones, and design flood elevations, as appropriate, shall be shown on preliminary plats; and

Compliance with the site improvement and utilities requirements of Section 107.102.7 of this chapter.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.7 Site Improvements, Utilities And Limitations

Minimum requirements. All proposed new development shall be reviewed to determine that:

Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;

All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and

Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.

Sanitary sewage facilities. All new and replacement sanitary sewage facilities, private sewage treatment plants (including all pumping stations and collector systems), and on-site waste disposal systems shall be designed in accordance with the standards for onsite sewage treatment and disposal systems in Chapter 64E-6, F.A.C. and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the facilities and discharge from the facilities into flood waters, and impairment of the facilities and systems.

Water supply facilities. All new and replacement water supply facilities shall be designed in accordance with the water well construction standards in Chapter 62-532.500, F.A.C. and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the systems.

Limitations on placement of fill. Subject to the limitations of this ordinance, fill shall be designed to be stable under conditions of flooding including rapid rise and rapid drawdown of floodwaters, prolonged inundation, and protection against flood-related erosion and scour. In addition to these requirements, if intended to support buildings and structures (Zone A only), fill shall comply with the requirements of the Florida Building Code.

Limitations on sites in coastal high hazard areas (Zone V). In coastal high hazard areas, alteration of sand dunes and mangrove stands shall be permitted only if such alteration is approved by the Florida Department of Environmental Protection and only if the engineering analysis required by Section 107.102.1.B of this chapter demonstrates that the proposed alteration will not increase the potential for flood damage. Construction or restoration of dunes under or around elevated buildings and structures shall comply with Section 107.102.11.F(3) of this chapter.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.8 Manufactured Homes

General; limitation. All manufactured homes installed in flood hazard areas shall be installed by an installer that is licensed pursuant to Fla. Stat. § 320.8249, and shall comply with the requirements of Chapter 15C-1, F.A.C. and the requirements of this ordinance. Unless located in a manufactured home park or subdivision, new installations of manufactured homes are not permitted. New installations are not permitted in coastal high hazard areas (Zone V) under any circumstance.

Foundations. All new manufactured homes and replacement manufactured homes installed in flood hazard areas shall be installed on permanent, reinforced foundations that:

In flood hazard areas (Zone A) other than coastal high hazard areas, are designed in accordance with the foundation requirements of the Florida Building Code, Residential Section R322.2 and this ordinance.

In coastal high hazard areas (Zone V), are designed in accordance with the foundation requirements of the Florida Building Code, Residential Section R322.3 and this ordinance.

Anchoring. All new manufactured homes and replacement manufactured homes shall be installed using methods and practices which minimize flood damage and shall be securely anchored to an adequately anchored foundation system to resist flotation, collapse or lateral movement. Methods of anchoring include, but are not limited to, use of over-the-top or frame ties to ground anchors. This anchoring requirement is in addition to applicable state and local anchoring requirements for wind resistance.

Elevation. All manufactured homes that are placed, replaced, or substantially improved in flood hazard areas shall be elevated such that the bottom of the frame is at or above the elevation required, as applicable to the flood hazard area, in the Florida Building Code, Residential Section R322.2 (Zone A) or R322.3 (Zone V and Coastal A Zone).

Enclosures. Enclosed areas below elevated manufactured homes shall comply with the requirements of the Florida Building Code, Residential Section R322.2 or R322.3 for such enclosed areas, as applicable to the flood hazard area.

Utility equipment. Utility equipment that serves manufactured homes, including electric, heating, ventilation, plumbing, and air conditioning equipment and other service facilities, shall comply with the requirements of the Florida Building Code, Residential Section R322, as applicable to the flood hazard area.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.9 Recreational Vehicles And Park Trailers

Temporary placement. Recreational vehicles and park trailers placed temporarily in flood hazard areas shall:

Be on the site for fewer than 180 consecutive days; and

Be fully licensed and ready for highway use, which means the recreational vehicle or park model is on wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanent attachments such as additions, rooms, stairs, decks and porches.

Permanent placement. Recreational vehicles and park trailers that do not meet the limitations in Section 107.102.9.A of this ordinance for temporary placement shall meet the requirements of Section 107.102.8 of this ordinance for manufactured homes.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.10 Tanks

Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty.

Above-ground tanks, not elevated. Above-ground tanks that do not meet the elevation requirements of Section 107.102.10.C of this chapter shall:

Be permitted in flood hazard areas (Zone A) other than coastal high hazard areas, provided the tanks are anchored or otherwise designed and constructed to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty and the effects of flood-borne debris.

Not be permitted in coastal high hazard areas (Zone V).

Above-ground tanks, elevated. Above-ground tanks in flood hazard areas shall be elevated to or above the design flood elevation and attached to a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area.

Tank inlets and vents. Tank inlets, fill openings, outlets and vents shall be:

At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and

Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Sec 107.102.11 Other Development

General requirements for other development. All development, including man-made changes to improved or unimproved real estate for which specific provisions are not specified in this ordinance or the Florida Building Code, shall:

Be located and constructed to minimize flood damage;

Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the design flood;

Be constructed of flood damage-resistant materials; and

Have mechanical, plumbing, and electrical systems above the design flood elevation or meet the requirements of ASCE 24, except that minimum electric service required to address life safety and electric code requirements is permitted below the design flood elevation provided it conforms to the provisions of the electrical part of building code for wet locations.

Detached accessory structures in coastal high hazard areas (Zone V). In coastal high hazard areas, detached garages are not permitted. Detached accessory structures used only for storage that are 100 square feet or less in area are permitted below the base flood elevation provided the structures comply with Section 107.102.11.A of this chapter.

Concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses in coastal high hazard areas (Zone V). In coastal high hazard areas, concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses are permitted beneath or adjacent to buildings and structures provided the concrete slabs are designed and constructed to be:

Structurally independent of the foundation system of the building or structure;

Frangible and not reinforced, so as to minimize debris during flooding that is capable of causing significant damage to any structure; and

Have a maximum slab thickness of not more than four (4) inches.

Decks and patios in coastal high hazard areas (Zone V). In addition to the requirements of the Florida Building Code, in coastal high hazard areas decks and patios shall be located, designed, and constructed in compliance with the following:

A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the design flood elevation and any supporting members that extend below the design flood elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck.

A deck or patio that is located below the design flood elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

A deck or patio that has a vertical thickness of more than 12 inches or that is constructed with more than the minimum amount of fill necessary for site drainage shall not be approved unless an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to the building or structure or to adjacent buildings and structures.

A deck or patio that has a vertical thickness of 12 inches or less and that is at natural grade or on nonstructural fill material that is similar to and compatible with local soils and is the minimum

amount necessary for site drainage may be approved without requiring analysis of the impact on diversion of floodwaters or wave runup and wave reflection.

Other development in coastal high hazard areas (Zone V). In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate federal, state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;

Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters; and

On-site sewage treatment and disposal systems defined in 64E-6.002, F.A.C., as filled systems or mound systems.

Nonstructural fill in coastal high hazard areas (Zone V). In coastal high hazard areas:

Minor grading and the placement of minor quantities of nonstructural fill shall be permitted for landscaping and for drainage purposes under and around buildings.

Nonstructural fill with finished slopes that are steeper than one (1) unit vertical to five (5) units horizontal shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures.

Where authorized by the Florida Department of Environmental Protection or applicable local approval, sand dune construction and restoration of sand dunes under or around elevated buildings are permitted without additional engineering analysis or certification of the diversion of floodwater or wave runup and wave reflection if the scale and location of the dune work is consistent with local beach-dune morphology and the vertical clearance is maintained between the top of the sand dune and the lowest horizontal structural member of the building.

HISTORY

Adopted by Ord. 2018-05 § 2 on 8/14/2018

Amended by Ord. 2021-06 § 2 on 3/9/2021

Appendix B: Stormwater Assessment Ordinance

ARTICLE 34-III STORMWATER SYSTEM

DIVISION 34-III-1 GENERALLY

DIVISION 34-III-2 ESTABLISHMENT OF UTILITY AND ERU RATE

DIVISION 34-III-3 OPERATION AND DISCHARGE

DIVISION 34-III-1 GENERALLY

Sec 34-68 Purpose, Intent, And Findings

Sec 34-69 Definitions

Secs 34-70--34-96 (Reserved)

Sec 34-68 Purpose, Intent, And Findings

The purpose of this article is to promote the health, safety and general welfare of the inhabitants of the City of Marathon by establishing a stormwater utility responsible for the financing, construction, operation and maintenance of stormwater facilities; for stormwater system planning; for coordinated review of development plans for compliance with stormwater regulations; and ensuring the protection and enhancement of the City's nearshore waters. Further, the City finds more specifically that:

The City is located in the middle of the Florida Keys archipelago, which contains environmental and natural resources of such Statewide importance the Florida Legislature declared it to be an area of critical state concern under Fla. Stat. ch. 380; and

As a result of its inclusion within the Florida Keys Area of Critical State Concern, the City is statutorily obligated to limit the adverse impacts of development on the quality of its nearshore waters and to protect and improve water quality by providing for the construction, operation, maintenance, and replacement of stormwater management facilities; and

The Federal and State government ordered the City to comply with National Pollutant Discharge Elimination System ("NPDES") requirements or face financial penalties, the suspension of Federal and State grant funding, and a possible building moratoria; and

Stormwater runoff is capable of carrying pollutants into the City's nearshore waters, thereby degrading water quality; and

The increase in nutrients, such as phosphorous and nitrogen, accelerates eutrophication of the City's nearshore waters, thereby adversely affecting flora and fauna; and

Improperly channeling water increases the velocity of stormwater runoff, thereby increasing erosion and sedimentation; and

The alteration of natural topography and removal of vegetation tends to increase erosion; and

Siltation of the City's nearshore waters resulting from increased erosion interferes with navigation and harms flora and fauna; and

Impervious surfaces increase the volume and rate of stormwater runoff, and allow less water to percolate into the soil, thereby decreasing groundwater recharge; and

Improperly managed stormwater runoff from developed and undeveloped property may increase the incidents of flooding and the level of floods which occur thereby endangering property and human life; and

Improperly managed stormwater runoff from developed and undeveloped property may interfere with the maintenance of optimum salinity in estuarine areas thereby disrupting biological productivity; and

Substantial economic losses will result from such adverse impacts upon the City's nearshore waters ecosystem; and

Sound stormwater management practices result in the avoidance of future problems concerning the development of land and the maintenance of the quality of the City's nearshore waters; and

The City maintains a system of stormwater management facilities including, but not limited to, conduits, manholes, channels, ditches, drainage easements, retention and detention basins, swales, infiltration facilities, and other components that need regular maintenance and improvements; and

All real property in the City benefits from this stormwater system.

This article is intended to comply with Federal and State law and regulations regarding water quality and has the following objectives:

To establish a stormwater utility and management program within the City responsible for the construction, operation, and maintenance of City stormwater devices and facilities; for stormwater system planning; for review of development plans for compliance with stormwater management regulations; and for nearshore water quality management; and

To adopt stormwater service assessments sufficient to plan, construct, operate, and maintain stormwater management facilities throughout the City; and

To protect, restore, and maintain the chemical, physical, and biological integrity of the City's nearshore waters; and

To prevent individuals, business organizations, companies, and governments from causing harm to the community, by activities which adversely affect water resources; and

To encourage the construction of drainage systems which aesthetically and functionally approximate natural systems; and

To encourage the protection of natural systems, and the use of such natural systems in ways which do not impair their beneficial functioning; and

To minimize the transport of pollutants to the City's nearshore waters; and

To minimize erosion and sedimentation; and

To prevent damage to wetlands; and

To reduce damage from flooding, while recognizing that natural fluctuations in water levels are beneficial; and

To protect, restore, and maintain the City's nearshore habitat of flora and fauna; and

To ensure the attainment of these objectives by requiring the approval and implementation of a stormwater management program for all activities, which have an adverse impact upon the City's nearshore waters.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-69 Definitions

For the purpose of this article, the following definitions shall apply; words used in the singular shall include the plural, and the plural, the singular; words used in the present tense shall include the future tense. The word "shall" is mandatory and not discretionary. The word "may" is permissive. Words not defined herein shall be construed to have the meanings given by common and ordinary use as defined in the latest edition of Webster's Dictionary.

Assessable real property means "nonresidential property," "residential property" and "undeveloped property."

Authorized official means any employee or agent of the City authorized in writing by the City Manager to administer or enforce the provisions of this article.

Best management practices or BMPs means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

City means the City of Marathon, Florida.

City Manager means the City Manager or his designee.

Clean Water Act or CWA means Public Law (PL) 92-500, as amended PL95-217, PL95-576, PL6-483, PL97-117, and 33 U.S.C. 1251 et seq., as amended by the Water Quality Act of 19876, PL100-4.

Construction activities means the alteration of land during construction and include such activities as clearing, grading, and excavation.

DOR Code means a property use code established in Rule 12D-8.008, Florida Administrative Code, assigned by the Monroe County Property Appraiser to parcels within the City.

Discharge means the release of liquid, solid or gaseous material and includes, but is not limited to, a release, spilling, leaking, seeping, pouring, emitting, emptying and/or dumping of any substance or material.

Dwelling unit means any residential space identified for habitation by members of the same family or as classified by the Florida Building Code.

Equivalent residential unit (ERU) means that unit of construction consisting of one (1) dwelling unit (whether single-family, condominium, mobile home, or townhouse unit) for developed residential property; or for developed commercial or industrial property, an impervious area equal to 4,769 square feet; or for undeveloped commercial, industrial, or residential property, an area equal to 4,769 square feet. An ERU serves as a reference from which an equitable distribution of the stormwater cost of services and facilities can be made among all properties within the City through a stormwater assessment rate methodology.

Exempt property means any submerged land or parcel (nonresidential, residential or undeveloped) containing wetlands of such quality and/or size (a/k/a "red-flagged wetlands") that it does not contribute stormwater to the City's stormwater system, and is not otherwise benefited by the City's stormwater utility. Additionally, "exempt property" includes all governmental real property within the City. Governmentally owned real property used for nongovernmental purposes shall not be included within the definition of "exempt property." The exemption of

property from taxation under Florida law shall not relieve the owner of any such real property from the provisions of this article, or from the imposition by the City of the annual stormwater service assessment applicable to such real property.

Illicit connection means any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm sewer system including, but not limited to, any conveyances which allow a non-stormwater discharge including sewage, process wastewater, and wash water to enter the storm sewer system and any connections to the storm sewer system from indoor drains and sinks regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency, or any drain or conveyance connected from a commercial or industrial land use to the storm sewer system which has not been documented in plans, maps or equivalent records and approved by an authorized enforcement agency.

Illicit discharge means any direct or indirect nonstormwater discharge to the storm sewer system, except as specifically exempted in this article.

Impervious area or impervious surface means any horizontal surface, which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water, or modified by the action of a person to reduce the land's natural ability to absorb and hold rainfall. It includes, but is not limited to, semi-impervious surfaces such as compacted clay, as well as areas that have been cleared, streets, roofs, sidewalks, parking lots and other similar surfaces.

Industrial activities mean activities subject to NPDES Industrial Permits as defined by 40 CFR, Section 122.26(b)(14).

Municipal separate storm sewer system or MS4 means a conveyance, storage area or system of conveyances and storage areas (including, but not limited to, roads with drainage systems, streets, catch basins, curbs, gutters, ditches, manmade channels, storm drains, treatment ponds and other structural BMPs) owned or operated by a local government that discharges to waters of the United States or to other MS4s; is designed solely for collecting, treating or conveying stormwater; and is not part of a publicly owned treatment works (POTW), as defined by 40 Code of Federal Register 122.2 or any context may require.

NPDES (National Pollutant Discharge Elimination System) Stormwater Permit means permit issued by EPA (or by a state under authority delegated pursuant to 33 USC § 1342(b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group or general area-wide basis.

Nonresidential property means any developed or undeveloped parcel not otherwise defined as residential.

Parcel means land(s) or lot(s) shown on a recorded plat or on the Monroe County Property Appraiser's maps or any piece of land described by deed and recorded in the public records of Monroe County, Florida.

Person means any natural individual, corporation, partnership, institution, or other entity.

Pollutant means anything that causes or contributes to pollution including, but is not limited to: paints, varnishes, and solvents; oil and other automotive fluids; nonhazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Red-flag wetlands means wetlands that lack disturbance and are of obvious and exceptionally high quality meeting criteria specified in the Florida Keys Wetlands Evaluation Procedure.

Residential property means any developed or undeveloped parcel existing in the City exclusively for residential purposes including, but not limited to, single-family homes, manufactured homes, multifamily, apartment buildings and condominiums, transient rentals such as hotels and motels, and floating structures.

Site of industrial activity means any area or facility used for manufacturing, processing or raw materials storage, as defined under 40 CFR 122.26(a)(14) of regulations of the U.S. Environmental Protection Agency, as amended.

Stormwater means surface flow and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Stormwater management plan means a City or State government-approved plan for receiving, handling, and transporting stormwater and surface waters within the City.

Stormwater management system means the system of storm and surface water management facilities including, but not limited to, conduits, manholes, channels, ditches, drainage easements, retention and detention basins, infiltration facilities, and other components owned by the City used for collecting, storing and transporting stormwater.

Stormwater utility cost or Stormwater cost means the amount necessary to fund the City's stormwater utility services that are allocable to assessed property during a tax year and shall include, but not be limited to:

The cost, whether direct or indirect, of all services, programs or facilities provided by the City, or through contractual arrangements with the City relating to stormwater management and disposal activities;

The cost of any indemnity or surety bonds and premiums for insurance;

The cost of salaries, volunteer pay, workers compensation insurance, or other employment benefits;

The cost of computer services, data processing, and communications;

The cost of training, travel and per diem;

The recovery of unpaid or delinquent fees or charges advanced by the City and due for stormwater management and disposal services, programs or facilities allocable to specific parcels;

The cost of engineering, financial, legal or other professional services;

All costs associated with the structure, implementation, collection, and enforcement of the stormwater service assessments or a prior year's assessment for a comparable service, facility or program, including any service charges of the Monroe County Tax Collector or Monroe County Property Appraiser;

All other costs and expenses necessary or incidental to the acquisition, provision, or delivery of the services, programs or facilities funded by the stormwater service assessment, and such other expenses as may be necessary or incidental to any related financing authorized by the City Council;

A reasonable amount for contingency and anticipated delinquencies and uncollectible stormwater service assessments; and

Reimbursement to the City or any other person for any monies advanced for any costs incurred by the City or such person in connection with any of the foregoing items.

Stormwater service assessment means a special assessment lawfully imposed by the City against assessable property to fund all or any portion of the stormwater cost, providing a special benefit to property because of possessing a logical relationship to the value, use, or characteristics of the assessable property.

Submerged land means land below the mean high tide line and/or the mean high water line of an upland water body.

Undeveloped property means any parcel (residential or nonresidential), which has not been altered from its natural state through any construction activity; by the addition of any improvements such as a building, structure, and impervious surface; or change of grade,

placement of fill, tree or vegetation removal, or landscaping. For new construction, a property shall be considered developed:

Upon issuance of a certificate of occupancy, or upon completion of construction or final inspection if no such certificate is issued; or

Where construction is at least 50 percent complete and construction is halted for a period of three (3) months.

Wastewater means any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Wetlands means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and, under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce or persist in aquatic environments or anaerobic soil conditions. Florida Keys wetlands generally include tidal marshes, mangrove swamps and other similar areas.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2011-06 on 7/12/2011

Amended by Ord. 2014-20 on 12/16/2014

Secs 34-70--34-96 (Reserved)

DIVISION 34-III-2 ESTABLISHMENT OF UTILITY AND ERU RATE

Sec 34-97 Stormwater Utility And Stormwater Service Assessment

Sec 34-98 Assessment Role And Schedule Of Rates

Sec 34-99 Billing And Payment; Penalties

Sec 34-100 Adjustment Of Service Assessment; Correction Of Errors And Omissions

Sec 34-101 Capital Contributions

Sec 34-102 Stormwater Utility Enterprise Fund

Sec 34-103 Conflicting Provisions

Secs 34-104--34-132 (Reserved)

Editor's note(s)—Ord. No. 2014-20, § 2, adopted Dec. 16, 2014, amended Div. 2 in its entirety to read as set out herein. Former Div. 2 pertained to similar subject matter and derived from Ord. No. 2005-10, § 2, art. 2, adopted May 10, 2005; Ord. No. 2011-06, § 3, adopted July 12, 2011.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Sec 34-97 Stormwater Utility And Stormwater Service Assessment

Pursuant to the home rule power of Article VIII, Section 2(b) of the Florida Constitution, Chapter 166, Florida Statutes and Chapter 24 of the Marathon Code, a stormwater utility is hereby established and a stormwater service assessment is hereby imposed, upon each nonexempt parcel within the City for services and facilities provided by the stormwater utility. For purposes of imposing the stormwater service assessment, all parcels within the City are classified into four (4) customer classes:

Residential.

Nonresidential, which includes institutional (tax exempt); commercial; industrial and other.

Undeveloped.

Exempt.

The stormwater service assessment imposed on each nonexempt parcel in the City shall constitute a non-ad valorem assessment.

On or before the 15th day of September of the first year of assessment, the City Council shall hold a public hearing to adopt a final rate resolution and assessment roll. The rate resolution and assessment roll shall stay in effect until a change in the stormwater service assessment is proposed. On or before the 15th day of September in the year of a proposed assessment change, the City Council shall hold a public hearing to adopt the modified stormwater service assessment resolution and assessment roll for the purposes of imposing the stormwater service assessment upon each nonexempt parcel within the City. Said rate resolution and assessment roll shall incorporate a schedule of rates and classifications of all parcels in the City.

Notice of the public hearing concerning the above-referenced stormwater service assessment resolution shall be published in a newspaper of general circulation in the City at least once, with the first publication being at least 20 days prior to the public hearing. Said public hearing may be

continued to a date certain without the necessity of further newspaper advertisement or public notice.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-98 Assessment Role And Schedule Of Rates

Pursuant to the home rule power of Article VIII, Section 2(b) of the Florida Constitution, Chapter 166, Florida Statutes and Chapter 24 of the Marathon Code, the City Manager is directed to prepare a list of all parcels within the City and assign a classification of residential, nonresidential, undeveloped, or exempt to each parcel, which list shall constitute the annual stormwater utility assessment roll. Such roll shall contain a summary description of each parcel in the City setting forth the name and address of the owner of each such parcel; the assessment classification applicable to each parcel of real property as specified in the rate resolution; and the amount of the annual stormwater utility fee or assessment applicable to each such parcel.

The City Manager shall be responsible for determining the impervious area based on data supplied by the Monroe County Property Appraiser, or by the property owner, tenant or developer if such information is unavailable from the Property Appraiser. The City Manager may require additional information as necessary to determine the impervious area of a parcel. The annual stormwater assessment amount shall be updated by the City Manager based on any additions or deletions to the impervious area of a parcel.

On or before the 15th day of September of the first year the stormwater service assessment is imposed the City Council shall, at any regular or special meeting, review the stormwater utility assessment roll prepared by the City Manager for its conformity with the rate resolution provided for in Section 34-97; and make such changes or additions as necessary to conform such roll with the rate resolution. Upon the completion of such review, and any changes or additions, it shall ratify and confirm such roll and certify the roll to the Monroe County Tax Collector for appropriate action. The ratified and confirmed stormwater utility assessment roll shall be maintained on file in the office of the City Manager, and thereafter shall be incorporated into the annual stormwater service assessment resolution by reference.

The service assessment imposed for residential properties shall be one (1) ERU per parcel, multiplied by the number of dwelling units existing on the parcel (1 ERU) x (number of dwelling units). The minimum service assessment for any residential property, irrespective of the number of existing dwelling units, shall be equal to one (1) ERU per parcel.

The minimum service assessment for any nonresidential property, irrespective of the amount of impervious area, shall be equal to one (1) ERU per parcel.

The minimum service assessment for any undeveloped property, irrespective of the amount of impervious area, shall be equal to one (1) ERU per parcel.

Exempt properties shall not be assessed.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-99 Billing And Payment; Penalties

The annual stormwater service assessment shall be collected and enforced in the same manner that ad valorem taxes are collected and enforced, including, but not limited to, provisions relating to discount for early payment, prepayment by the installment method, penalty for delinquent payment, and issuance of tax certificates and tax deeds for nonpayment, as provided for in Fla. Stat. § 197.3631. Failure to pay the annual stormwater utility assessment in the required manner will result in the issuance of a tax certificate against the subject property, and may result in the loss of title to the subject property. Alternatively, any unpaid stormwater service assessment shall constitute a lien on such property assessed. Such lien, when delinquent for more than 30 days, may be foreclosed by the City in the manner provided by the State law for the foreclosure of mortgages on real property.

The owner of a property is responsible for all stormwater service assessments imposed under this division.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-100 Adjustment Of Service Assessment; Correction Of Errors And Omissions

Requests for adjustment of the stormwater service assessment shall be submitted in writing to the City Manager, who shall administer the procedures and standards and review criteria for the adjustment of service assessment as established herein. All requests shall be reviewed based on the amount of impervious area on the parcel, or additional/enhanced stormwater facilities. No credit shall be given for the installation of facilities required by City or County development codes or Federal or State water quality regulations and stormwater rules. The following procedures shall apply to all adjustment requests of the stormwater service assessment:

Any property owner may submit an adjustment request to the City Manager. A condition precedent to the submission of an adjustment request is the payment of all unpaid stormwater service assessments.

Adjustment requests shall be in writing and set forth, in detail, the grounds upon which relief is sought.

Adjustments resulting from such request shall be retroactive for assessment refunds, but refunds shall not exceed one (1) year of imposed assessments.

The property owner requesting the adjustment may be required by the City, at property owner's own cost, to provide supplemental information to the City Manager including, but not limited to, facts, professional opinions or engineering studies to substantiate the adjustment request.

Adjustments to the stormwater service assessment will be made upon the granting of the adjustment request in writing by the City Manager. Denials of adjustment requests shall be made in writing by the City Manager.

Should an adjustment be granted to a lesser number of ERUs and the property owner later increases the number of lots or parcels to be developed, assessments that would have otherwise been imposed in fiscal year 2014-2015 (or such fiscal year in which the original adjustment is made), and each year thereafter, shall be due from the property owner as a condition of increasing the number of ERUs.

Upon receipt of the written denial of the adjustment request, the owner who initially requested the adjustment may, within 30 days of receipt of such denial, appeal to the City Council for review of the denial.

The City Council shall complete its review within 60 days of receipt of said request for appeal. The City Council's determination on the appeal shall be in writing and set forth in detail the reason for its decision.

In evaluating the appeal, the City Council shall be bound by the standards and review criteria contained herein.

All determinations of the City Council arising out of this section shall be final.

All adjustment requests submitted under this section must be submitted within a period of 90 days of the adoption of the annual stormwater service assessment resolution set forth in Section 34-98. After the expiration of such period of limitation, no right of administrative adjustment shall be asserted or be available to any owner.

No act of omission or commission on the part of the Monroe County Property Appraiser, Monroe County Tax Collector, the City Council, or City Manager shall operate to defeat the required

payment of the annual stormwater utility assessment imposed by the City Council under the provisions of this article. Provided, however, any acts of omissions or commission may be corrected at any time by the officer or party responsible, and when so corrected they shall be construed to be valid ab initio and shall in no way affect any process by law for the enforcement of the annual stormwater service assessments imposed under the provisions of this article.

The City Council shall have the authority, at any time, upon its own initiative or in response to an adjustment request from any affected owner of real property, to correct any error of omission or commission in the adoption of any annual stormwater service assessment roll, or in the implementation of this article, and make necessary adjustments thereto, subject to the one (1) year refund limitation in Subsection (a)(3) herein.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2011-06 on 7/12/2011

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-101 Capital Contributions

Procedures and standards developed by the City Manager shall define appropriate means by which to optimize development capital contributions in the implementation of basic specific stormwater systems. These basic specific capital contributions shall take the form of "service assessment-in-lieu-of" or "availability charges." Each situation will be analyzed by the City Manager, and a specific written decision will be developed. The application is defined as follows:

"Service assessment-in-lieu-of" is applied to a site-specific negotiated procedure, wherein a development's stormwater contribution (quantity and quality) is assessed its share of the capital needs of the facilities required to serve the development in question. This capital contribution would be used to implement City-owned stormwater facilities. The process does not apply wherein the stormwater facilities are privately held. Each application is evaluated against the City's stormwater master plan for the watershed involved or, while the master plan is incomplete, the cumulative impacts from the development.

"Availability charge" is administered on a site-specific basis identical to the service assessment-in-lieu-of procedure noted above; the only difference is that the capital investment advanced by the City in implementing a stormwater facility is not recovered through an availability charge. The capital charge is determined on a pro rata share of the capacity used by the new applicant or by the cumulative impact from the development upon all impacted facilities.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-102 Stormwater Utility Enterprise Fund

There shall be established a stormwater utility enterprise fund for the deposit of all service assessment and charges collected by the stormwater service assessment. These funds shall be for the exclusive use of the City's stormwater utility including, but not limited to, the following:

Stormwater management services, such as studies, design, permit review, plan preparation and development review.

Operation, maintenance, repair and replacement of the stormwater collection, storage, treatment and conveyance infrastructure.

Project costs related to constructing major or minor structural improvements to the stormwater system infrastructure as provided in the Citywide stormwater management plan.

Administrative costs associated with the management of the stormwater service assessment. A maximum of ten (10) percent of the annual stormwater utility fund may be transferred to the general fund annually for administrative costs.

Debt service financing of stormwater-related capital improvements defined in the Citywide stormwater management plan.

Funding of studies including water quantity and quality monitoring, aerial photography, and geotechnical work associated with the planning of the stormwater system infrastructure.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2014-20 on 12/16/2014

Sec 34-103 Conflicting Provisions

In the event that any provision of this article is in direct conflict with the provisions of any other provision of the City Code, the more restrictive provision shall apply.

HISTORY

Adopted by Ord. 2014-20 on 12/16/2014

Secs 34-104--34-132 (Reserved)

DIVISION 34-III-3 OPERATION AND DISCHARGE

Sec 34-133 Program Administration

Sec 34-134 Stormwater Discharges From Industrial, Commercial And Construction Activities

Sec 34-135 Illicit Discharges

Sec 34-136 Spills And Dumpings

Sec 34-137 Enforcement

Sec 34-138 Inspections And Monitoring

Sec 34-139 Discharges To The Municipal Separate Storm Sewer System

Secs 34-140--34-159 (Reserved)

Sec 34-133 Program Administration

It shall be the duty of the City Manager to administer the stormwater utility program. The City Manager shall keep an accurate record of all persons using the services and facilities of said stormwater management utility of the City and make changes in accordance with the rates and charges established in this article or by ordinance.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Sec 34-134 Stormwater Discharges From Industrial, Commercial And Construction Activities

General prohibitions. The State of Florida standards are hereby adopted by reference.

Specific prohibitions. By adoption of industrial activity stormwater regulations or by issuance of industrial activity stormwater permits, or both, the City Manager may impose reasonable limitations as to the quality of stormwater including without limitation the designation of maximum levels of pollutants discharged into the stormwater system from sites of industrial activity. Any promulgation of such regulations and issuance of permits by the City Manager shall be in accordance with applicable law.

Administrative orders. The City Manager may issue an order to any person to immediately cease any discharge determined by the City Manager to be in violation of any provision of this division, or in violation of any regulation or permit issued hereunder.

NPDES permits. Any person who holds a National Pollutant Discharge Elimination System (NPDES) permit shall provide a copy of such permit to the City Manager no later than 60 calendar days after issuance.

Stormwater discharges from industrial and commercial activities shall be treated or managed on site, in accordance with appropriate federal, state, or local permits and regulations, prior to discharge to the City's MS4.

Stormwater discharges from construction activities shall be treated or managed on site in accordance with appropriate federal, state, or local permits and regulations, prior to discharge to the City's MS4. Erosion, sediment and pollution controls for the construction site shall be properly implemented, maintained and operated according to a pollution prevention plan required by an NPDES permit for the discharge of stormwater from construction activities, or according to a state permit issued by the Florida Department of Environmental Protection or South Florida Water Management District.

The owners or operators of industrial facilities, commercial entities, and construction sites which discharge stormwater to the City's MS4 shall provide prior written notification to the City of the discharge and shall have received prior approval of the discharge from the City.

Editor's note(s)—Ord. No. 2011-06, § 3, adopted July 12, 2011, changed the title of § 34-134 from "Industrial activity" to "Stormwater discharge from industrial, commercial and construction activities". This historical notation has been preserved for reference purposes.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2011-06 on 7/12/2011

Sec 34-135 Illicit Discharges

General prohibitions. Except as set forth under Subsection (c) of this section or in accordance with a valid NPDES permit, any illicit discharge and illicit connection to the City's MS4 stormwater system is prohibited.

Failure to report a connection from industrial activities, commercial entities or construction activities to the City's MS4 or to waters of the United States constitutes an illicit connection.

Failure to report to the City a discharge from industrial activities, commercial entities, or construction activities to the City's MS4 or to waters of the United States constitutes an illicit discharge.

Any discharge to the City's MS4 or to waters of the United States which is in violation of federal, state or local permits or regulations constitutes an illicit discharge.

Specific prohibitions. Any discharge to the stormwater system containing any sewage, industrial waste or other waste materials, or containing any materials in violation of federal, state, county, municipal or other laws, rules, regulations, orders or permits, is prohibited including, but not

limited to: petroleum products, oil, gasoline, grease, solid waste, paints, steam cleaning waste, pesticides, herbicides, fertilizers, degreasers, solvents, sanitary sewage, chemically-treated cooling water, antifreeze/automotive products, lawn clippings, leaves, branches, animal carcasses, recreational vehicle waters, dyes, construction materials, any liquids in quantity or quality which are capable of causing a violation of the City's NPDES stormwater permit and solids in such quantities or of such size capable of causing interference or obstruction to the flow in the City's stormwater system.

Authorized exceptions. Unless the City Manager determines that it is not properly managed or otherwise is not acceptable, the following discharges are exempt from the general prohibition set forth under subsection (a) of this section: flows from firefighting activities and emergency response activities done in accordance with adopted spill response/action plan, water line flushing and other contributions from potable water sources, landscape irrigation and lawn watering, irrigation water, diverted stream flows, rising groundwaters, direct infiltration to the stormwater system, uncontaminated pumped groundwater, foundation and footing drains (not including active groundwater dewatering systems), water from crawl space pumps, air conditioning condensation, springs, individual residential car washings, flows from riparian habitats and wetlands, dechlorinated swimming pool contributions (typically less than one (1) part per million chlorine), and discharges for which all applicable federal, state and local permits have been obtained and which are in compliance with the conditions of said permits.

Illicit connections. No person may maintain, use, or establish any direct or indirect connection to the stormwater system that results in any discharge in violation of this article. This prohibition is retroactive and applies to connections made in the past, regardless of whether made under a permit, or other authorization, or whether permissible under laws or practices applicable or prevailing at the time the connection was made.

Persons responsible for illicit discharges or illicit connections shall immediately cease the illicit discharge or illicit connection, and obtain appropriate approvals from applicable regulatory agencies prior to resuming the discharge or connection.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2011-06 on 7/12/2011

Sec 34-136 Spills And Dumpings

Notification of spills. As soon as any person has knowledge of any discharge to the stormwater system in violation of this division, such person shall immediately notify the City Manager, and if such person is directly or indirectly responsible for such discharge, then such person shall also take immediate action to ensure the containment and cleanup of such discharge and shall confirm

such telephone notification in writing to the City Manager at City of Marathon, 9805 Overseas Hwy. Marathon, FL 33050, within three (3) calendar days.

Administrative order. The City Manager may issue an order to any person to immediately cease any discharge, or connection to the stormwater system, determined by the City Manager to be in violation of any provision of this division, or in violation of any regulation or permit issued hereunder.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Sec 34-137 Enforcement

A violation of this article or any resolution adopted pursuant to this article my be enforced by issuance of a citation, summons, notice to appear in County court, or by filing an action in civil court for injunction relief. This section is supplemental and nothing contained herein shall prohibit this City from enforcing this chapter by any other lawful means.

Injunctive relief. Any violation of any provision of this article, or of any regulation or order issued hereunder, shall be subject to injunctive relief if necessary to protect the public health, safety or general welfare.

Continuing violation. A person shall be deemed guilty of a separate violation for each and every day during any continuing violation of any provision of this article, or of any regulation or permit issued hereunder.

Enforcement actions. The City Manager may take all actions necessary, including the issuance of notices of violation, the filing of court actions and/or referral of the matter to the local code compliance board to require and enforce compliance with the provisions of this article and with any regulation or permit issued hereunder.

Remedial actions. Any violator may also be required to undertake remedial action, including, but without limitation:

The performance of site and water monitoring, analyses, and reporting;

The elimination of illicit connections or discharges;

The cessation of all illegal discharges, practices, or operations;

The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;

Payment of administrative, investigative and remediation costs incurred by the City;

The implementation of source control or treatment BMPs.

If abatement of a violation or restoration of affected property is required, any notice issued by the City shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or a designated contractor and the expense thereof shall be charged to the violator.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Amended by Ord. 2011-06 on 7/12/2011

Sec 34-138 Inspections And Monitoring

Authority for inspections. Whenever necessary to make an inspection to enforce any of the provisions of this article, or regulation or permit issued hereunder, or whenever an authorized official has reasonable cause to believe there exists any condition constituting a violation of any of the provisions of this article, or regulation or permit issued hereunder, any authorized official may enter any property, building or facility at any reasonable time to inspect the same or to perform any duty related to enforcement of the provisions of this article or any regulations or permits issued hereunder; provided that:

If such property, building or facility is occupied, such authorized official shall first present proper credentials and request permission to enter; and

If such property, building or facility is unoccupied, such authorized official shall make a reasonable effort to locate the owner or other person having charge or control of the property, building or facility, and shall request permission to enter.

Any request for permission to enter made hereunder shall state that the owner or person in control has the right to refuse entry, and that in the event entry is refused, the authorized official may enter to make inspection only upon issuance of a search warrant by a court of competent jurisdiction. If the owner or person in control refuses permission to enter after such request has been made, the authorized official is hereby authorized to seek assistance from any court of competent jurisdiction in obtaining entry.

Authority for monitoring and sampling. Any authorized official may establish on any property such devices as are necessary to conduct sampling or metering of discharges to the stormwater system. During any inspections made to enforce the provisions of this article, or regulations or permits issued hereunder, any authorized official may take any samples deemed necessary.

Requirements for monitoring. The City Manager may require any person engaging in any activity or owning any property, building or facility including but not limited to a site of industrial activity to undertake such reasonable monitoring of any discharge to the stormwater system and to furnish periodic reports.

HISTORY

Adopted by Ord. 2005-10 on 5/10/2005

Sec 34-139 Discharges To The Municipal Separate Storm Sewer System

No discharge to the City's municipal separate storm sewer system ("MS4") shall be permitted to impair the operation of the MS4 or contribute to the failure of the MS4 to meet any local, state, or federal requirements, including, but not limited to, NPDES permits.

Stormwater discharges to the MS4 from industrial, commercial or construction activities and from new development or redevelopment projects are required to obtain appropriate local, state and/or federal permits prior to discharging to the MS4.

Any person determined by the City to be responsible for a discharge contributing to the failure of the City's MS4 to comply with the provisions and conditions of an NPDES permit shall be guilty of a violation of this article and shall provide corrective measures as determined necessary by the City Manager, and shall be liable for fines and damages.

Structural controls and other BMPs used for controlling the discharge of pollutants to the City's MS4 or to waters of the United States shall be operated and maintained so as to function in accordance with permitted design and performance criteria and in compliance with federal, state or local permit conditions and regulations.

HISTORY

Adopted by Ord. 2011-06 on 7/12/2011

Secs 34-140--34-159 (Reserved)

Appendix C: Stormwater Management Standards

ARTICLE 107-11 STORMWATER MANAGEMENT

Sec 107.87 Purpose And Intent

Sec 107.88 Standards

Sec 107.89 Relationship To Project Design

Sec 107.90 Water Quality Criteria

Sec 107.91 Erosion And Sedimentation Control

Sec 107.92 Special Criteria For Systems Within New Residential Subdivisions

Sec 107.93 Plan Review

Sec 107.94 Inspections

Sec 107.95 Maintenance

Sec 107.96 Enforcement

Sec 107.97 Article To Be Liberally Construed

Sec 107.87 Purpose And Intent

It is the intent and purpose of this article to implement the goals, objectives, and policies of the Comprehensive Plan of the City of Marathon by providing standards for the design, construction, and operation of stormwater management systems in conformance with the best overall management practices for the control of runoff volume and treatment of stormwater runoff for the protection of surface water and groundwater quality, and for the control and prevention of erosion, sedimentation, and flooding. It is further the intent of this article to provide flexibility in meeting the design standards in an effort to encourage the construction of stormwater management systems that are an amenity to the development.

Sec 107.88 Standards

Permit Required. No person shall initiate any construction activity, or construct or modify a stormwater management system, without complying with the provisions of this article.

Supplemental Standards. All stormwater management systems must be designed and implemented to meet the performance criteria outlined in this article and the BMP according to the Generic Permit under NPDES. In addition, the following documents are incorporated herein as

part of the LDRs by reference, for supplemental standards and methodologies for use in designing, implementing and maintaining erosion and sediment control and surface water systems to meet the intent of this article:

Chapter 40E-4, Florida Administrative Code (F.A.C.), South Florida Water Management District (SFWMD), Environmental Resource and Works of the District Permits;

Chapter 62-4, F.A.C., Department of Environmental Protection, Permits;

Chapter 62-25, F.A.C., Department of Environmental Protection, Regulations of Stormwater Discharge;

Chapter 62-302.700, F.A.C., Department of Environmental Protection, Special Protection, Outstanding Florida Waters, Outstanding Natural Resource Waters;

Chapter 62-621, F.A.C., Department of Environmental Protection, Generic Permits;

Chapter 62-624, F.A.C., Department of Environmental Protection, Municipal Separate Storm Sewer Systems;

Chapter 8, Article V, "Hazardous Waste" and Chapter 106 Article 4, "Open Water, Surface Waters and Wetlands", Code of Ordinances, City of Marathon, Florida;

City of Marathon Stormwater Management Master Plan;

The Florida Stormwater, Erosion and Sedimentation Control Inspector's Manual, State of Florida Department of Environmental Protection;

Florida Development Manual: A Guide to Sound Land and Water Management, and Drainage Manual, State of Florida Department of Transportation; and

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO).

Alternate Methods. Innovative approaches to stormwater management shall be encouraged and the concurrent control of erosion, sedimentation, flooding, and water quality shall be mandatory. For sites containing or in close proximity to wetlands, stormwater management facilities should be designed to mimic pre-development hydrologic conditions.

For all projects, the stormwater management system shall be designed to, at a minimum, to retain the minimum runoff required by the SFWMD. The site shall be designed to either contain the 25-year 72-hour storm event or discharge into an injection well.

All stormwater management systems should be designed to provide treatment of the stormwater runoff prior to discharging to the aquifer and to preclude the formation of solution pipe sinkholes in the system. In addition, the following minimum design features are required:

Stormwater basin depth should be as shallow as possible with a horizontal bottom;

Maximum stormwater basin depth of eight (8) feet; and

More stringent requirements shall apply for some industrial and commercial sites. Stormwater discharge facilities which receive stormwater from areas which are a potential source of oil and grease contamination in concentrations exceeding applicable water quality standards shall include a baffle, skimmer, grease trap or other mechanism suitable for preventing oil and grease from leaving the stormwater discharge facility in concentrations that would cause or contribute to violations of applicable water quality standards in the receiving waters.

Compliance. All stormwater management systems in the City of Marathon shall be designed and maintained in accordance with the provisions of this article and the BMP according to the Generic Permit under NPDES.

General Engineering and Environmental Standards.

No stormwater management system shall cause water to become a health hazard as determined by the City Engineer, the Environmental Protection Department and/or the Health Department.

All storage volumes in detention or retention systems shall account for the seasonal high water table, tidal fluctuations or normal pool elevations.

Runoff from off-site areas which drain to or across a site proposed for development shall be accommodated.

Retention basins shall recover the capacity for the given volume of stormwater within 72 hours following the storm event.

Reasonable maintenance access to all stormwater management facilities must be provided.

All storm pipe must be designed to convey a 25-year, 24-hour storm event. Safe conveyance of all flow in excess of storm sewer capacity must also be included in the design.

Wet detention systems shall be designed to provide for drawdown of half of the specified treatment volume between 60 and 72 hours following the storm event for which they are designed to accommodate.

Utilization of other best management practices must not adversely affect the ability of the wetlands stormwater management system to meet the requirements of this Section.

Rainfall volumes shall be taken from the SFWMD "Basis of Review".

Sec 107.89 Relationship To Project Design

General. Stormwater areas shall be designed in the context of the site design for the entire subdivision or other development. Careful consideration shall be given to the layout of basins and stormwater management areas to optimize treatment, aesthetics, and groupings of trees. Basins and stormwater management systems shall be designed to blend into public open spaces and shall resemble natural areas to the greatest extent possible. The following design standards and principles shall apply to stormwater management areas:

All stormwater areas shall be designed in accordance with the standards and principles set forth in Subsection B. below;

Permanently wet retention and detention structures shall be fenced or shall not have side slopes that are steeper than 4H:1V out to a depth of five (5) feet below the control elevation.

General Design Criteria.

When possible, the inflow and outflow locations of stormwater structures and retention areas must be located to provide for optimal treatment. Flow paths and mixing within basins shall be maximized.

Erosive velocities shall be reduced through the use of adequate controls.

Fenced Basins. All fences must be a minimum height of six (6) feet and have a ten-foot wide gate that allows easy access for maintenance equipment.

Sec 107.90 Water Quality Criteria

All stormwater management systems must be designed to meet the water quality criteria required by the FDEP/SFWMD permit.

Sec 107.91 Erosion And Sedimentation Control

The erosion and sedimentation control plan shall be prepared by a registered civil engineer and conform to the general standards of the Florida Department of Environmental Protection Erosion and Sedimentation Control Manual.

The development and implementation of an erosion and sedimentation control system is essential to minimizing the adverse impacts of soil erosion and sediment transport. The system shall be designed according to the following principles:

The development plan must be compatible with the existing topography, soils, waterways, and natural vegetation of the site.

The smallest possible area shall be exposed for the shortest possible time during construction.

On-site control measures shall be applied to reduce erosion. Stockpiling and storage of materials shall not be located in a manner to impede flow or cause materials to be eroded by stormwater runoff.

The erosion and sedimentation control plan shall identify permanent stormwater conveyance structures, final stabilized conditions of the site, provisions for removing temporary control measures, stabilization of the site when temporary measures are removed, and maintenance requirements for any permanent measures. All sedimentation control structures to be used during construction shall be installed prior to any soil disturbance or site preparation in anticipation of construction activity and shall be maintained in an effective condition until such time as the completion of the permanent system or other erosion control measures can assure adequate erosion and sediment control.

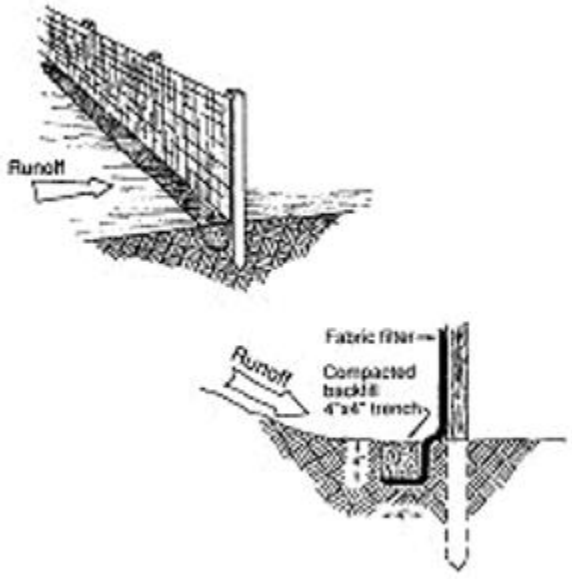
All stormwater management facilities shall be stabilized with either grass or sand-based sod. When used, sod shall be certified apparently weed-free sod.

All dry basin bottoms must be seeded or sodded. Side slopes shall be 4H:1V or flatter.

During construction, provisions shall be made to minimize disturbance to and compaction of soils in the basin bottom.

Figure 107.91.1

Silt Control Fence



Sec 107.92 Special Criteria For Systems Within New Residential Subdivisions

Within a private residential subdivision, the homeowners must provide routine maintenance and associated landscape management responsibilities for the stormwater management system within the residential subdivision; and shall provide reasonable maintenance access to all stormwater management facilities.

Sec 107.93 Plan Review

The following information, plans and supporting data must be included with the applicant's final development plan:

Aerial Photograph. An aerial photograph delineating the project area and the watershed boundaries in which the project is located.

Map. A map of the project that shows the following information:

Project boundary;

Existing topography of the project with the existing drainage patterns clearly established;

Additional off-site topographical information may be needed to adequately identify drainage patterns. At a minimum topography shall be included up to 50 feet outside the boundary of the project except where the project is bounded by water;

The drainage boundary of the area of any lands outside the project limits contributing runoff to the project for both pre-development and post development;

Existing FEMA flood lines;

A plan of the proposed land use and land cover, including acreage and percentage of impervious surfaces;

Description of vegetative cover, locations of any wetlands, surface waters or other known conservation areas;

Proposed construction phases;

Rights-of-way, common areas, and/or easement locations;

Location of existing and proposed stormwater retention and/or detention facilities, including size, design capacity, 100-year flood elevation, side slopes, depth of pond, retained and/or detained runoff volumes, and treatment volumes;

Detailed grading plan with sufficient spot elevations to determine the direction of flow;

Certified erosion and sedimentation control plan. See Section 107.91 for requirements; and

Stormwater Pollution Prevention Plan (SWPPP). A SWPPP should be submitted for all projects. This plan shall be included in the erosion and sedimentation control plan.

Calculations. All hydrologic and hydraulic calculations shall be certified and must include:

A description of the proposed stormwater management plan;

Hydrologic and hydraulic model input and output for pre-development and post development conditions;

Pipe-sizing calculations; and

Calculations used to size all treatment facilities;

Operation and Maintenance Authority. A statement designating the entity that will be responsible for the operation and maintenance of the stormwater management system. A copy of the restrictive covenants for the establishment of a homeowners' association must be submitted, if applicable. The restrictive covenants shall contain a statement indicating that, upon the homeowners' association's written request, City of Marathon will inspect the stormwater management system prior to the developer transferring responsibility for the maintenance of the system to the association.

Certification Statement. A statement, certified by the engineer responsible for the design that will read as follows:

Maintenance Plan. A proposed maintenance plan for the stormwater management system. This plan, along with the estimated annual maintenance costs, shall be incorporated into the restrictive covenants required by this chapter.

Easements. Off-site easements for stormwater management facilities will be required when the discharge is into any man-made facility for which City of Marathon does not have either drainage easements or rights-of-way.

Other Agency Approval. Prior to the issuance of a construction permit, a copy of all other applicable state, water management district, or City permits must be submitted.

Sec 107.94 Inspections

The City may inspect during the construction activities of all approved stormwater management systems. Any duly authorized representative of the City at any reasonable time may enter and inspect property on which a stormwater management system is located, in order to determine compliance of proposed or constructed stormwater management systems with this Chapter or any applicable City ordinances, or consistency with any development application or development approval. The duly authorized representative of the City may collect water quality samples and obtain other information necessary to determine compliance of the stormwater management

system. No person shall refuse reasonable entry or access to any authorized representative of the City who requests entry for purposes of inspection and who presents appropriate credentials.

Sec 107.95 Maintenance

All stormwater management systems require periodic maintenance. The entity designated in the application will be responsible for implementing the maintenance plan. If a system is not functioning as designed, the owner or permittee will be responsible for taking corrective measures to ensure the applicable criteria of this Chapter are met.

Sec 107.96 Enforcement

This Chapter shall be enforced in accordance with procedures outlined in Chapter 109, "Violations, Penalties, and Enforcement."

Sec 107.97 Article To Be Liberally Construed

This article shall be liberally construed in order to effectively carry out the purposes hereof, which are deemed to be in the best interest of the public health, safety, and welfare of the citizens and residents of City of Marathon, Florida.

Appendix D: Asset Inventory Maps

Community and Emergency Management Baseline

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Subsection 380.093, F.S.

Marathon, Florida

Feet

0 1,250 2,500

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Overseas Hwy

Morton St

Ferreire St

Grassy Key

Kyle Ave

Florida Keys Scenic Hwy

Burn Pt

Long Point Key

Little Crawl Key

Municipal Boundary **Evacuation Routes** **GasStations** **Mobile Home Parks**

Public Beach Access Sites

Full Access With Parking

FDEP, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, Monroe County BOCC, Earthstar Geographics, FDEP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Monroe County BOCC, Maxar, GIS analysis by Clearview Geographic LLC (www.clearviewgeographic.com)

Community and Emergency Management Baseline

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Overseas Hwy
107th St
Long Point Key
Curry Hammock State Park
Fat Deer Key
Deer Key
Coco Plum Dr
13th St
10th St
9th St
8th St
7th St
Key Colony Beach

- Beyond Study Area
- Municipal Boundary
- Evacuation Routes
- Affordable Public Housing
- Child Care Centers
- San Pablo Church
- San Pablo Catholic Church Field
- DMS
- Disaster Recovery Center
- Staging
- Fire
- City Offices
- County/Government
- Emergency Medical Service Facilities
- EMS Stations
- Fire Stations
- GasStations
- Health Care Facilities
- Local Government Facilities
- Local Law Enforcement
- Logistical Staging Areas
- Low Income Housing Tax Credit
- Mobile Home Parks
- National Shelter System Facilities
- Nursing Homes
- Pharmacies

Public Beach Access Sites

- Full Access
- Full Access With Parking

FDEP, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS, Earthstar Geographics, FDEP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Monroe County BOCC, Maxar, GIS analysis by Clearview Geographic LLC (www.clearviewgeographic.com)

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Overseas Hwy
74th St
Marathon
Overseas Hwy
Sombrero Country Club
Manor Ln
Sombrero Beach Rd
W Side
Marathon Middle High School
20th Street Ocean
Boot Key
Sombrero Beach Rd

- Municipal Boundary
- Evacuation Routes
- Affordable Public Housing
- Child Care Centers
- Community Centers
- Correctional Facilities
- Kmart Parking Lot
- Knight's Key Campground Field
- Courthouses
- Nursing
- DMS
- Shelter
- Staging
- EMS
- EOC
- Fire
- Hospital
- County/Government
- Law
- Nursing
- School
- Dental Providers Public Health Dental Program Participants
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- Emergency Operation Centers
- EMS Stations
- FDOT Facilities
- Fire Stations
- GasStations
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- Supplemental Colleges
- State Government Facilities
- Schools
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- Prisons
- Ports
- Pharmacies

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- Full Access With Parking

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Critical Infrastructure Baseline - Electrical

Subsection 380.093, F.S.

Marathon, Florida

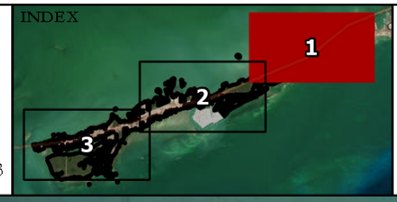
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- FKEC_PRI_RISERS
- FKEC_PRI_SECTIONALIZING_CABS
- Electrical Transmission Lines

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Morton St
Fetterer St
Grassy Key
Kyle Ave
Florida Keys Scenic Hwy
Burn Pl
Long Point Key
Little Crawl Key

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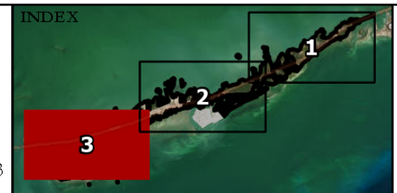
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- Solid and Hazardous Waste Facilities - SQG

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Overseas Hwy
Florida Keys Scenic Hwy
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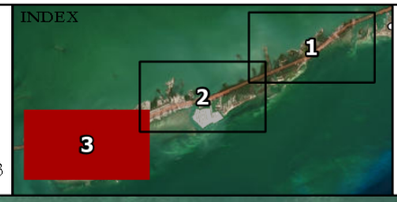
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Critical Infrastructure Baseline - Potable Water

1905R1 AlexZelenski 4/7/2024

Subsection 380.093, F.S.

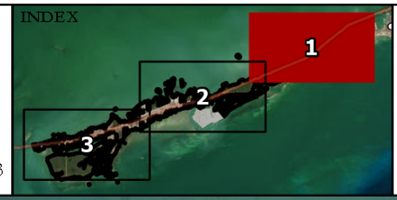
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- wSamplingStation
- wMasterTap
- wHydrant
- wControlValve
- wCathodicProtection
- wServiceLine
- wPressurizedMain
- wFitting

Overseas Hwy

Morton St

Ferreiro St

Grassy Key

Kyle Ave

Florida Keys Scenic Hwy

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Long Point Key

Little Crawl Key

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Critical Infrastructure Baseline - Potable Water

1905R1 AlexZelenski 4/7/2024

Subsection 380.093, F.S.

Marathon, Florida

Feet

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CLEARVIEW GEOGRAPHIC

Geospatial Intelligence DeLand, Florida
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Key Colony Beach

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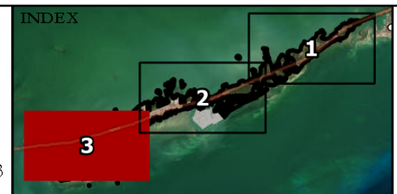
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Critical Infra Baseline - Stormwater, Sewer and Reuse

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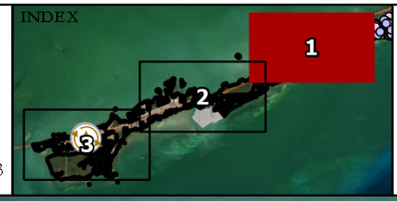
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Critical Infra Baseline - Stormwater, Sewer and Reuse

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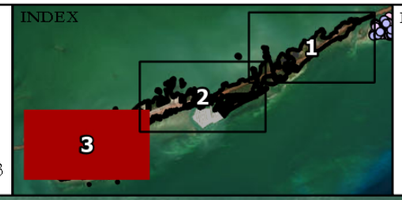
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Natural Cultural and Historic Baseline

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Marathon, Florida

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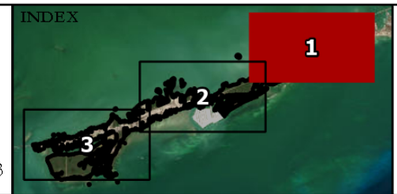
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- T&E Species Critical Habitat
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Earthstar Geographics, Monroe County BOCC, Maxar, GIS analysis by Clearview Geographic LLC (www.clearviewgeographic.com)

Natural Cultural and Historic Baseline

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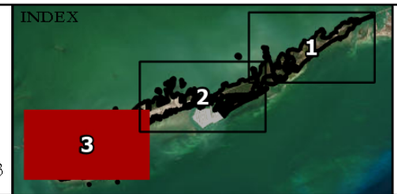
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Transportation Baseline

Subsection 380.093, F.S.

Marathon, Florida

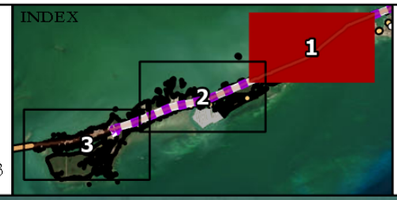
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- Major Roadways - NTD
- Ports - PL

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Florida Keys Scenic Hwy
Burn Pt
Long Point Key
Little Crawl Key
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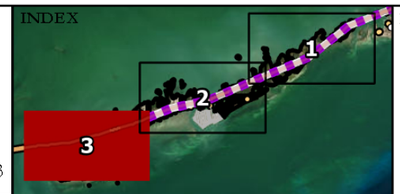
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The Florida Keys

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October 14, 2025

Monroe County LMSWG Co-Chair
Mimi Young

October16, 2025

Brian Shea
Planning Director
City of Marathon
9805 Overseas Highway
Marathon, FL 33050

Dear Mr. Shea:

As the Co-Chair [or Chair] of the Monroe County Local Mitigation Strategy Working Group (LMSWG), this correspondence serves as a verification that your recently completed Watershed Management Plan for FEMA's Community Rating System (CRS) program will be used to update the risk assessment and mitigation strategy during the next LMS plan update.

The LMSWG is aware that all the communities in Monroe County are either updating or currently developing Watershed Management Plans for Activity 452.b in the CRS program. Additionally, the communities are either updating or developing new Vulnerability Assessments. All this new information will greatly help the LMSWG in its efforts to complete the next LMS update.

We will greatly appreciate your transmittal of the Watershed Management Plan to us upon its completion and adoption. We look forward to working with Marathon on the next LMS update. Thank you again for your coordination with our group.

Sincerely,

Mimi Young
Monroe County LMSWG Co-Chair

Activity 450 WMP Technical Review

Community: Marathon **State:** Florida **CID:** 120681
Specialist: Craig Carpenter **Reviewer:** Shauna Urlacher **Date:** 10/2/2025

WATERSHED MASTER PLAN (WMP) SUMMARY

SUB-ELEMENT		SCORE	COMMENTS
Prerequisites are met	WMP(1):	90	
Manages the 100-year storm	WMP(2):	30	
Manages future peak volumes	WMP(3):	0	
Manages the 5-day event	WMP(4):	0	
Preserves natural flood storage	WMP(5):	0	
Existing natural channels	WMP(6):	0	
Soft channel improvements	WMP(7):	0	
Dedicated funding source	WMP(8):	25	
Raw Score:		145	
Impact Adjustment:		1.00	

WMP SCORE: 145

PLAN MEETS THE WMP CLASS 4 PREREQUISITES Yes

Received WMP(1) and WMP(2) credit with a minimum impact adjustment of 0.5

DETAILED SCORING & VERIFICATION RESULTS

WMP(1): Prerequisites are met		SCORE	COMMENTS
Met	90 points. For WMP(1) credit, the Plan must:	90	
Met	Be adopted by the community		The Plan is scheduled to be adopted.
Met	Evaluate runoff from full development		The future land use was analyzed.
Met	Evaluate the drainage system for the100-year event and more common events		Modeling of the drainage system was completed.
Met	Manage at least the 10-year and 25-year events		Recommendations designed to manage the 10-year and 25-year storms were provided.
Met	Drainage system analysis considered a tailwater elevation equal to mean sea level plus three feet, or a higher elevation (tidally influenced watersheds only)		The impacts of 3 feet of tailwater on the drainage system were included in the analysis.

PLAN IS ELIGIBLE FOR WMP(2) - WMP(8) CREDIT Yes

WMP1 credit must be received to receive credit for any of the other items.

WMP(2): Manages the 100-year storm		SCORE	COMMENTS
Met	30 points. For WMP(2) Credit, the Plan must manage the runoff from all storms up to and including the 100-year event to ensure that flood flows downstream of new development do not increase due to the development.	30	The Plan analyzed the 100-year storm; however, recommendations to manage the 100-year storm are implied in the report. Clearly stating in the Plan or in a separate memo how the 100-year storm is managed by the recommendation is preferred.

WMP(3): Manages future peak volumes		SCORE	COMMENTS
Not Met	55 points. For WMP(3) Credit, the Plan must provide onsite management of future peak flows and volumes so they do not increase over present values.	0	The Plan does not provide recommendations to control future peak volumes.

Activity 450 WMP Technical Review

Community: Marathon **State:** Florida **CID:** 120681
Specialist: Craig Carpenter **Reviewer:** Shauna Urlacher **Date:** 10/2/2025

WMP(4): Manages the 5-day event		SCORE	COMMENTS
Not Met	35 points. For WMP(4) Credit, the Plan must manage the runoff from all storms up to and including the 5-day event.	0	The Plan does not model or provide recommendations to manage the 5-day event.

WMP(5): Preserves natural flood storage		SCORE	COMMENTS
Not Met	30 points. For WMP(5) Credit, the Plan must identify existing wetlands or other natural open space areas to be preserved from development so that natural attenuation, retention, or detention of runoff is provided.	0	The Plan does not include recommendations to preserve natural flood storage. A map of the areas to be preserved was not provided.

WMP(6): Existing natural channels			SCORE	COMMENTS
Not Met	25 points. For WMP(6) Credit:		0	
	Not Met	The Plan must recommend prohibiting development, alteration, or modification of existing natural channels, AND		The Plan does not include the required recommendations.
	Not Met	The community has adopted a qualifying ordinance		Qualifying ordinance language was not provided.

WMP(7): Soft channel improvements			SCORE	COMMENTS
Not Met	25 points. For WMP(7) Credit:		0	
	Not Met	The Plan must recommend that channel improvement projects use natural or “soft” approaches rather than gabions, rip rap, concrete, or other “hard” techniques, AND		Recommendations for soft channel improvements were not found.
	Not Met	The community has adopted appropriate design standards or ordinances.		Supporting ordinances or standards were not provided.

WMP(8): Dedicated funding source		SCORE	COMMENTS
Met	25 points. For WMP(8) Credit, the community must have a funding source dedicated to implementing the plan’s recommendations.	25	Documentation of a dedicated funding source was provided.

REFERENCES

1. City of Marathon 2025 Draft Watershed Management Plan (dated August 2025)