



Floodplain Management Plan

2020-2025

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CITY OF SARASOTA 2020-2025 FLOODPLAIN MANAGEMENT PLAN

INTRODUCTION

The City of Sarasota is in northwestern Sarasota County, in southwest Florida and is a Gulf Coast community located on the west coast of Florida that encompasses approximately 24 square miles, of which approximately 10 square miles is water. In 1902, the Town of Sarasota came into being. Large land purchases and subsequent investments were followed by rapid development. In 1914, Sarasota was incorporated as a city. The population of the City increased from 8,498 in 1930 to 40,237 in 1970. Although the City experienced a significant loss of population during the recent recession, the population has begun to increase again and was 57,338 from the 2018 Census Factfinder at <https://www.census.gov/quickfacts/fact/table/sarasotacityflorida,US/PST045219>. The City of Sarasota, as do most coastal communities in Florida, experiences a significant increase in population during the winter months.

The City of Sarasota is bounded on the north by Manatee County, the east by Desoto County, the South by Charlotte County, and the west by the Gulf of Mexico.

The generally flat topography of Sarasota County is characterized by pine flatwoods and other upland systems, numerous wetlands, and marshy tributary systems. Elevation ranges from sea level in the west to a maximum of 95 feet referenced to the North American Vertical Datum of 1988 (NAVD) in the northeast portion of the County. The barrier islands are low-lying and generally do not exceed 7 feet NAVD.

PURPOSE

Among all the natural hazards, floods are the costliest and most pervasive hazard in the United States. Property losses from flooding events in the United States have been steadily increasing since the mid 1900s and have now reached billions of dollars per year.

Floodplain management plans form the foundation for a community's long-term strategy to reduce flood losses and break the cycle of flood damage. They create a framework for risk-based decision making to reduce damages to lives, property, and the economy from future floods. Local governments are required to develop a flood mitigation plan as a condition for receiving certain types of non-emergency disaster assistance.

The City of Sarasota has developed this Floodplain Management Plan to provide a comprehensive set of community wide efforts to address flooding and other hazards facing the City of Sarasota.

The goals of the program include, but are not limited to:

- help reduce flood losses

- improve local flood hazard mitigation capability
- increase public and private sector awareness by educating about hazards,
- education on loss reduction measures improve the natural and beneficial function of the floodplain
- protect cultural, economic, and natural resources

The number of claims paid out through the National Flood Insurance Program totaled approximately \$7.5 million since 1978 for the City of Sarasota for 871 claims. (FEMA, 2019). These claims only reflect properties that have had flood insurance policies in-force through the National Flood Insurance Program (NFIP).

The purpose of this plan update is to:

- Guide mitigation efforts to better protect the people and property in the City of Sarasota from the effects of hazard events.
- Ensure the City of Sarasota and participating partners' continued eligibility for certain federal disaster assistance.
- Maintain and earn points for the National Flood Insurance Program's Community Rating System (CRS), which provides for lower flood insurance premiums in CRS communities.
- Meet the requirement of the Federal Emergency Management Agency (FEMA) to assist local communities in the Region to become more disaster resistant through cooperative efforts of the private, public, and non-profit sectors.

COMMUNITY PROFILE

CLIMATE

The climate in Sarasota County is characterized as subtropical, with warm and humid summers, mild winters, and dry springs and falls. Summer daytime temperatures commonly reach to 90 degrees Fahrenheit or more. Average annual precipitation for the county is 53 inches. More than half of the annual rainfall typically falls during the summer months of June through September, mainly a result of convective storms. Winter frontal systems are the source of most of the precipitation during the remaining 8 months.

The sub-tropical weather pattern in this region provides frequent extreme weather events including flooding from tropical depressions and hurricanes. Extreme and severe summer rains can cause flooding in various locations throughout the County. These events may pose a significant threat to life and property. The City of Sarasota can experience flooding due to hurricanes or tropical storms, as well as heavy rainfall that can occur throughout the year in Florida. Hurricane Hermine, a category 1 hurricane, hit Sarasota County in September 2016 with peak winds of 54 mph and 9.38 inches of rainfall. Tropical Storm Colin caused flooding, power outages and beach erosion throughout the County in June 2016. Hurricane Charley, a category 4 hurricane, severely damaged hundreds of buildings, and trees in August 2004. In

June of 1992, Tropical Depression One exceeded the 100-year storm conditions, dropping more than 20 inches of rain in northern Sarasota County where the City of Sarasota is located.

POPULATION AND DEMOGRAPHICS

The State of Florida requires that population estimates, and projections used in the development of the Sarasota City Plan include both “resident” and “seasonal” populations. The full-time resident population is counted in the same manner utilized by the United States Bureau of the Census (the “year-round” permanent population). The seasonal population reflects “part-time” inhabitants who are expected to utilize public facilities and services on a short-term or long-term basis (e.g., tourists and migrant farm workers). Since the City of Sarasota is using several locally generated values (as well as those generated by the Bureau of Economic and Business Research (BEBR)), the methodologies for these numbers are set out following Illustration LU-10.

Illustration LU-10 Summary Table of Population Estimates and Projections

Population	2005	2010	2015	2020	2025	2030
Resident	54,848	57,748	59,930	62,021	63,812	65,334
Seasonal	11,079	11,665	12,106	12,528	12,890	13,197
Resident + Seasonal	65,927	69,413	72,036	74,549	76,703	78,531
Functional	79,904	84,129	87,308	90,353	92,964	95,179

Source: City of Sarasota Neighborhood and Development Services Department, 2005. Resident, Resident + Seasonal, and Functional populations for year 2005 are an estimate using data from the Bureau of Economic and Business Research and populations for years 2010 through 2030 are projections.

HOUSING

There are an estimated 24,416 households in the City of Sarasota (U.S. Census Bureau, 2018). The median value of owner-occupied housing units for the City in 2018 was approximately \$239,600 with 57.5% of the housing units being owner occupied. The median gross rent was \$1,069.

ECONOMY

The economy of the City of Sarasota is largely service-oriented, driven by the tourism and migration of retirees. Approximately half of all City jobs are health care, retail trade, and hospitality related. The City’s population was approximately 56,692 in 2019 not counting the seasonal population that increases with an additional 11,000 tourists. Every year Sarasota’s International Airport welcomes almost 1 million visitors to the City of Sarasota.

Sarasota County’s Office of Financial Management publishes monthly economic reports that contain statistics for the County’s labor force, including the top 10 industries, average wages, and unemployment rates. According to these reports, the average annual wage for Sarasota County was \$47,765 in 2019. In December 2019 Sarasota County unemployment rate was 2.5%.

(Data provided from Sarasota County June 2020 Monthly Economic Report)

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The National Flood Insurance Program (NFIP) was approved by Congress in 1968 primarily to make flood insurance available to property owners with buildings located in Special Flood Hazard Areas (SFHA) identified on Flood Insurance Rate Maps (FIRM). To qualify for participation, a community must develop and adopt a regulatory program designed to reduce exposure to flood damage and, at a minimum, that conforms to the basic participating requirement of the NFIP (44CFR, Part 60.3). If conforming, flood insurance is available to anyone that lives in that community. The City of Sarasota fulfills these requirements through the City's Floodplain Management Ordinance and Zoning Codes. The City of Sarasota first adopted its Ordinance, including FEMA's Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRM), in December 1971. The FIS and FIRMs were last revised on November 4, 2016. There are approximately 8,000 NFIP insurance policies currently in force, representing more than \$2 billion of coverage (FEMA 2019).

COMMUNITY RATING SYSTEM (CRS)

FEMA's National Flood Insurance Program (NFIP) administers the CRS. Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that these communities are implementing. The National Flood Insurance Program's (NFIP) CRS was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Under the CRS, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

- Reduce flood losses,
- Facilitate accurate insurance ratings, and
- Promote the awareness of flood insurance

To obtain the necessary credit points to achieve lower CRS class ratings, communities implement a broad range of programs aimed at addressing these three goals of the CRS program. In general, these goals are accomplished through a mix of more stringent regulations, additional property acquisitions and relocations, floodproofing of flood prone buildings, preservation of natural resources such as open space, and other measures that protect natural resources. This program can have a major influence on the design and implementation of flood mitigation activities, so a summary is provided here.

A community receives a CRS classification based on the credit points it receives for activities. It can undertake any mix of activities that reduce flood losses, such as enhanced mapping, regulatory changes, public information programs, flood damage reduction, or flood warning and preparedness programs.

There are 10 CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction (see Table 1). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community. The NFIP's Community Rating System (CRS) is a voluntary incentive program

that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements,

Table 1: Community Rating System Premium Reductions

Class	Points	Premium in Floodplain	Reduction Outside Floodplain
1	4500+	45%	10%
2	4,000-4,499	40%	10%
3	3,500-3,999	35%	10%
4	3,000-3,499	30%	10%
5	2,500-2,999	25%	10%
6	2,000-2,499	20%	10%
7	1,500-1,999	15%	5%
8	1,000-1,499	10%	5%
9	500-999	5%	5%
10	0-499	0%	0%

The City of Sarasota has participated in the CRS program since October 1992. By implementing comprehensive floodplain management activities, the City of Sarasota has been rated as a Class 6 community under this program since 2010.

This means that the NFIP insurance for the City of Sarasota property owner is discounted annually by 20% for high risk properties and 10% for medium to low risk policies. This represents a current savings of over \$1.7 million dollars to residents of the City every year.

The Disaster Mitigation Act of 2000 (DMA 2000) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. Among its main features, the DMA 2000 authorized the creation of a pre-disaster mitigation program that makes mitigation grants available to states, as well as to local and tribal governments, providing they have a FEMA approved hazard mitigation plan in effect prior to the time of the disaster. In accordance with the DMA 2000, the Sarasota County developed the Local Mitigation Strategy (LMS) that the City is part of. This approved hazard mitigation plan has enabled the County and City to receive Hazard Mitigation Grant Program (HMGP) awards, Flood Mitigation Assistance (FMA) Planning Grants and Pre-Disaster Mitigation awards.

FLOOD INSURANCE BENEFITS OF CRS PARTICIPATION

Table 2 on the following page shows the direct dollar benefit to the City of Sarasota and the City’s policy holders for participation in the CRS. The savings per policy are for properties in the FEMA mapped 100-year floodplain (“Special Flood Hazard Area”). The savings are lower for policies outside the mapped floodplain.

The City of Sarasota is currently a Class 6 community with a 20% discount on SFHA policies.

Table 2: City of Sarasota Policy Savings for CRS Participation

	Total Policies	* Policies in SFHA	** X/X-500	*** PRP
NUMBER OF POLICIES	8,098	6,389	332	1,377
TOTAL PREMIUMS	\$7,579,580.00	\$6,745,868.00	\$181,834.00	\$651,878.00
CLASS 9 SAVINGS PER FLOODPLAIN POLICY	\$53.00	\$66.00	\$30.00	\$0.00
CLASS 9 SAVINGS FOR COMMUNITY	\$431,718.00	\$421,616.00	\$10,102.00	\$0.00
CLASS 8 SAVINGS PER FLOODPLAIN POLICY	\$105.00	\$132.00	\$30.00	\$0.00
CLASS 8 SAVINGS FOR COMMUNITY	\$853,341.00	\$843,239.00	\$10,102.00	\$0.00
CLASS 7 SAVINGS PER FLOODPLAIN POLICY	\$157.00	\$198.00	\$30.00	\$0.00
CLASS 7 SAVINGS FOR COMMUNITY	\$1,274,958.00	\$1,264,856.00	\$10,102.00	\$0.00
<u>CLASS 6 SAVINGS PER FLOODPLAIN POLICY</u>	<u>\$211.00</u>	<u>\$264.00</u>	<u>\$61.00</u>	\$0.00
<u>CLASS 6 SAVINGS FOR COMMUNITY</u>	<u>\$1,706,676.00</u>	<u>\$1,686,472.00</u>	<u>\$20,204.00</u>	\$0.00
CLASS 5 SAVINGS PER FLOODPLAIN POLICY	\$263.00	\$330.00	\$61.00	\$0.00
CLASS 5 SAVINGS FOR COMMUNITY	\$2,128,292.00	\$2,108,089.00	\$20,204.00	\$0.00
* SFHA (Zones A, AE, AH, AO, VE) Discount varies depending on class.				
** SFHA (Zones X, X-500) 10% Discount for Classes 1-6: 5% Discount for Classes 7-9.				
*** Preferred Risk Policies not eligible for CRS Premium Discounts.				



1. ORGANIZATION

This Floodplain Management Plan provides a comprehensive overview of best management practices adopted and implemented by the City of Sarasota to improve flood risk reduction and flood protection for its residents, and to support other City and County regulatory, preservation, conservation, social, and economic needs. The City of Sarasota developed and adopted the first Floodplain Management Plan in 2005, prior to 2005 it was dependent on the Sarasota City Plan (1998).

The current plan was and continues to be updated by a committee consisting of Sarasota City staff as well as public stakeholders and residents.

PLANNING COMMITTEE

The City of Sarasota’s Floodplain Management Committee is composed of the members of the Public Information Office, Building and Zoning, Engineering, Planning, Sustainability, and Emergency Management Departments within the City. Table 2-1 lists the members and departments. This Committee began its initial review of this Floodplain Management Plan in February 2020 and have conducted a series of meetings in compliance with the National Flood Insurance Program Community Rating System Coordinator’s Manual to update our currently approved plan.

Table 2-1 Current Floodplain Management Plan Committee Members

OFFICIAL MEMBERS		REPRESENTING
TODD KERKERING	richard.kerkering@sarasotaFL.gov	EMERGENCY MANAGEMENT
BOB HEGGAN	robert.heggan@sarasotaFL.gov	PUBLIC WORKS
CYNDI CAHILL	cynthia.cahill@sarasotaFL.gov	DEVELOPMENT SERVICES FEMA
DAVID SMITH	david.smith@sarasotaFL.gov	PLANNING
DAN OHRENSTEIN	daniel.ohrenstein@sarasotaFL.gov	ENGINEERING
GRETCHEN SCHNEIDER	gretchen.schneider@sarasotaFL.gov	DEVELOPMENT SERVICES ZONING
JAN THORNBURG	jan.thornburg@sarasotaFL.gov	PUBLIC INFORMATION
STEVIE FREEMAN-MONTES	stevie.freeman-montes@sarasotaFL.gov	SUSTAINABILITY

Key topics during the committee meetings include:

- Plan organization
- Public involvement
- Assessment of flood hazards that affect the City of Sarasota
- Assessment of the problems brought about by the flood hazards
- Floodplain management goals
- Review of possible and in process floodplain management activities
- Development of an action plan
- Plan adoption and update

The Floodplain Management Committee will continue to meet quarterly after the 2020-2025 FMP is approved. Agendas, sign-in sheets, and meeting notes for the subsequent meetings will be provided in the next 5-year update.

COMMISSION APPROVAL OF THE FMP COMMITTEE

The original Committee met four times between January and March of 2005 and was formally recognized by the Sarasota City Commission at its February 22, 2005 public meeting.

RECOGNITION OF FLOODPLAIN MANAGEMENT COMMITTEE

MINUTES OF THE REGULAR SARASOTA CITY COMMISSION MEETING OF FEBRUARY 22, 2005, AT 2:30 P.M.

PRESENT: Mayor Richard F. Martin, presiding, Vice Mayor Mary Anne Servian, Commissioners Fredd "Glossie" Atkins, Danny Bilyeu, and Lou Ann R. Palmer, City Attorney Robert M. Fournier, City Manager Michael A. McNees, and City Auditor and Clerk Billy E. Robinson

ABSENT: None

The meeting was called to order by Mayor Martin at 2:37 p.m.

INVOCATION/PLEDGE OF ALLEGIANCE: City Auditor and Clerk Robinson

1. CITIZENS' INPUT

Ms. Joy McIntosh spoke about worship services being conducted at the Gillespie Park Pavilion.

2. APPROVAL OF MINUTES

Following revisions, Mayor Martin noted Commission consensus to approve the minutes of the February 7, 2005, meeting with corrections. Following discussion, Mayor Martin noted Commission consensus to institute motion minutes immediately. (FTR 2:53)

3. CONSENT AGENDA NO. 1

A motion was made by Commissioner Bilyeu, seconded by Commissioner Atkins, and carried by a 5-0 vote to approve Consent Agenda No. 1, Item Nos. 2 through 9, to:

- 1) Authorize the Mayor and City Auditor and Clerk to execute the Assignment of Lease Agreement between the City of Sarasota and Helen R. Payne Day Nursery to Children First, Inc., for the remainder of the Lease which terminates on March 15, 2018 - Removed for discussion and considered as Minutes Item 7(1) later in the meeting;
- 2) Recognize formation of a Floodplain Management Plan Committee
- 3) Authorize the Mayor and City Auditor and Clerk to execute the First Amendment to the Audit Agreement between the City and Purvis, Gray and Company for a one year renewal to cover the 2005/06 Fiscal Year Audit

The City of Sarasota Community Rating System (CRS) Coordinator attended the Coalition of City Neighborhood Associations (CCNA) to obtain written comments from the public on flood problems and possible solutions, including goals or action strategies to include in the Floodplain Management Plan. The CCNA is comprised of individuals representing the various neighborhood associations throughout the City of Sarasota, including those areas subject to flooding.

The Development Services Department is responsible for the Floodplain Management Plan. The Emergency Management Manager and Floodplain Manager/CRS Coordinator shall be co-chairpersons of the FMP Committee. The Floodplain Manager/CRS Coordinator will coordinate the meetings and will prepare and update the FMP.

2. PUBLIC INVOLVEMENT

The City of Sarasota makes every effort to involve the public throughout development of this plan and other activities relating to flood risk. The City provides for public outreach through public meetings. These meetings are sometimes conducted through neighborhoods or associations.

The City provides for public outreach through public meetings and presentations provided to civic and neighborhood associations as well as establishing informational booths at the local Farmer's Market and County Fair.

Further public involvement is also provided by the City of Sarasota's participation in the Sarasota County Unified Local Mitigation Strategy (LMS) Work Group, the Sarasota County Floodplain Plan Committee, and the Sarasota County Multi-jurisdictional Program for Public Information Committee.

The City of Sarasota's Floodplain Management Committee began meeting and planning in October of 2019 to update our currently approved 2015-2020 Floodplain Management Plan. Committee meetings were planned monthly beginning in January of 2020 and several public meetings were planned for the early summer of 2020. In addition, staff members were able to promote the City's Floodplain Management Plan update process and seek public input by utilizing the local FEMA Risk Map update process and participating in two public outreach events in early March 2020

Due to the COVID-19 Pandemic, all in-person public meetings were cancelled in mid-March of 2020. Committee members continued to discuss the update process by various methods and developed the following to seek further public involvement:

- Created a flood information email address for citizens to provide input to the plan and other flood issues within the City,
- Created a floodplain management survey that was launched thru Survey Monkey May 20, 2020 thru July 1, 2020 in which we received almost 200 responses,
- Created a social media marketing campaign to encourage citizens to participate in the survey and seek input to the floodplain management plan.

The City of Sarasota has also utilized the following platforms to get input from the public on the FMP plan:

- Due to the COVID 19 the committee developed a floodplain management survey for the public in April 2020. The survey was launched thru Survey Monkey from May 20, 2020 thru July 1, 2020. We received almost 200 responses.
- At public outreach events this spring, Open Houses on Preliminary Flood Maps, we discussed the Flood Maps and their impact on the FMP with residents and received questions and comments to be incorporated.

Thru out the year HOA's request presentations on flooding and the City's plan to reduce flooding and proposed projects. The FMP is discussed at these presentations and comments and concerns are reviewed.

3. COORDINATION WITH OTHER AGENCIES

Personnel from the City of Sarasota coordinate monthly at a minimum with other agencies as it relates to floodplain management activities. Within these meetings, discussion and action on current projects, plans, technical data, reviews of existing studies and reports take place. Listed below are some of the coordination activities that take place:

- The City of Sarasota and Sarasota County entered into an Inter-local Agreement for the Consolidation of Storm-water Management in 1998. Meetings are quarterly. Members include staff from the City and County along with discussions with FDOT and SWFWMD as needed.
- The City participates and has adopted The Sarasota County Unified Local Mitigation Strategy (LMS). Work group members include but not limited to; City of North Port, City of Sarasota, City of Venice, Sarasota County, Sarasota Memorial Hospital, and the Town of Longboat Key. This organization conducts quarterly meetings.
- The City of Sarasota participates as a Stakeholder Member of the Sarasota County Floodplain Management Plan Planning Committee. This organizations conducts quarterly meetings.
- The City of Sarasota participates as a Government Member of the Sarasota County Multi-Jurisdictional Program for Public Information Committee. This organizations conducts quarterly meetings
- Florida Division of Emergency Management Region 6. Members include but not limited to; Sarasota County, City of North Port, City of Sarasota, DeSoto County, Charlotte County, Highlands County, Okeechobee County, Glades County, Hendry County, Lee County, City of Cape Coral, and Collier County. This organization conducts quarterly meetings.
- Southwest Florida Regional Planning Council, Local Emergency Planning Committee. Members include but not limited to; Florida National Guard, Florida Department of Health, Collier County Government, Sarasota County Fire Department, Lee County Utilities, Glades County Emergency Management, Mote Marine, Florida Power & Light, Lee Memorial Health System, Charlotte County Sheriff's Office, and Cape Coral Fire Rescue. This organization conducts quarterly meetings.
- Tampa Bay Regional Resiliency Coalition is a group of over 29 local governments that collaborate to strengthen southwest Florida's ability to plan for a changing climate, reduce impacts and secure increased levels of federal funding for resilient infrastructure improvements, adaptation and mitigation programs, to protect communities, property and economies. This organization conducts quarterly meetings.

4. ASSESSMENT OF FLOOD HAZARDS

Flooding results from two major sources in the City of Sarasota. Coastal areas are subject to inundation from surges from the Gulf of Mexico and associated coastal waves. Inland areas become flooded when rainfall accumulates in low, flat areas which have inadequate or poorly maintained drainage systems. Land development activities have significantly increased runoff volumes and have exceeded the capacity of natural or manmade drainage systems. Rainfall occurs primarily due to thunderstorm activity in the summer months, with additional rainfall occurring with the passage of hurricanes.

This section describes the known flood hazards within the City of Sarasota, their history of occurrence, and areas that are likely to be impacted by those hazards. The City of Sarasota coastal community characterized by low, flat topography and a high-water table. These characteristics make the City highly susceptible to the effects of flood damage caused by hurricanes, tropical storms, and heavy rain.

To reduce the risk of damage due to flooding for new developments, the City implements regulations that exceeds the minimum requirements of the NFIP. One of the ways that they accomplish this is, in addition to the SFHA, the City also regulates activities in the CFHA. The City along with Sarasota County continues to update the FEMA Flood Insurance Rate Maps (FIRM) with improved risk information based on newer and better data. During 2017 and 2018, the County submitted three MT-2 requests for physical map revisions to FEMA. These include updated flood risk data for Little Sarasota Bay, Phillippi Creek, and Dona Bay/Roberts Bay and Lemon Bay.

Flooding can be attributed to several types of natural hazards that may occur in this region, including coastal flooding, inland flooding due to frequent and heavy rains, tropical storms, and hurricanes. By nature of its location along the coast of the Gulf of Mexico, the City is continuously at risk of coastal flooding in conjunction with tropical storms, hurricanes, and heavy rain. High tide conditions increase the effects of storm surge and inland flooding due to high tailwater conditions.

This section summarizes the flood hazards that affect The City of Sarasota. The City of Sarasota is a StormReady community. Therefore, for many of these natural hazards, City staff coordinates with the National Weather Service to receive warnings regarding the source of flooding, warning times and expected depth of flooding. The County also maintains gages that provide additional information including rainfall amount, flow/velocities, and depth.

The City of Sarasota Post-Disaster Redevelopment Plan is included in the Comp Plan.

COASTAL FLOODING

The City of Sarasota coastline stretches 37 miles along the Gulf of Mexico, making the City extremely vulnerable to coastal flooding. Coastal flooding is usually the result of a severe weather system such as an ashore by the wind, known as a storm surge, is the main cause of coastal flooding as well as low-lying barrier islands and canals subject to tidal surge. The damaging effects to structures in the beach areas are caused by a combination of higher levels of storm surge, winds, waves, rains, erosion, and battering by debris. Sea walls, jetties, and beach areas are affected by coastal flooding, and losses can occur over short or long periods.

Historically, the City has experienced several damaging coastal floods caused by wind-driven water associated with high tide. Significant occurrences of coastal flooding in the past include:

October 1921: An unnamed tropical storm originated in the western Caribbean Sea and made landfall in Florida north of Tarpon Springs. Flooding conditions were prolonged due to the slow forward movement of the storm. A combination of high tides (above 7 feet) with wave action resulted in heavy damage in Sarasota County and City of Sarasota.

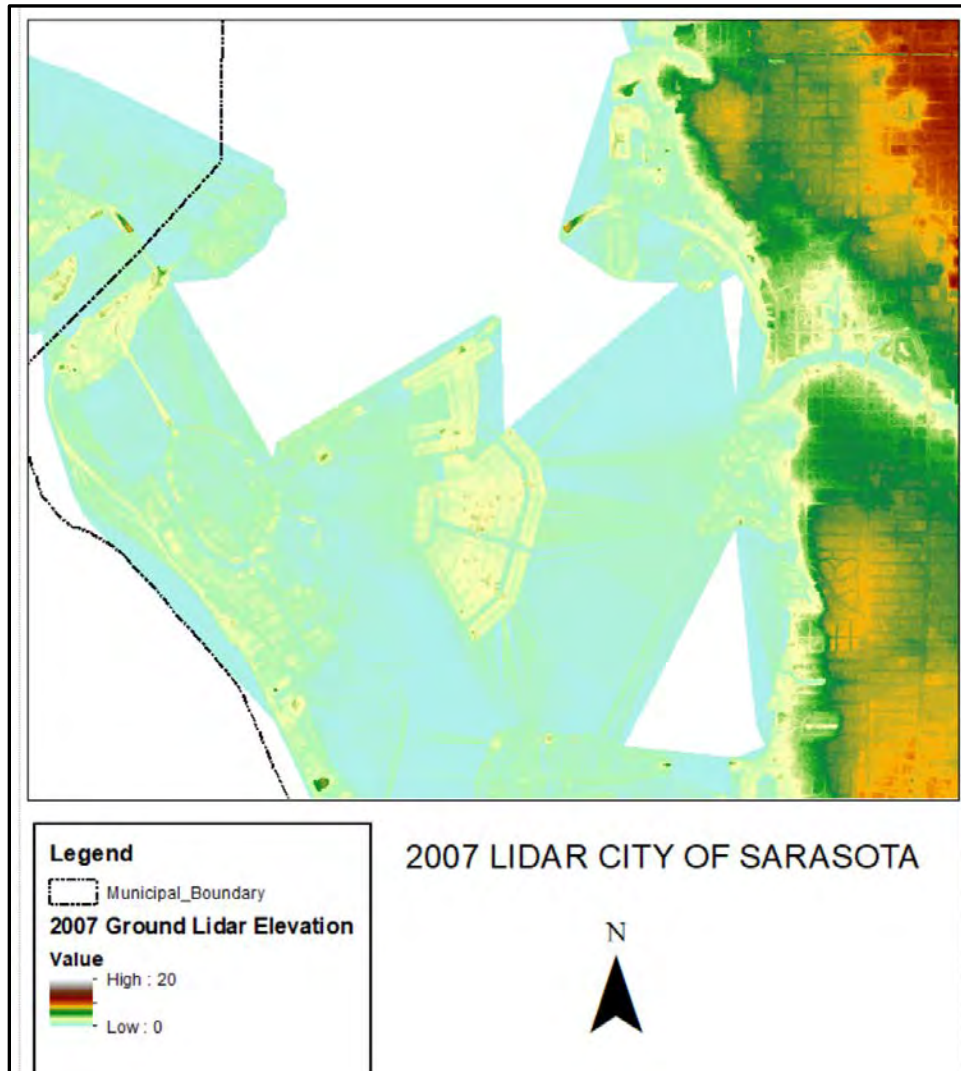
June 1972: Hurricane Agnes originated on the northeastern tip of the Yucatan Peninsula and traveled westward. Although the center of the storm passed approximately 150 miles west of the Florida peninsula, it produced high tides of 3 feet above normal and precipitation of 5 inches in Sarasota County. The high tides caused damage to many homes, seawalls, revetments, and roads along the Sarasota coastline. In addition, wave action produced considerable erosion along the City and Sarasota County coast.

June 1982: Subtropical Storm One hit the Sarasota area with 60 mile-per-hour winds and 6 inches of rain with little warning. The storm and abnormally high tides caused considerable structural flood damage to properties.

Tropical storms and hurricanes can produce coastal flooding, although they are not the only conditions under which such flooding occurs. The probability of coastal flooding in the City of Sarasota is relatively high. This probability increases if the storm strikes the coastline during a high tide.

Residences along the City of Sarasota coast and barrier islands are highly vulnerable to coastal flooding due to storm surge and/or high tide. The most vulnerable locations to storm surge are the barrier islands and areas along the coast. This often occurs because these areas are closest to the coast or are located along inland waterways and low-elevation areas.

CITY OF SARASOTA LIDAR, BARRIER ISLANDS



Flood events that have affected the City of Sarasota and Sarasota County include, but are not limited to the following:

September 1962: Exceptionally heavy rains covered the Florida west coast area, including 5,000 square miles over six counties. The highest amount of precipitation reported in a 24-hour period was 14.5 inches measured at the Manasota Tower. Over 1,000 residences were flooded, many to depths of 3 feet or more. Automobiles, streets, and bridges were severely damaged. Numerous roads were underwater for several hours, and many were impassable. The greatest damages occurred in the residential area of Sarasota, which comprises much of the 57-square-mile drainage area of Phillippi Creek. In addition to urban areas, approximately 60,000 acres of ranch land sustained damages. Floods at Phillippi Creek and US Hwy 41 measured 6 feet in depth. Sarasota County suffered significant damages in the Phillippi Creek Basin, in addition to one death. An estimated 10,000 to 15,000 people were directly impacted.

June 1992: Tropical Depression One exceeded the 100-year storm conditions, dropping more than 20 inches of rain in northern Sarasota County. An estimated 3,000 structures countywide were flooded during this intense storm.

July 1995: Tropical Storm Dean dropped more than 11 inches of rain within a 15-hour period, resulting in structural flooding throughout the area.

October 1996: Heavy rainfall of 4 to 6 inches associated with rain bands from Tropical Storm Josephine caused flooding of several homes and streets.

November 1997: In less than 14 hours, more than 10 inches of rain fell in the Phillippi Creek Basin, located in the southern portion of the City of Sarasota, flooding about 190 structures. The rain fell on already saturated soils, causing runoff to flow shortly after the storm began, with water levels rising quickly in the County's Main A Canal.

Tropical storms and hurricanes can often produce inland flooding, although they are not the only conditions under which such flooding occurs. Other historical occurrences of inland flooding in Sarasota County and the City of Sarasota are described later in this section.

Storm events can be described as the amount of precipitation that occurs over a given duration (e.g., 10 inches of rain over a 24-hour period). Typically, the probability of these storm events is categorized as follows, consistent with United States Geological Survey (USGS) and FEMA terminology:

- 100-year flood (1 percent chance per year)
- 50-year flood (2 percent chance per year)
- 25-year flood (4 percent chance per year)
- 10-year flood (10 percent chance per year)

These categories indicate a probability of occurrence (a 100-year flood has a 1-percent chance of occurrence in any given year). The smaller the chance of occurrence is, the more devastating the flood potential may be. Each of the flood categories is associated with a specific amount of rainfall over a given duration for a specific region. For Sarasota County region, the 10-year flood is characterized as receiving 7 inches of rain within a 24-hour period, while the 100-year flood is associated with 10 inches of rain within a 24-hour period.

TROPICAL STORM and HURRICANE

Tropical storms and hurricanes are large cyclonic storms with counterclockwise winds of 39 mph or greater. If the conditions are right, with warm ocean water and favorable high-altitude winds, the system could develop winds more than 155 miles per hour, with catastrophic results if it makes landfall in populated areas. The following are descriptions of the three general levels of development for tropical cyclones:

- Tropical depression: The formative stages of a tropical cyclone in which the maximum sustained surface wind is 38 mph or less.
- Tropical storm: A warm core tropical cyclone in which the maximum sustained surface wind ranges from 39–73 mph.

- Hurricane: A warm core tropical cyclone in which the maximum sustained surface wind is 74 mph or greater.

Hurricanes are categorized according to the Saffir-Simpson Hurricane Wind Scale (Table 3-2), which is based on estimates of potential property damage. Hurricanes rated Category 3 and higher are considered major hurricanes because of their potential for significant damage and loss of life. While less devastating, Category 1 and 2 hurricanes are still dangerous, and they, too, require preventative measures.

Table 3-2 Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Potential Damage
Tropical Storm	39 – 73 mph	Some
1	74 – 95 mph	Some
2	96 – 110 mph	Extensive
3	111 – 130 mph	Devastating
4	131 – 155 mph	Catastrophic
5	156 mph or higher	Catastrophic

NOAA describes the damage potential for each category as follows:

- **Category 1:** Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
- **Category 2:** Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
- **Category 3:** Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
- **Category 4:** Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
- **Category 5:** Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Although hurricanes are categorized according to sustained wind speeds, they are often accompanied by heavy rains and storm surge that can cause flooding throughout Sarasota County and City of Sarasota. NOAA's projections for increased sea level rise over the coming decades indicates increased flooding when heavy rains and storm surges interact with rising water levels. The interconnection of sea level rise and heavy precipitation events will continue to be an important component for mitigation efforts. In addition, fallen trees and debris can obstruct water flow, contributing to flood damage to structures.

Hurricanes cause the most severe flooding problems in the City and it should be noted that most hurricanes occur in the latter portion of the rainy season. Thus, rain associated with hurricanes commonly falls when conditions are most critical for runoff. A representative sample of some damaging storm activity demonstrates the level of coastal flood hazard experienced in the City of Sarasota:

October 24, 1921: Flooding conditions were prolonged due to the slow forward movement of the storm. A combination of high tides (above 7 feet) with wave action resulted in heavy damage along the coastline in Sarasota County. Total loss in the City of Sarasota was estimated at \$200,000.

September 19, 1926: Flooding in the Sarasota area caused damage estimated at \$1 million. In addition, wave action resulted in considerable erosion along the coast in Sarasota County and the City of Sarasota.

September 10, 1960: Hurricane Donna resulted in tidal heights of approximately 3 feet above normal in Sarasota. Pre-storm rainfall of nearly 10 inches saturated the ground. That combined with rainfall of 5 to 7 inches during the storm caused extensive flood damage.

October 19, 1968: Un-named Storm - Tides of up to 5 feet above normal resulted in considerable flood damage.

June 18, 1972: Although the eye of Hurricane Agnes passed approximately 150 miles west of the south Florida peninsula, it produced high tides of 3a feet above normal and five inches of rainfall. High tides caused damage to many homes, seawalls, revetments, and roads along the coastline.

June 18, 1982: A subtropical storm, commonly known as the "No Name Storm", hit the Sarasota area with 60 mph winds and 6 inches of rain with little or no warning from weather forecasters. The storm and abnormally high tides caused considerable structural flood damage to properties.

September 2, 1985: Hurricane Elena hovered over the west coast of Florida for 6 days. Aug 28 – Sept 4, 1985 and brought rainfall of more than 11 inches, requiring the evacuation of 37,000 people. Building on the effects of Elena, Tropical Storm Juan caused serious structural damage to shoreline areas of the City of Sarasota and Sarasota County. Elena required the evacuation of 37,000 persons, of which about 6,500 stayed in shelters

October 28, 1985: Hurricane Juan caused 25 to 35-foot swells in the Gulf of Mexico, and subsequent coastal flooding.

October 16, 1987: Hurricane Floyd brought heavy rains and strong winds, resulting in flooding.

November 20, 1988: Tropical Storm Keith brought rain and strong winds, creating tidal surges 4 feet above normal.

June 23, 1992: This storm exceeded the 100-year storm both in terms of duration and intensity, dropping more than 20 inches of rain in northern Sarasota County. An estimated 3,000 structures were flooded during this intense storm.

June 23, 1993: June 23-26, 1993. Rain exceeded the 100-year, 24-hour storm event with 11.82 inches of rain falling in a 24-hour period.

July 18, 1995: This greater than 100-year storm dropped more than 11 inches of rain within a 15-hour period, resulting in structural flooding.

November 1, 1997: In less than 14 hours, more than 10 inches of rain fell in the Phillippi Creek Basin, located in the southern portion of the City, flooding about 190 structures. This rain fell on already saturated soil, causing runoff to flow shortly after the storm began, with water levels rising quickly in Sarasota County's Main A Canal.

September 14, 2001: Gabrielle, a tropical storm which approached Category 1 hurricane status, made landfall near Venice, Florida to the south of Sarasota. Several inches of rain fell on the area, which resulted in some structural flooding.

August 13, 2004: Hurricane Charley, which developed into a Category 4 storm, was forecast to remain just offshore of the west coast of Florida and make landfall near the mouth of Tampa Bay. However, the storm took an easterly turn and made landfall in the Punta Gorda area, about 50 miles south of Sarasota. It then proceeded northeast through Arcadia, Lake Wales, and Orlando before exiting the state between Daytona and Jacksonville. Because of the relatively compact size of the storm and the fact that it was fast moving, there was little impact on the City of Sarasota in the form of wind or rainfall.

September 5, 2004: Hurricane Frances was a very slow-moving Category 2 storm, with a diameter approximately the size of the state of Texas, which impacted virtually the entire state of Florida. The eye of the storm made landfall near Stuart, and then moved across the state in a northwest direction and went back into the Gulf of Mexico near New Port Richey. The eye stayed to the northeast of Sarasota, but several inches of rainfall fell in Sarasota during the storm, which resulted in some flooding of structures.

September 16, 2004: Hurricane Ivan, a strong Category 4 storm, made landfall near Gulf Shores, Alabama. The storm remained west of Sarasota, out in the Gulf of Mexico far enough so that the only impact was beach erosion and damage to some docks because of changing tides.

September 26, 2004: Hurricane Jeanne made landfall on the east coast of Florida near Stuart. The storm then moved northwest, but the eye remained to the northeast of Sarasota. During the storm, up to 8 inches of rainfall resulted in the flooding of some structures. The storm remained on a northerly track and moved into Georgia.

October 24, 2005: Hurricane Wilma made landfall in Florida near Cape Romano and moved across the peninsula in less than 5 hours. The location of the landfall was far enough south of the City of Sarasota that winds and rain were minimal.

June 2, 2007: Tropical Storm Barry made landfall near Tampa, dropping a few inches of rain, and creating high surf conditions along the west coast of Florida, including Sarasota.

August 19, 2008: Tropical Storm Fay made landfall in Florida south of Naples near Cape Romano and moved to the northeast, with rainfall amounts more than 20 inches reported on Florida's east coast near Melbourne. Because of the path of the storm, there was a minimal impact in Sarasota.

June 23-26, 2012: Tropical Storm Debby developed from a trough of low pressure in the central Gulf of Mexico and made landfall near Steinhatchee, Florida. Initial predictions anticipated the storm to move towards Louisiana or Texas, but the storm moved in the opposite direction. Upwards to 10 inches of rain fell within the City of Sarasota flooding many secondary roads and the Lido Beach parking lot was impacted by flooding from the shifting of the highwater mark due to surf and tide conditions. Overall, Sarasota County suffered almost \$2 million in beach erosion damage which included Lido Key.

January 18, 2016: EF2 Tornado touched down in Siesta Key in Sarasota County with winds estimated to have reached 70 mph, according to the NWS. 111 to 135 mph. 300 business throughout the county were damaged

June 2016: Tropical Storm Colin stayed far offshore as it passed Sarasota, delivering intermittently heavy rainfall, and causing erosion along the coast.

September 1, 2016: Hurricane Hermine caused storm surges and erosion along the coast.

September 10, 2017: Hurricane Irma entered Florida as a Category 4 hurricane. By the time it made it to the Sarasota area, it was still a Category 1 hurricane that brought substantial winds, flooding, downed power, and debris.

A hurricane vulnerability zone is based on storm intensity. Generally, storm intensities are more severe immediately adjacent to large bodies of water such as the Gulf of Mexico and Sarasota Bay. The hurricane vulnerability zone is defined as those areas requiring evacuation in the event of a Category 3 storm event. Storm events are classified by storm categories numbered 1 through 5, with Category 1 storms having the least potential for destruction and Category 5 storms having the greatest potential for destruction.

On average, The Tampa Bay Region, which includes Sarasota County, sustains a hurricane every 4.5 years based on the National Hurricane Center's (NHC) historical assessment of tropical storms and hurricanes. Table 3-3 and Table 3-4 describe the frequency of occurrences of tropical storms and hurricanes in the Tampa Bay Region, which includes Sarasota County.

Table 3-3 NHC Hurricane or Tropical Storms Return Intervals for the Tampa Bay Region

Number of Years	135
Number of Hurricanes and Tropical Storms	100
Mean Number of Occurrences per Year	0.74
Mean Recurrence Interval	1.35 Years

Table 3-4 NHC Hurricane Return Intervals for the Tampa Bay Region

Number of Years	135
Number of Hurricanes	30
Mean Number of Occurrences per Year	0.22
Mean Recurrence Interval	4.5 Years

Every year the state of Florida is at risk of being impacted by tropical storms and hurricanes. Figure 3-6 illustrates the historical tropical storm and hurricane tracks for Florida from 1842 to 2019. Figure 3-7 illustrates the tropical storm and hurricane tracks since 1950 for the Sarasota area. Based on events recorded by the NOAA, 37 of these tracks were within 75 nautical miles of Sarasota County since 1950.

Fig. 3-6 Historical Tropical Storm and Hurricane Tracks in Florida from 1842-2019

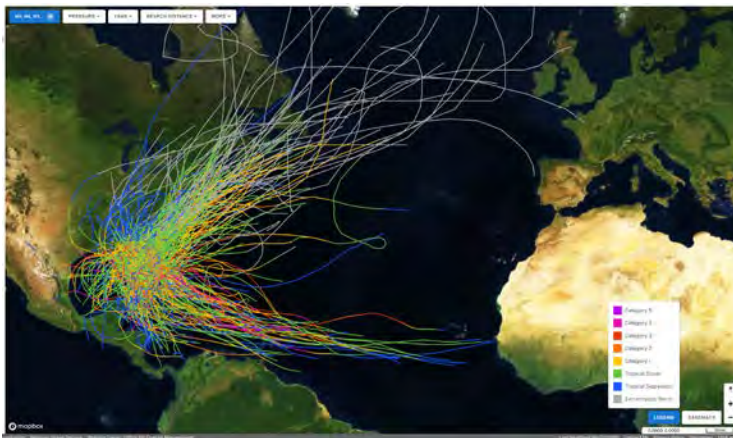


Fig. 3-7 Historical Tropical Storm and Hurricane Tracks in Sarasota County from 1842-2019 (within 75 nautical mile radius)



Due to its geographic location in the subtropics, adjacent to the Gulf of Mexico, the entire County is vulnerable to damage caused by tropical storm and hurricane-force winds and related flooding. Vulnerability to hurricane related flooding is dependent upon the severity of storm surge, a general rise in sea level caused by the low pressure and strong winds around a hurricane's eye, and the amount of rain carried by the hurricane. Storm surge is influenced by the hurricane's velocity and can rise 20 feet or more above normal sea level to cause massive flooding and destruction along shorelines in its path. During tropical storms and hurricanes, flooding due to heavy rainfall may extend over widespread areas of the County including the City of Sarasota.

INLAND FLOODING

Flooding has been the most frequently occurring natural hazard in the City of Sarasota, including inland flooding due to heavy rains, whether or not the rains are associated with tropical storms or hurricanes. Areas within the City are subject to flood depths that range from less than a foot up to 10 feet. Prolonged periods of rainfall have shown increased potential for causing damage to property and requiring residents to evacuate due to flooding. This problem can become more severe if the heavy rainfall occurs at the same time as a high tide, which prevents much of the rainwater from flowing through the drainage systems into the bays or Gulf of Mexico.

Sarasota County has experienced several damaging floods in recent history. Since 1950, 62 flood events have been recorded in Sarasota County by the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information. The types of events recorded include coastal flood, flash flood, flood, heavy rain, hurricane, storm surge/tide, tropical depression, and tropical storm

The most vulnerable are structures are built before the City of Sarasota entered the NFIP in 1971 called pre-FIRM structures. The City of Sarasota has approximately 8,000 of these structures built prior to flood mapping or regulations.

REPETITIVE LOSS AREAS and HISTORICAL CLAIMS

The NFIP has paid over \$6.9 million in claims in the City of Sarasota. Of these paid losses, approximately \$6.3 million were for pre-FIRM structures, representing 534 claims while post-FIRM structures accounted for 47 claims totaling approximately \$467 thousand, illustrating the importance of maintaining accurate flood risk information and the benefits of the City of Sarasota floodplain management practices and regulations. Table 3-5 and Table 3-6 describe the policy and claim statistics for the City of Sarasota.

Table 3-5 PRE-FIRM Built before 7/31/1971

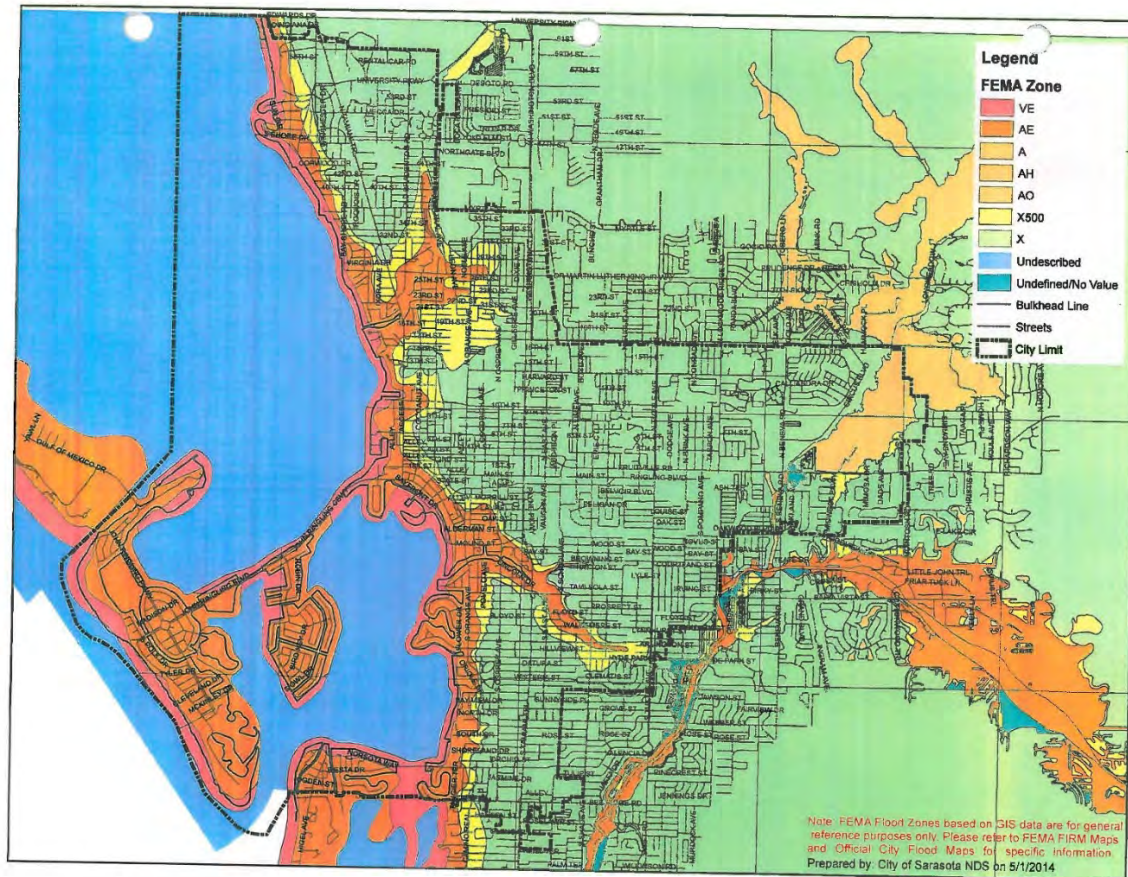
ZONE	POLICIES	NUMBER OF CLOSED PAID LOSSES	AMOUNT OF PAID LOSSES
A 01-30.AE	2,977	311	\$ 2,871,456.23
A	3	20	\$ 409,909.74
AO	0	0	\$ 0
AH	6	1	\$ 36,705.92
V 01-30, VE	151	52	\$ 751,131.24
B, C, X	825	29	\$ 123,073.50
STANDARD	79	59	\$ 560,274.09
PREFERRED	746	62	\$ 1,558,830.64
TOTALS	3,962	534	\$ 6,311,381.36
<i>FEMA as of 8/31/2019</i>			

Table 3-6 POST FIRM Built on or after 7/31/1971

ZONE	POLICIES	NUMBER OF CLOSED PAID LOSSES	AMOUNT OF PAID LOSSES
A 01-30.AE	3,160	7	\$ 27,695.14
A	0	2	\$ 27,940.97
AH	46	12	\$ 109,571.29
V 01-30, VE	44	1	\$ 1,635.26
D ZONE	0	2	\$ 13,487.60
B, C, X	884	23	\$ 286,551.02
STANDARD	253	20	\$ 201,365.75
PREFERRED	631	3	\$ 85,185.26
TOTALS	4,134	47	\$ 466,881.28
<i>FEMA as of 8/31/2019</i>			

FLOODPLAINS

The City's floodplains are identified on the map below and are defined by the "A" and "V" zones of the flood insurance rate maps of the Federal Emergency Management Agency (FEMA). "A" zone are areas subject to the 100-year flood hazard and "V" zones are subject to the 100-year flood hazard and associated wave action. The areas within the floodplains are largely developed and include residential, commercial, and recreational and community uses.



LESS FREQUENT FLOOD HAZARDS and OTHER TYPES of HAZARDS

This Section describes other, less frequent, hazards that may affect the City of Sarasota, including but not limited to:

Tornado

Tornados can destroy buildings, flip cars, and create deadly flying debris. They are violently rotating columns of air that extend from a thunderstorm to the ground.

- Can happen anytime and anywhere
- Bring intense winds, over 200 MPH
- Can occur with high wind and or rain events
- Warning time is minimal
- Look like funnels and sound like freight trains

King Tide

King Tides refer to the extreme high tides that occur when the moon is aligned with the earth and sun, and when it is closest to the earth in its orbit.

- King tides are the highest tides.
- They are naturally occurring, predictable events
- The king tides occur when the Earth, Moon and Sun are aligned at perigee and perihelion, resulting in the largest tidal range seen over the course of a year.

Lightening

- There is no safe place outside when thunderstorms are in the area.
- If you hear thunder, lightning is close enough to strike you.
- Just Remember, When Thunder Roars, Go Indoors.
- Florida has had the most reported lightning deaths in the U.S. since 2011

Coastal Erosion

- High winds, which can cause significant wave action and result in substantial erosion

Sea Level Rise

- The City of Sarasota uses NOAA's 2017 sea level rise projections, calibrated for the rate of change observed at the St. Petersburg tidal gauge.
- The Sarasota region has experienced 8 inches of sea level rise since 1944, when official federal records began for the Tampa Bay area.
- It is projected the Sarasota region will experience 1 – 1.5 feet of sea level rise by 2050.
- Sea level rise is a unique hazard from other hazards as it is a slow moving event that is known to be occurring yet exact increases depend on complicated global variables.

Erosion of Structural Elements

- Failure can take several forms, including a collapse of or breach in the structure
- Prolonged periods of rainfall and flooding, which cause most failures.
- Inadequate spillway capacity, resulting in excess overtopping of the embankment.
- Internal erosion caused by embankment or foundation leakage or piping.
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components.
- Improper design or use of improper construction materials.
- High winds, which can cause significant wave action and result in substantial erosion

Additional Hazards

Listed in the Sarasota County Unified Local Mitigation Strategy (LMS) that the City of Sarasota is a participant.

5. ASSESS THE PROBLEM

Many things can contribute to flooding, including hurricanes, tropical storms, sea level rise, and large rainfall events. A historical look at such storm events was discussed earlier in this document. There are more than 4,000 structures located in the floodplains within the City of Sarasota. It is estimated that more than 90 percent are residential (some are condominiums or apartments with multiple dwelling units in a single structure), with the remaining 5 to 10 percent being commercial or industrial. Some structures are subject to repeat flooding. The most current Repetitive Loss List data issued to the City of Sarasota by the Federal Emergency Management Agency is dated fall, 2018, which lists repetitive loss properties in the City based on losses from January 1, 1978. There are 73 properties located within the incorporated boundaries of the City of Sarasota. Repetitive loss properties are discussed in the Sarasota County Unified Local Mitigation Strategy (LMS), and a map of all repetitive loss properties in Sarasota County, including the City of Sarasota, can be found in Appendix G of the LMS. Nearly all the repetitive loss properties are residential structures.

Life Safety: Warnings and Evacuations

Hurricane vulnerability and the resulting flooding is a fact of life for local governments in coastal locations. Therefore, hurricane evacuation planning is both a necessity and major concern. Much of the City lies within the storm surge category areas used to define evacuation during storm events. The ability to safely evacuate during a natural disaster depends on strong disaster preparedness planning and requires the cooperation of all affected citizens.

In 2014, the City of Sarasota created its own Emergency Management Division within the Police Department which is responsible for developing and administering all-hazards preparedness planning through the City's Comprehensive Emergency Management Plan (CEMP). The City's Emergency Manager works closely with the Sarasota County Department of Emergency Management which is responsible for developing and administering hurricane preparedness planning for the entire Sarasota County area through the County's Comprehensive Emergency Management Plan (CEMP). These plans establish uniform policy that jurisdictions use to create specific procedures and guidelines during floods and other similar emergencies. The City of Sarasota coordinates its hurricane, flooding, and other emergency efforts with the Sarasota County Department of Emergency Management through our Emergency Operations Center to their Emergency Operations Center.

Prior to the arrival of a storm, the Public Safety Group determines which areas are to be evacuated. The Sarasota County Sheriff's Office is responsible for coordinating the evacuation of Sarasota County, with assistance from the City of Sarasota and its various departments, to execute the notification of citizens in the areas to be evacuated and the establishment and monitoring of evacuation routes. Sarasota County Emergency Management also supports the Sarasota County Sheriff and affected municipalities with resource requests and to make sure the public is informed.

The City of Sarasota maintains three Tactical First-In Teams whose primary mission is to clear routes to critical infrastructure within the City. These teams are assembled in advance of a storm (before wind speed reaches 45 mph) and is activated by City's Emergency Manager from the Emergency Operations Center. These teams are self-supporting and have the communications assets available to redeploy based on the current threat situation. Teams are

composed of members from the City of Sarasota Police Department, City of Sarasota Public Works Department, Verizon, Florida Power and Light (FPL), Sarasota County School Board Transportation, and Sarasota County Fire and Rescue. These teams conduct an annual drill.

Sarasota County partners with all municipalities to develop and maintain a “Local Mitigation Strategy” (LMS). The program’s purpose is to encourage local jurisdictions to minimize risks and costs associated with natural disasters by planning and pursuing preventive measures such as strengthening existing vulnerable structures, elevating vulnerable structures, modifying building codes as appropriate, implementing public awareness programs, and preparing emergency response plans. The program is coordinated through the Sarasota County Emergency Management Department. Sarasota County has a FEMA approved LMS as January 2016 and adopted by Resolution by Sarasota County and all municipalities, including the City of Sarasota.

The City of Sarasota and Sarasota County continue to partner and collaborate in order to add and maintain in technological systems that have increased the effectiveness in alerting the public throughout both of our jurisdictions to potential emergency situations and predicting where storm-related flooding is anticipated.

Emergency Alert System (EAS)

EAS is a national public warning system that requires broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service (SDARS) providers, and direct broadcast satellite (DBS) providers to provide communications capability to the President to address the American public during a national emergency. The system may also be used by state and local authorities to deliver important emergency information, such as weather information targeted to specific areas. The City of Sarasota submits an event appropriate message through Sarasota County to the State Watch Office or National Weather Service to be disseminated via EAS.

Alert Sarasota County

In May of 2020, the City of Sarasota, Sarasota County, and the other municipalities within the county entered into a partnership with the Florida Division of Emergency Management for the creation of Alert Sarasota County an emergency telephone calling system hosted by Everbridge. This notification system is a geographical information system (GIS) based high-speed telephone communication service for emergency notifications. Telephone numbers are matched electronically to the associated addresses and the pre-recorded message with information about the incident and instructions for action to be taken is delivered to all phone numbers in the selected area. This system can also call a cell phone and/or deliver text messages, emails, or push information via the mobile app notification based upon user preference.

ARMS System

In August of 1998, Sarasota County’s Emergency Management Department completed installation of a virtual rain gauge. Linked to a satellite system, the virtual rain gauge provides a precise picture of how much rain will fall in a specific area. This system has been connected with four existing flood monitors on the Myakka River and the Sarasota County Drainage

Operation's network of 30± gauges that includes river flood gauges and salt-water tide gauges to give the Emergency Management Department the early warning capability to reduce losses caused by storm-related riverine flooding. The data is accessible via the Internet at <http://sarasota.wateratlas.usf.edu/datamapper/>.

Wireless Emergency Alerts (WEA)

WEA is a public safety system that allows customers who own certain wireless phone models and other enabled mobile devices to receive geographically targeted, text-like messages alerting them of imminent threats to safety in their area. The City of Sarasota submits an event appropriate message through Sarasota County to the State Watch Office or National Weather Service to be disseminated via WEA.

Door-to-Door

Based upon the particular weather hazard and unfolding situation, the Emergency Manager may direct the Police Department's Patrol Division to conduct a door-to-door/mobile public address to disseminate the warning information. The City is divided into 10 patrol zones and each Officer will proceed north to south and west to east direction within their patrol zone relaying the designated message to the citizens. Additional Officers from the Police Department's Emergency Response Team may be dispatched to the more vulnerable areas as needed. If additional resources are needed, the Emergency Manager may direct the Public Works Solid Waste Division to assist based upon their pickup day collection routes.

Global Positioning System (GPS)

A community Base Station receiver for the GPS is used by many Sarasota County agencies. This system develops data collection, conducts real time surveying, and vehicle location or Emergency Operations and Transit Operations.

800 MHz Trunk Radio System.

This county-wide interoperable radio communications system has expanded to over 4,000 units since its implementation in 1996. There are just over 1,000 mobile and 3,000 portable units in service. The ability for interagency communication, such as communication between school buses, sheriff patrol cars, City police cars, City public works vehicles, City utilities division vehicles, and emergency vehicles, greatly enhances public health and safety, especially during an emergency.

Hurricane Evacuation Study

The Southwest Florida Regional Planning Council, of which the City is a member, updated the *Hurricane Evacuation Study* as part of a statewide evacuation study, in 2010. The study includes evacuation information such as shelter listings, evacuation routes, and clearance times. It provides an updated Sea, Lake and Overland Surges from Hurricane (SLOSH) Model, produced in conjunction with the Atlantic Oceanic Meteorological Laboratory. The SLOSH Model includes inundation maps showing hurricane surge limits for Sarasota County, including the City of Sarasota, increasing the City and County's ability to warn residents in

high-risk areas. On September 14, 2020, the initial kick-off meeting was held by the Southwest Florida Regional Planning Council to update this plan.

Public Health

A flood can devastate residential homes, commercial property, environmentally sensitive lands, and other public infrastructure. However, during the flood and its aftermath, there are also threats to the community’s health and safety. Although most attention is normally paid to the risk of physical property damage during and after a flood event, citizens must take precautions to lower the associated health risks. Health risks can be found in many forms, and are not limited to:

- Unsafe food
- Contaminated drinking and washing water
- Poor sanitation
- Domestic and wild animals
- Mosquito borne diseases
- Mold and mildew
- Carbon monoxide poisoning
- Structure electrical and natural gas
- Mental stress and fatigue

Restoring flooded properties is an overwhelming task, and everyone should be cognizant of the potential health risk and associated hazards. Residents should seek assistance from professional sources or their public safety officials.

Critical Facilities and Infrastructure

Critical facilities are defined as those structures from which essential services and functions for victim survival, continuation of public safety actions, and disaster recovery are performed. The City of Sarasota’s Emergency Manager maintains an up-to-date contact list for all critical facilities within the jurisdiction. There are no special warnings or early notification requirements for these facilities for a non-tropical weather event. If the situation is a tropical event, all special warnings or early notifications of facilities will be coordinated by the following table:

Facility Jurisdiction	Coordination Entity
City of Sarasota	Logistics Section Facilities Unit
Sarasota County	Sarasota County Public Works Facilities Department (note- County Constitutional Officers facilities are owned and operated by Sarasota County Government)
Sarasota Schools	The School Board assigns a liaison officer to the Sarasota County Emergency Operations Center.
Sarasota Memorial Hospital	Sarasota Memorial Hospital is a public hospital jurisdiction which assigns a

	liaison officer to the Sarasota County Emergency Operations Center
Non-Government Schools	The School Board liaison officer will coordinate with all private schools
Florida Power & Light	Florida Power & Light assigns a representative to Sarasota County Emergency Management to staff Emergency Support Function 12, “Energy” to coordinate all activities
Non-Government Medical Facilities	The Sarasota County Health Department Staffs’ Emergency Support Function 8, “Health and Medical Services” and coordinates all activities

Community Economy and Major Employers

The City of Sarasota is an internationally recognized destination known for its arts and cultural excellence, exceptional healthcare facilities, premier educational institutions, diverse recreational opportunities, and the vibrancy of its downtown. Sarasota’s economy is driven by education, arts, tourism, and financial services. Major Private Employers include Publix, Pines of Sarasota, Ringling College of Art and Design, Sarasota Family YMCA, and Mote Marine Laboratory & Aquarium. Major Public Employers include Sarasota County Government, School Board of Sarasota County, Sarasota Memorial Hospital, City of Sarasota, and the John and Mable Ringling Museum.

Natural and Beneficial Functions within the Floodplain

Wetlands

A wetland is defined in 373.019(27), Florida Statutes as “areas that are inundated or saturated by surface or groundwater at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Unlike Sarasota County and some other areas of the state, the City is essentially urbanized and developed. Therefore, wetlands are not as abundant in the City. However, it is important that the City protect wetlands and the natural function of wetlands through coordination with the private sector, other units of government and the Sarasota Bay National Estuary Program (SBNEP).

Beach and Dune Systems

The City’s beaches protect upland infrastructure and buildings and provide critical habitat for many species including sea turtles and birds. In addition to being a significant natural resource, the beaches are also an important recreational facility for residents and tourists, which is essential to the area’s economy. The beach runs the entire three (3) miles of Lido Key with a dune system along most of this length. There are over 500 parking spaces within walking distance of Lido Beach. A need for additional parking has not been identified. The Gulf side of Lido Key has experienced severe erosion at various times, in which portions of

the beach did not exceed 10-feet in width, and the City works with the Army Corps of Engineers and Florida Department of Environmental Protection to protect the beach. In 2015, the City completed a 1.8-mile stabilization project for Lido Beach which replaced sand that was lost due to Tropical Storm Debby in 2012. The Post-Tropical Storm Debby Lido Beach Re-nourishment Project added 197,000 cubic yards along the 1.8 miles of Lido Beach from the Lido pool to Ted Sperling Park. The project added approximately 85 feet width of beachfront along the affected areas. If it had not been corrected, it would have had a significant negative impact on the economy of the City and Sarasota County. To mend damage from subsequent storm events, in July 2020 the City began construction on the Lido Beach Hurricane and Shoreline and Damage Reduction Project. The project should be completed May 2021 to add 710,000 cubic yards of sand to the beach. Future re-nourishment will occur every 3 to 5 years depending on the extent and urgency of the re-nourishment needed.

Beaches are dynamic systems that constantly shift in response to wave action, tides, and winds. Dune systems buffer upland property and provide support to numerous plant and animal species. Development along beach systems and inlets interrupt the natural movement of the sand. Shoreline hardening structures may protect the beach areas on which they were built, but beach areas near these structures generally experience scouring of beachfronts. For this reason, the City and the State regulate shoreline hardening.

Beaches also provide habitat for sea turtles with nesting season running from May through October on the Gulf coast. Sea turtles are protected by both the Federal Endangered Species Act and the Florida Marine Protection Act. It is illegal to touch or disturb nesting sea turtles, hatchlings, or their nests.

Lido Key is the only active beach/dune system within the City limits. According to the 1984 Southwest Florida Ecological Characterization Atlas, U.S. Department of the Interior, the northern half of Lido Key experiences erosion at the rate of one foot per year and is known to be unstable. The southern half of Lido Key generally experiences build-up but also encounters severe erosion at times. This data is based on the regression of the mean highwater line expressed in feet/year and was calculated by periodically reviewing shorelines using aerial photography or U.S. Army Corps of Engineers high-water-shoreline-change charts. The measurements are of limited use, however, because they can indicate considerable regression while no net sand loss occurred.

Mangroves

Mangroves occur along extensive portions of the shoreline of Sarasota Bay. Two species with specialized root systems grow in the intertidal environment, and two more species grow near the shore at higher elevations. Well-established mangrove forests can protect shorelines during episodes of erosion, and buffer uplands from storm surges. They filter upland pollutants, and in doing so serve as valuable nutrient stores and sources. The Florida Department of Environmental Protection issues permits for trimming or removing mangroves.

The protection of mangroves shall comply with the Mangrove Trimming and Preservation Act, Sections 403.9321 through 403.93333, Florida Statutes.

Tree Protection

In 1989, the City adopted a Tree Protection Ordinance providing protection for trees of four and one-half inches in diameter or larger, palms with greater than 8 feet of clear trunk and all species of mangroves. A permit is required for removal of these trees. Removal is allowed only when a tree creates a safety hazard, utility problem, prevents reasonable access, is dead or diseased, or prevents the reasonable development of property. In addition, the regulations provide protection for trees during construction.

Development, Redevelopment and Population Trends

The City of Sarasota is essentially built-out, meaning there are no large vacant tracts of land such as those found in Sarasota County outside of the City. Therefore, the City population is not expected to grow rapidly because of new development. During the past 15 years, a great amount of redevelopment has occurred in the central core of the City's downtown. Large condominium buildings have replaced older and, in most cases, smaller structures. This redevelopment has increased the downtown's population and this trend is expected to continue in the future. Additionally, increases in the City population could result from annexation of areas of unincorporated Sarasota County. It should be noted that any annexed lands are likely to already be developed; therefore the population increase resulting from annexation will not be from new development, but rather a "transfer" of the status of the people as residents of unincorporated Sarasota County to residents within the limits of the City of Sarasota.

Much of the development that has been occurring in the City in recent years and is projected to occur in the future, consists of the razing of existing buildings and the construction of new ones. This has been particularly true with waterfront properties and those located near the water, such as on Bird Key, Lido Key, and elsewhere along Sarasota Bay and the Gulf of Mexico in "A" and "V" flood zones. Many homes have been purchased for the purpose of being razed and a new home being built. Many of the homes being demolished were built prior to any requirement to elevate structures or meet any flood prevention regulations. The new homes being constructed have to meet all flood development regulations such as the first finished floor being elevated to a certain level, requiring hydrostatic flow-through openings in walls, breakaway walls if located in a "V" flood zone, and locating equipment such as water heaters, air handlers, etc. above the design flood elevation. Being constructed to meet all these standards should result in less flood damage to these structures as compared to the ones they replaced. In addition to meeting requirements to develop in an "A" or "V" flood zone, new homes and other buildings being constructed also must comply with the latest building code requirements regarding elevation, wind, and hurricanes.

Economic Impact on Future Flooding

The amount of economic impact by flooding and its duration depends on the severity of the storm event. A storm event with heavy rain and little wind may only result in flooding in a limited area of the City and would have relatively little long-term economic impact. Conversely, torrential rains, along with high winds and storm surge associated with a Category 4 or 5 hurricane could result in citywide damage and mid to short-term financial impacts. Based on the assumption of a catastrophic storm, property tax revenue would decline severely in the year following such a storm. The return of property tax revenues to pre-storm

levels would depend on how quickly structures are rebuilt. The City reserve funds would need to be drawn upon to pay for damages to City property, rent temporary office space, and replace lost revenues. Franchise and Excise fees from electric, natural gas and communication fees would drop until such time as the damaged areas are rebuilt and these services restored. However, at the same time the subsequent receipt of disaster assistance, clean-up and recovery activity, and the production of replacement capital will serve to act as a counterweight to some losses. Also, the City's loss of property is insured and payments to reimburse the City will be forthcoming. Building permit revenues, which are not included in the General Fund, would soar in the months following such a storm as insurance claims are settled and property owners begin the process of rebuilding structures. The sales tax revenue generated from purchases of supplies and replacement goods (e.g. lumber, plumbing fixtures, furniture, appliances, electronics) may offset in part the loss of sales tax revenue from a drop in tourism and visitors to the City due to the storm. Another economic factor to consider is the fact that studies have shown the employment in Florida drops between 1% - 1.5% in response to hurricanes as well as residents leaving the City temporarily.

6. FLOODPLAIN PROGRAM GOALS

- Increase public awareness of known flood hazard areas, availability of flood insurance, and flood protection methods.
- Increase publicly owned natural areas within flood prone areas.
- Provide adequate warning to residents of storm events, impending floods, and other natural disasters.
- Protect environmentally sensitive lands from development.
- Eliminate or reduce stormwater system levels of service deficiencies in the 12 drainage basins located in the City.
- Prevent increased water runoff from new development, which could result in increased flood flows.

7. REVIEW OF CURENT ACTIVITIES

Preventative

Engineering Design Criteria Manual

The City's "Engineering Design Criteria Manual" addresses stormwater attenuation requirements for all new subdivisions and other multi-family developments within the City limits. Attenuation is a design principle whereby additional stormwater run-off created by development is controlled so that it does not increase the probability of flooding either upstream or downstream property owners. Adequate retention areas and controls are engineered so that the rate of discharge into the receiving body is not increased. Run-off reduction enhances the ability of precipitation that falls on land surfaces to be absorbed by the soil (infiltration), thus recharging the groundwater supplies. All information to be based on the datum used by the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) received from FEMA at time of submittal.

Stormwater Environmental Utility

In 1989 the City and Sarasota County Government entered into an interlocal agreement creating a "Stormwater Environmental Utility" to comply with the National Pollutant Discharge Elimination System (NPDES) regulations for the management of municipal stormwater. Sarasota County as the lead agency and the City as a co-permittee for this endeavor received one of the first such permits issued. The Utility's responsibilities include administration, basin planning, operations, maintenance, repair, and capital improvements to the stormwater system.

Beach and Dune Maintenance

In January 1990, the City Commission authorized the preparation of the Lido Beach Long-Range Beach Management and Erosion Control Plan. As part of that plan, an analysis was made of the littoral processes affecting the key. This included researching and summarizing the range of wind and wave conditions and the effects of the seven major extra tropical storms, which had affected the area since the 1920's. A sediment budget (inventory of sand gains and losses) was developed to examine sources of sand, and transport rates and directions. Littoral drift rates (the rate at which sand moves along the coast) along Lido Key were estimated by studying the rates that sand builds up at Sarasota County inlets and passes. Various authors based on shoaling/dredging records at the passes have inferred net rates of 28,000 to 50,000 cubic yards per year. This data was used to calibrate a computer model for calculation of sediment transport, which was then used in subsequent analyses. The effects of wave transformation by the ebb shoals of the passes were also considered and the model results were compared with historical shoreline changes identified from previous surveys. The final sediment budget confirmed the existence of a "nodal point" around the public beach in the center of Lido Key. The significance of this is that sand transport patterns indicate erosional losses in both directions (north and south) from the public beach. According to the City Engineer, in 2015 the southern portion of Lido accretes sand while the north portion remains stable.

The Lido Beach Long-Range Beach Management and Erosion Control Plan, completed in January of 1991, recommended an initial beach re-nourishment of 350,000 cubic yards with subsequent re-nourishments of 200,000 cubic yards approximately every four years, all placed along approximately one mile of publicly accessible beach on central Lido Key. The initial beach fill width of approximately 155-feet (with a gradual taper extending over the southern 1400 feet) resulted in a 75-foot design beach width to be maintained for a 50-year period. This work was to be in addition to and alternating with the fill placed by the U.S. Army Corps of Engineers (USACE) via their New Pass channel maintenance project every four years. This alternating and periodic re-nourishment process is necessary because of the designed, sacrificial loss of sand, due to natural effects. The City Commission approved the Plan, after several public hearings and great support from the citizens. The City Commission authorized the multitude of necessary studies for the design of the initial project in August of 1991. The City applied for a State grant for construction of the Long-Range Plan's initial fill through the Florida Beach Erosion Control Program for fiscal year 1997-98. The 1997 State Legislature recommended funding of the project to the Governor in the amount of 15 percent. The project was constructed in April 1998.

New Pass at the north end of Lido Key was dredged in 1982 and 1990-91 and the spoil used in a beach re-nourishment project along Lido Key and Longboat Key. The U.S. Army Corps of Engineers dredged new Pass in the summer of 1997 and approximately 160,000 cubic yards of spoil was deposited on Lido Key along the beach from John Ringling Boulevard, southward. Another 160,000 cubic yards of spoil was placed on Longboat Key, north of the channel. Dredge disposal sites are discussed below.

The southern third of Lido Key experienced severe erosion during the first half of 1998 and the September 1998 storms. Condominium owners and resort owners became well organized and requested help from the City of Sarasota. On March 2, 1998, the City Commission approved an Agreement for Engineering Services with Coastal Planning and Engineering, Inc. (CPE) to accomplish the engineering and permitting, including the sand search. A sand source was identified by CPE about eight miles offshore, directly west of Lido Beach.

To protect the shoreline and back dunes on Lido Beach, Sarasota County has constructed wooden dune crossovers to the beaches to allow the back dunes a chance to develop a vegetative cover. A dune cross over is essentially a footbridge so pedestrians will not walk on and damage dune vegetation. Natural forces destroyed several dune crossovers in the last few years. They have been or will be replaced with "at-grade" access points and the new dune will be revegetated.

As they did for the 1998 Lido Beach Restoration Project, the Florida Department of Environmental Protection (FDEP) required the establishment of an "Erosion Control Line" (ECL) for this project. The City Commission approved the ECL on 4 December 2000 and the document was recorded with the County Clerk on 17 January 2001. Drawings showing the exact location of the adopted ECL are in our office for public review.

During March and April of 2001, Weeks Marine placed approximately 360,000 cubic yards of sand on the southern half of Lido Beach, a distance of 1.3 miles. The sand source was about 8 miles west of Lido Beach, under 35 feet of water. The total cost of this project was \$4.18 million.

The USACE had New Pass dredged again in 2003. Goodloe Marine, Inc. started dredging New Pass and placing some sand on Lido Beach on December 15, 2002. At the recommendation of City Engineer and CPE, on April 15, 2002, the City Commission approved the plan to place the “white” sand on the entire southern two-thirds of the island, as a two-foot thick layer, approximately one hundred feet wide. Goodloe completed the Lido Beach portion on February 1, 2003, placing approximately 125,000 cubic yards and continued dredging New Pass and placing the other half on Longboat Key’s beach. The New Pass maintenance program currently reached its cap for federal funding.

On December 22, 2004, the Chief of Engineers of the USACE signed the “Feasibility Study for Hurricane and Storm Damage Reduction for Lido Key” culminating the 3-year study by the USACE. The following steps in order of needed action were completed:

1. Office of Management and Budget (OMB) clears Feasibility Study and submits to Congress.
2. Congress authorizes increased project cost via the next Water Resources Development Act (WRDA) bill.
3. Authorization to proceed under authority of Section 206 approved by Assistant Secretary of the Army.
4. USACE prepares, City executes and USACE executes Project Cooperation Agreement (PCA).
5. Congress authorizes construction financing.

In addition to the long-range Lido Beach project, the “FEMA” project was completed in early 2009. The agreement for the design of Lido Beach for the next 50 years was approved by the City Commission in August of 2006 and is presently underway by the USACOE.

In January 2005, Sarasota County awarded a contract to a coastal engineering firm to prepare inlet management studies for both New Pass and Big Sarasota Pass.

In June 2012, Tropical Storm Debby produced severe erosion on Lido Beach. Receiving funding from the FEMA, FDEP, and the Tourist Development Tax, in 2015 the Post-Tropical Storm Debby Lido Beach Re-nourishment project added 197,000 cubic yards of sand from New Pass to Lido Beach. CB&I (formerly CPE) was hired as the coastal engineering consultant, and Orion Marine Group was hired as the contractor. The total cost of the project was approximately \$3.6 million.

In July 2020, the City began construction on the Lido Beach Hurricane and Shoreline Damage Reduction project. The project will re-nourish Lido Beach with 710,000 cubic yards of sand carried from the Gulf of Mexico and recycle it back onto the beach. Subsequent to the beach re-nourishment, the project will also construct new beach groins to absorb wave action and slow natural beach erosion. The project is expected to be completed by May 2021. This re-nourishment will be the first project completed under the long-term agreement with the U.S. Army Corps of Engineers. Future re-nourishments will occur about once every 5 years or as needed depending on the severity of erosion and threat to nearby infrastructure.

The City continues to receive grant funds from Sarasota County's Tourist Development Tax fund and from the Florida Department of Environmental Protection's Beach Erosion Control Program.

Coastal Construction Control Line

The State of Florida addresses coastal development in Chapter 161.053, Florida Statutes, which is administered by the Florida Department of Environmental Protection (FDEP), Rule 62B-33, Florida Administration Code. The statute establishes a Coastal Construction Control Line (CCCL) defined as that portion of the beach-dune system which is subject to severe fluctuations based on the 100-year storm surge, storm waves, or other predictable weather conditions. Development seaward of the line is subject to FDEP review to ensure that coastal construction minimizes the adverse impacts to beach-dune systems and adjacent property and is designed to meet hurricane resistance building standards. Chapter 162.053, F.S., also establishes the 30-year erosion projection line, which is the projected location of the seasonal highwater line on subject property 30 years following submittal of an application for a permit. No major structures are eligible to receive a permit seaward of the 30-year erosion projection line except single-family dwellings meeting specific site requirements.

In 1989 the Florida Department of Environmental Protection relocated the Coastal Construction Control line (CCCL) further inland in Sarasota County in response to general erosion trends. Development seaward of the CCCL is required to meet more stringent construction standards to help protect development in highly dynamic areas.

Development in the coastal area is generally subject to more stringent regulation than other areas in order to minimize the risk to life and property if a disaster were to occur. The City is bound by regulation at the federal, state, and local levels that provide mitigation measures for coastal development.

City of Sarasota Regulation of Development in Special Flood Hazard Areas

Within the City of Sarasota, development in the coastal areas as well as all Special Flood Hazard Areas, is regulated by the Florida Building Code (FBC), Chapter 16, the Florida Building Code Residential (FBCR) Chapter 3, and the American Society of Civil Engineers–ASCE-24-Standard as referenced by the Florida Building Code (FBC) and the Florida Building Code Residential (FBCR).

In addition, the City of Sarasota has a Floodplain Management Ordinance 16-5188 adopted September 19, 2016 that amended Ordinance 15-1520 adopted May 4, 2015 which has procedures and criteria for development in Special Flood Hazard Areas. These areas are defined on the flood insurance rate maps of Federal Emergency Management Agency and include all V and A zones of these maps.

The purpose of these regulations is to minimize public and private losses due to flood conditions in the Special Flood Hazard Areas. Below are some examples of how the regulations in the aforementioned documents help to minimize flood losses:

- Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities.
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against potential flood damage at the time of initial construction.

- Control the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwaters.
- Control filling, grading, dredging and other development which may increase erosion or flood damage.
- Prevent or regulate the construction of flood barriers which will unnaturally divert Floodwaters, or which may increase flood hazards to other lands.

Regulation of Moderate to Low Risk Areas (Zone X Shaded and Unshaded)

Section VI-105 of the Zoning Code establishes minimum building finished floor elevation requirements. For most buildings, the minimum finished floor Elevation must be 24 inches above the average elevation of the crown of the road.

Sec. VI-105. - Establishment of minimum building finished floor elevations.

For buildings, including manufactured homes and mobile homes, with a front yard setback of ten feet or more:

- (1)The minimum finished floor elevation for the first floor shall be as provided in subsection a. below, or the highest elevation produced by any of the measurements provided for under subsections b., c. or d. below, as determined by the city engineer.
 - a. A minimum of 24 inches above the average elevation of the crown of a dedicated public street abutting a front yard, as established by the city engineer;
 - b. A minimum of 24 inches or more above the average elevation of the crowns of two or more dedicated public streets that determine the drainage pattern of the area, as established by the city engineer;
 - c. A minimum of 24 inches or more above the crown of a street that has not been dedicated as a public street where the elevation of the street has been approved by the city engineer for drainage purposes; or
 - d. Not less than five feet above mean sea level for the location of the proposed construction, as determined by reference to the datum established by the United States Coast and Geodetic Survey.

Property Protection

Sarasota County acts as the local sponsor on behalf of the repetitive flood loss property owners in the Flood Mitigation Assistance grant program. City of Sarasota property owners are eligible to participate in this program. This mitigation program is offered by the Federal Emergency Management Agency (FEMA) and administered by the Florida Division of Emergency Management (FDEM). The program provides grant reimbursements up to 75 percent of the approved project cost for flood proofing projects including building elevation, relocation, acquisition, dry flood proofing, and minor localized flood control structural projects and minor beach nourishment activities. Sarasota County has participated in this grant application program since it was first offered in 1997.

Development Services Department provides property owners with flood insurance information, Flood Insurance Rate Map (FIRM) information, and information on flood proofing. These activities are discussed below under “Public Information Activities.”

Natural Resource Protection

Beach Nourishment

Beach nourishment along the City’s beaches is discussed earlier in this document under “Beach and Dune Maintenance” in the “Preventative” section of current activities.

Tree Protection Ordinance

As discussed earlier in this document, well-established mangrove forests can protect shorelines from occasional episodes of erosion, and buffer uplands from storm surges.

To protect mangroves and other trees, in 1989 the City adopted a Tree Protection Ordinance NO. 16-5173 amended in 2016 providing protection for trees of four and one-half inches in diameter or larger, palms with greater than 8 feet of clear trunk and all species of mangroves. A permit is required for removal of these trees. Removal is allowed only when a tree meets certain criteria. In addition, the regulations provide protection for trees during construction.

The protection of mangroves shall comply with the Mangrove Trimming and Preservation Act, Sections 403.9321 through 403.93333, Florida Statutes.

Emergency Services

Prior to May 2014, the City of Sarasota relied upon Sarasota County Emergency Management to coordinate much of their disaster preparedness, response, and recovery activities through planning documents such as the Hurricane Evacuation Study 2010 and the County’s Comprehensive Emergency Management Plan. The County’s plans were reviewed amongst the various City Department Directors in order for them to plan their respective department’s roles in a County-wide disaster event.

In May 2014, the City of Sarasota created an Emergency Manager position within the Sarasota Police Department to focus on the direct needs of the City and to coordinate activities prior to, during, and after a disaster with Sarasota County. While the position continues to expand, the primary duties of the position are:

- Serves as the City’s Incident Commander during a “State of Emergency”.
- Serves as Chair of the Floodplain Management Committee.
- Serves on the Sarasota County Local Mitigation Strategy Work Group.
- Responsible for all emergency related planning activities.
- Responsible for all emergency management training activities.
- Maintains the City’s Emergency Operation Center.

- Coordinates emergency response and recovery activities with surrounding jurisdictions and agencies.

The creation of this position enables the City to respond to the needs of our residents more effectively and efficiently during a disaster and the damage that may follow.

Structural Projects

Shoreline Protection Structures

There are approximately 40 miles of coastal shorelines within the corporate boundaries of the City of Sarasota. Of these 40 miles, approximately 8 miles are in a natural state and 32 miles have been altered by some type of man-made structure. The City regulates shoreline hardening through the Zoning Code.

Stormwater Infrastructure

In 1998 the City of Sarasota and Sarasota County entered an interlocal agreement whereby all stormwater management services are consolidated under the control of Sarasota County. Current, future, and maintenance needs are identified in various master plan studies, such as replacement of aging pipes, upgrades to under capacity systems, and provide outfall to landlocked basins. Additional, up-to-date information on water quality and stormwater master plans can be found at the following website: <http://www.sarasota.wateratlas.usf.edu/>.

Public Information Activities

Informational Flyers, Articles, and Internet Site

The City of Sarasota provides information to the public about flooding. Annually, an informational flyer is included in water utility bills which discuss flood hazard areas, flood warnings, flood safety, flood insurance, property protection measures, floodplain development permit requirements, and other helpful information.

Information flyers concerning preparedness, response, and recovering from flooding events and evacuation information may be found in the following locations, Sarasota Police Department Headquarters, City Hall, and the Utility Bill Pay Center. Additional information is also available in the Building Department regarding development requirements in the various flood zones, and the regulations concerning the remodeling or improvement of structures which do not meet the minimum finished floor requirements because they were built prior to such regulations.

The City of Sarasota maintains a web site accessible via the Internet. A link for flood information and safety is available on the City of Sarasota home page at www.SarasotaFL.gov. Links are also provided to connect visitors to other web sites which provide flood information.

Flood Insurance Rate Maps

The FEMA Flood Insurance Rate Maps (FIRM) are available in the Development Services Department. The boundaries of the flood zones on these maps have been placed on the quarter-section maps of the City, enabling property owners, residents, developers, and insurance agents to determine what flood zone a specific property is located in. They can view the maps in person or, as many insurance agents do, call, and ask Zoning Department staff for the information.

The City of Sarasota participated with the Southwest Florida Water Management District (SWFWMD), Sarasota County, and other jurisdictions in Sarasota County in the updating of the Flood Insurance Rate Maps from paper to digital. Effective November 4, 2016 the FIRM maps are digital based on the NAVD 1988 datum.

Jurisdictions within Sarasota County also utilize the Local Mitigation Strategy Work Group to address, assist, and collaborate with one another on regulations and the flood map updates.

Flood Protection Assistance

The City of Sarasota Development Services Department provides information on required minimum floor elevations, data on historical flooding in the City, and other information relating to flood threats in the City. They can also provide the names of licensed and registered contractors, and information as to the appeal process should someone be dissatisfied with a contractor's performance. The Building Division staff are available to make site visits to advise of appropriate flood protection measures for both new and existing buildings and can lend assistance in reviewing retrofitting plans for existing structures.

The following Sarasota City Plan Action Strategies pertain to one or more of the six previous activity categories:

The following action strategies are from the Utilities Chapter of the Sarasota City Plan:

- 1.7 **Stormwater Drainage:** The City shall require development to provide facilities for stormwater drainage in accordance with the Engineering Design Criteria Manual and in accordance with the requirements of Florida Administrative Code, Chapter 62-25.
- 1.8 **Stormwater Drainage Level-of-Service:** The stormwater drainage system shall provide adequate capacity to maintain level-of-service C (Street and Yard Flooding only) using a 25-year/24-hour design storm.
- 1.9 **Sarasota County Storm Water Fee Proceeds:** Proceeds from the Sarasota County Storm Water Utility fees shall be used for maintenance, planning, elimination of structure flooding, and the reduction of pollutants carried by stormwater runoff into Sarasota Bay.
- 1.10 **Drainage System Improvements:** The City shall work with the Sarasota County Stormwater Environmental Utility or develop and fund its own stormwater utility to:

- Complete Basin Master Plans,
- Evaluate the recommended improvement to the drainage System to correct existing deficiencies as identified in each Basin Master Plan, and
- As the funds are available will consider implementing the improvements.

1.11 **Development:** Development shall be subject to the availability of adequate levels of service for potable water, sanitary sewer, solid waste, and drainage, pursuant to the relevant action strategies of the Capital Improvements Chapter. The design and function of utility infrastructure shall be in compliance with the requirements of the City’s Engineering Design Criteria Manual (EDCM).

2.2 **Environmental Protection from Stormwater Runoff:** The quality and quantity of storm water runoff shall be regulated in accordance with:

- Chapter 17-25 Florida Administrative Code;
- Environmental Resource Permitting of Surface Water Management Systems, administered by the Southwest Florida Water Management District, (Chapters 40D-4, 40D-40, 40D-45, and 40D-400 Florida Administrative Code);
- National Pollutant Discharge Elimination Permit No. FLS000004; and
- The City’s Engineering Design Criteria Manual (EDCM), Chapter 29.5, Ordinance 89-3278, to protect the quality of receiving water bodies. The EDCM will continue to require that any new development not be allowed to shed storm water at a higher rate onto adjacent right-of-way or property than was discharged from the site in its prior existing state.

2.6 **Permeable Surfaces:** The Engineering Department shall explore the use of permeable surfaces as an alternative to impervious pavement surfaces to minimize runoff.

3.3 **Stormwater Management:** The City will explore alternatives to balance redevelopment efforts and site-specific stormwater management requirements.

3.4 **Regional Stormwater Management:** In recognition of the desires to improve watershed management while promoting continued urban development and redevelopment, the City shall investigate the feasibility of utilizing aggregate and/or regional stormwater management facilities.

The following action strategies are from the Environmental Protection and Coastal Islands Chapter of the Sarasota City Plan:

1.3 **Specific Natural Resource Protection Initiatives - Water**

In addition to regulations listed in this action strategy, the City will continue to support and comply with all applicable county, state, and federal laws to protect water.

Stormwater Runoff: The quality and quantity of storm water runoff shall continue to be regulated in accordance with the ECDM to protect the quality of receiving water bodies by emulating natural hydrologic conditions.

- 1.4 **Specific Natural Resource Protection Initiatives – Wetlands:** The City will continue to support and comply with applicable regulations which protect wetlands. The applicable regulations shall include, but not be limited to, the most recently adopted and applicable documents, as may be amended, listed in Action Strategy 1.1 of this Environmental Protection Plan; Chapter 373, Florida Statutes; and Chapters 62-4, 62-40, 62-302, 62-340, and 62-342, Florida Administrative Code.
- 3.6 **Impervious Surface Area:** The City shall continue to explore reducing the amount of existing impervious surface in the Sarasota Bay watershed and seek alternatives for reducing impervious surface area in future development.
- 3.8 **Impervious Surface on Coastal Islands:** The City shall further evaluate the reduction of impervious surfaces for sites located on the coastal islands. Impervious surfaces shall be minimized to the maximum extent feasible, especially for parking surfaces.
- 4.1 **Development and Evacuation:** The City shall ensure that future development within the Coastal High Hazard Area does not occur in amounts, types, or locations that would cause total evacuation time to exceed those established by the City’s Emergency Operations Plan that is: they shall not exceed more than 16 hours.
- 4.2 **Storm Damage Minimization:** The potential for storm damage shall be minimized through compliance with applicable Land Development Regulations. In general, these regulations should ensure that proposed changes will not endanger the stability of the beach-dune system; will not accelerate erosion; and will be consistent with the Florida Department of Environmental Protection regulations.
- 4.3 **Federal Emergency Management Act (FEMA):** The City will continue to participate in the Federal Emergency Management Act Community Rating Systems (CRS) Program, which involves meeting higher than minimum FEMA standards. The CRS program includes but is not limited to:
 - the City’s adopted flood plain management program which deals with strategies to lessen flooding and respond to emergencies; and
 - annual reports to the CRS Program on the City’s progress, and effects of any storms.
- 4.5 **Emergency Operations Plan:** The City shall employ the hazard mitigation annex of The Emergency Operations Plan, for purpose of coordinating all preparedness, response, recover and mitigation activities which includes, but is not limited to:
 - assigning responsibilities and establishing procedures for governmental agencies, volunteer agencies, and individuals, in preparing for and executing evacuation of designated areas of Sarasota;

- relocation of coastal residents, residents of mobile home parks, and residents of low-lying areas subject to flooding; and
 - providing maximum warning time possible to residents of those areas which are deemed to be in danger.
- 4.6 **Coastal Property Acquisition:** The City will consider measures, including the acquisition of coastal property subject to frequent damage during natural disasters, to future disasters.
- 4.7 **Post-Disaster Redevelopment Plan:** Immediately following each major disaster, the City shall evaluate the Damage Assessment Team and Damage Survey Team reports (as required by the Peacetime Emergency Plan) and develop a specific post-disaster redevelopment plan in coordination with the Sarasota County Department of Emergency Management. The intent of the post-disaster redevelopment plan will be to repair damaged infrastructure needed for health and safety; to coordinate long term recovery operations to City infrastructure and public structures; and aid the City's economy to return to pre-disaster competitive status. The plan will include funding and staffing estimates, set priorities for post-disaster efforts, and develop criteria for deciding the order of importance in which the elements of the City's economy are to be aided.
- 4.8 **Public Fund Expenditures in Coastal High Hazard Area:** Prior to locating new public facilities or public infrastructure in the coastal high hazard area (CHHA), alternative locations outside of the CHHA shall be explored and evaluated. The expenditure of public funds on infrastructure in the CHHA shall be limited to:
- New public facilities and public infrastructure which cannot feasibly be located outside of the CHHA;
 - Restoration, maintenance, enhancement, relocation, mitigation, or replacement of;
 - ◇ Natural resources;
 - ◇ Passive recreation facilities;
 - ◇ Facilities and uses which further the land uses on the Future Land Use Map;
 - ◇ Facilities necessary to ensure the health, safety, and welfare of the public or sustain the financial integrity of the City. Examples of such facilities include, but are not limited to: Police stations, fire stations, medical facilities, bridges, roads, public rest rooms, performing arts centers, and auditoriums.
- 4.10 **Minimizing the Risks of Natural Disasters:** The City will coordinate with Sarasota County in the development of a Local Mitigation Strategy (LMS) as outlined by the Florida Department of Community Affairs, for the purpose of minimizing the risks of natural disasters. The LMS will include an assessment of vulnerabilities to natural disasters and mitigate initiatives to minimize risks. Mitigation initiatives include:
- Acquisition of hazard prone/repetitive loss property and conversion to open space,
 - Retrofitting existing buildings and facilities,
 - Elevation of flood prone/repetitive loss structures,
 - Vegetative management and soil stabilization,

- Infrastructure protection measures,
 - Stormwater management,
 - Minor structural flood control projects,
 - Post-disaster code enforcement activities,
 - Education, and
 - Dissemination of grant opportunities.
- 4.11 **Re-nourishment of the City’s Beaches:** The City shall continue its program of periodic beach re-nourishment to protect upland property and to support the economic benefits of tourism. The City shall pursue grants and other funding sources to assist in the re-nourishment of the City’s beaches for the protection of public and private property.
- 4.12 **Passive Recreation:** The City encourages that recreational activities on and adjacent to beaches minimize impacts to natural resources and the environment.
- 4.13 **Coastal Construction Control Line:** The City shall not issue permits for structures seaward of the Coastal Construction Control Line (CCCL) that do not have the appropriate permit(s) issued by the Florida Department of Environmental Protection unless the structure is exempt from the requirements of Chapter 62B-33, Florida Administrative Code. Construction activities seaward of the CCCL shall be consistent with Chapter 161, Florida Statutes.
- 5.1 **Evacuation:** The City shall cooperate with Sarasota County through the Emergency Operations Plan to:
- ensure orderly evacuation of the designated coastal high hazard areas, flood prone areas, and mobile homes in the event of a natural disaster consistent with evacuation orders issued by the County;
 - reduce evacuation times in conjunction with the Sarasota County comprehensive plan;
 - increase the amount of shelter space available; and
 - periodically review the Emergency Operations Plan.
- 5.2 **Law Enforcement After Storm Events:** After passage of a storm event, the City’s Police Department shall provide enough law enforcement patrols to safeguard property in evacuated locations.

8. REVIEW OF POSSIBLE ACTIVITIES

Preventative

The Floodplain Management Plan (FMP) Committee discussed the use of permeable surfaces as an alternative to impervious pavement surfaces to minimize runoff. There continues to be inquiries from the development community and property owners about using materials for parking, sidewalks, and other similar uses that allow water to percolate down through them into the ground, unlike traditional concrete and asphalt surfaces. One of the concerns about permeable surfaces is the durability. However, the Committee decided that the possible use of permeable surfaces is worth investigating and Action Plan item #1 and #15 was created to determine if permeable surfaces are feasible. It was determined that these should be reviewed on a project-by-project basis when proposed by the developer and/or City Staff.

One of the concerns of residents and property owners is the coverage of zoning lots with impervious surfaces area such as sidewalks, decks, and patios. On April 29, 2002, the City Commission adopted updates to the City's Zoning Code, which included maximum impervious surface coverage requirements in Residential Single-Family zone districts. The requirements apply to single-family zone districts throughout the City and limit the amount of impervious surface coverage allowed.

The FMP Committee discussed the City's participation in the Community Rating System (CRS), and the current regulations administered by the City that minimize flood and storm damage. It was felt that the existing regulations have served the City well and that no additional regulations were necessary at this time. Action Plan items #4 and #5 provide for the continued enforcement of applicable regulations to minimize flood and storm damage, and continued participation in the CRS program.

Development in the Coastal High Hazard Area (CHHA) was discussed, and the location of public facilities or public infrastructure in the CHHA. The Committee established Action Plan item #8 to coincide with the Action Strategy in the *Sarasota City Plan* to consider alternative locations outside of the CHHA for such facilities, but not require that they be. The FMP Committee realized that in some cases the most appropriate or strategic place for a facility is in the CHHA. An example would be a fire station located to provide an acceptable response time.

Property Protection

The FMP Committee discussed the acquisition, relocation, and retrofitting of structures in the floodplain, those structures which have been subject to repeated flooding. Sarasota County has a CRS Coordinator whose position is partially funded by property owners in the City of Sarasota. The County CRS Coordinator pursues grants for flood mitigation assistance, including retrofitting, relocation, and acquisition. Rather than duplicating pursuit of grants with City of Sarasota staff, it was determined by the FMP Committee that City staff should determine potential candidate structures for such grants in conjunction with the Sarasota County CRS Coordinator. The Sarasota County CRS Coordinator could then include such structures in any eligible grant applications Action Plan item #9 addresses this approach to reducing flood damage to structures.

Natural Resource Protection

The City's Bobby Jones Master Plan includes natural habitat restoration and land conservation in perpetuity. This includes restoring land to its natural conditions, a conservation easement and will also provide stormwater retention functions that will reduce flooding in the surrounding areas.

Emergency Services

The FMP Committee felt that existing City's Emergency Management Program adequately address measures taken during a flood to minimize its impact. Action Plan item #6 specifies what will occur following a disaster should one occur.

Structural Projects

Providing stormwater facilities on each individual site can consume a sizeable portion of a small development site, such as those found in the downtown area, and make it difficult to meet other regulations such as parking. If provided for in a development agreement, several properties can share a stormwater management facility, although this is rare. New zone districts, and new development regulations for these zone districts, were created for the downtown area, which will change the way these properties are developed, including how water run-off from a site will be designed. The rezoning of the downtown area affecting some 2000 properties was effective in the fall of 2005. The FMP discussed this issue and created Action Plan item #3 to see if such aggregate facilities are feasible.

The Basin Master Plan studies were discussed and that work on these studies should continue as part of the ongoing work program, resulting in Action Plan item #2.

Beach re-nourishment projects and their cost were discussed by the FMP Committee, and it was determined that the Development Services Department and Engineering Division should consider which grants or funding sources, if any, should be applied for to assist with such projects. Action Plan item #7 addresses pursuit of such grants and funding sources.

Public Information

The FMP Committee considered public information activities to advise property owners, potential property owners, and builders about flood hazards and ways to protect people and property from such hazards. The FMP Committee thought that the City should continue to send out an informational brochure on flooding to all property owners in the water utility bills each year, not just those located in the floodplains. While there was discussion on the possibility of just mailing to those located in the floodplains, it was determined that it was better to educate as many residents and property owners as possible about flood hazards and prevention. Action Plan item #10 was created to ensure that this informational brochure will be mailed annually.

Accuracy of information on flooding, flood hazards, warnings, flood insurance property protection measures, and flood protection assistance was also discussed. Residents, property owners, and members of the development community appear to take advantage of such information as there are many inquiries to the City, particularly the Building and Zoning Department on such topics. It was determined by the FMP Committee that keeping this

information up-to-date and accurate was very important, and relatively inexpensive to do. Action Plan item #11 was prepared to make sure this information is accurate and timely.

Since flooding and flood related issues transcend the boundaries of the city limits, it is important that the City of Sarasota participate with surrounding jurisdictions in flood prevention and public outreach activities. The Sarasota County Unified Local Mitigation Strategy (LMS) Work Group, of which the City of Sarasota is a member, meets and one of the issues they discuss is flooding and public outreach. As such, Action Plan item #12 was created to ensure continued participation with these groups.

There is was a Map Modernization project underway to update the Flood Insurance Rate Map's (FIRM's) for Sarasota County and all municipalities in the County, that included the City of Sarasota. This Map Modernization effort was to modernize the FIRM's into a digital product and update the flood hazard information to reflect the best possible data, and converting from the National Geodetic Vertical Datum 1929 (NGVD 29) to the North American Vertical Datum 1988 (NAVD 88). The Map Modernization project was completed in 2016. On November 4, 2016 the City of Sarasota, County of Sarasota and all the municipalities received and adopted by ordinances the current effective, digital Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS) in the North American Vertical Datum 1988 (NAVD 1988).

Action Plan item #13 and #14 was created by the committee regarding this project.

On December 31, 2019, the County and the Municipalities, including the City of Sarasota received the preliminary Risk Maps for updated Flood Insurance Rate Maps (FIRM) and Flood Insurance Study (FIS) in the North American Vertical Datum 1988 (NAVD 1988). The Risk Map Study included analysis of approximately 93 miles of shoreline in Sarasota County. Detailed analysis includes wave heights, run-up, erosion, and overtopping analysis. Primary Frontal Dunes (PFD) and Limit of Moderate Wave Action (LIMWA) have been identified along the coastal areas.

Action Plan item #14 was created by the committee regarding this project.

9. ACTION PLAN

1. The Development Services Department and Engineering Division shall continue to evaluate the use of permeable surfaces as an alternative to impervious pavement surfaces to minimize runoff.

Action: On a project-by-project basis, when proposed by developers or property owners, the Development Services Department shall evaluate the feasibility of permeable surfaces to minimize runoff.

Budget: Staff time (Operating funds)

Staff Update Comment: The current edition of the City of Sarasota Engineering Design Criteria Manual (EDCM) as adopted on March 18, 2002, provides allowance for use of “permeable” materials for parking areas, sidewalks, and similar uses through the run-off factors in the drainage calculations, and staff will encourage developers and property owners to utilize “permeable materials” where appropriate.

2. The City shall work with the Sarasota County Stormwater Environmental Utility to complete Basin Master Plans, evaluate the recommended improvements to the drainage system to correct existing deficiencies as identified in each Basin Master Plan, and as the funds are available will consider implementing the improvements.

Action: As an ongoing part of the work program, the Public Works Department and Development Services Department shall work with the Sarasota County Stormwater Environmental Utility to make drainage system improvements. This shall include drainage system maintenance, planning, elimination of structure flooding, and the reduction of pollutants carried by stormwater runoff into Sarasota Bay.

Budget: Staff time (operating funds and revenues from the Sarasota County Stormwater Utility assessments.)

Staff Update Comment: A liaison from the City of Sarasota works with Sarasota County to review drainage master plans and incorporate City comments and concerns into the design of these plans. The City and Sarasota County have signed an interlocal agreement dated July 28, 1998 that establishes a Joint Stormwater Environmental Utility, that is under the control of Sarasota County.

In January 2018, the Sarasota City Commission unanimously adopted the Climate Vulnerability Assessment and Adaptation Plan. Part of this plan identified stormwater vulnerabilities within future sea level rise and flooding scenarios and identified adaptation strategies. One goal of this plan is to integrate climate projections into Capital Improvement Projects and focus on and incorporate SLR and additional model inputs to address future storm

surge and extreme (inland) precipitation events. The City worked with Sarasota County stormwater in the identification of vulnerabilities and in relaying the outcomes of the assessment. The City of Sarasota Public Works Department is coordinating with Sarasota County with regards to a study of the drainage entering the Gulf Stream retention basins, they are also coordinating and tracking Sarasota County in their video inspection and cleaning of underground stormwater conveyance systems.

3. The City shall investigate the feasibility of utilizing aggregate and/or regional stormwater management facilities to reduce the resultant land consumption on individual sites, while improving the overall system efficiency.

Action: On a project-by-project basis, the Development Services Department shall determine the feasibility of aggregate and/or regional stormwater management facilities.

Budget: Staff time (Operating funds)

Staff Update Comment: The Engineering Design Criteria Manual (EDCM), as adopted on March 18, 2002, does not restrict developments from using shared storm drainage attenuation facilities, provided that proper legal agreements designating authority and responsibility are recorded, and that all required permits from local and/or state authorities have been approved.

The City passed resolution 19R-2793 March 25, 2019 requesting the Governor to reinstate the adoption process for the statewide stormwater treatment rule and is supporting state legislation that would assure that state water quality standards were being mitigated with respect to nitrogen and phosphorus nutrient pollutant loads.

4. The potential for storm damage and flooding shall be minimized through compliance with applicable Land Development Regulations.

Action: As part of its ongoing review of applications for building permits and development approvals, the City shall ensure that such proposals comply with all applicable Land Development Regulations including but not limited to the Florida Building Code, Coastal Construction Code, Sarasota Zoning, and the Engineering Design Criteria Manual.

Budget; Staff time (Operating funds)

Staff Update Comment: All appropriate City departments have been enforcing all regulations applicable to prevent or reduce flood damage. On June 28, 2002, the Zoning Code was revised to limit impervious surface area to 60, 70, or 75 percent of lot area (depending on zone district) in single-family residential zone districts. On November 2, 2009, the City Commission adopted Ordinance 09-4888 which revised the Zoning Code and created an Impervious Surface Overlay District (ISOD). The ISOD limits impervious coverage of parcels to 70 percent on the barrier islands and that portion of Siesta Key within the City unless the base zone already limits coverage to less than 70 percent.

5. The City will continue to participate in the Community Rating System (CRS) Program.

Action: Annually the CRS Coordinator will report to the CRS Program on the City's procedures to employ strategies to lessen flooding and respond to emergencies.

Budget: Staff time (Operating funds)

Staff Update Comment: The City of Sarasota Development Services Department and Emergency Management provide information as required to continue participating in the Community Rating System (CRS) Program.

The City's sustainability program has worked with emergency management to coordinate on sea level rise and flood risk education to meet and enhance CRS requirements. This includes installing an educational sign and in-water marker that indicates sea level rise projections and flooding levels associated with various storm surge at Nora Patterson Park. The City has also completed a climate vulnerability assessment and adaptation plan which looks at strategies for city infrastructure that would lesson flooding associated with future climate projections.

City staff actively educates community stakeholders on sea level rise and flood risk and participates in local networks to communicate risks in a unified manner throughout the region.

6. The City shall develop a specific post-disaster redevelopment plan and coordinate with Sarasota County and other surrounding jurisdictions as appropriate.

Action: The City will develop a Post-Disaster Redevelopment Plan specific to the needs of the City. The plan will include funding and staffing estimates, set priorities for post-disaster redevelopment efforts, and develop criteria for deciding the order of importance in which the elements of the City's economy are to be aided.

Budget: Staff time (Operating funds)

Staff Update Comment: Post-disaster redevelopment is addressed in the Sarasota City Plan Environmental Protection and Coastal Islands chapter. Current policy is to allow the redevelopment to occur at the same density that existed prior to the event if all current federal, state, and local regulations are met.

For post-disaster identification efforts, the Development Services, Utilities, and Public Works Departments have personnel trained and equipped to evaluate damage following a storm, flood, or other disaster as part of a county-wide damage assessment program. Training and exercises are conducted on an annual basis.

As part of the upcoming process to update City's Emergency Operations Plan, the Recovery Section will be evaluated and addressed to meet the concerns of short-term and long-term recovery needs as well as the structure needed to facilitate the community's redevelopment needs.

Additionally, the City participates as a member of the Sarasota County Local Mitigation Task Force that evaluates critical facilities and other projects of importance prior to an event for disaster mitigation projects.

The City hired a consultant to conduct a detailed feasibility assessment to understand the challenges and opportunities of using solar panels plus battery backup for a post-disaster community shelter. This assessment provided a comparison to diesel generator backup power and is being assessed for potential funding and implementation.

7. The City shall pursue grants and other funding sources to assist in the re-nourishment of the City's beaches for the protection of public and private property. (The deadline dates vary from year-to-year)

Action: As part of its annual work program, the Development Services Department shall consider which grants or other funding sources, if any, should be applied for to assist in beach re-nourishment projects.

Budget: Staff time (Operating funds)

Staff Update Comment:

The City and the USACOE are joint applicants for a permit from the FDEP to enact a regular maintenance program for Lido Key Beach, which will include obtaining sand from Big Pass. The first event will include removing 1,199,000 CY. Subsequent events are anticipated to occur on a 5-year nourishment interval to replace the advanced nourishment, which is estimated to be 325,000 CY per event.

The City is utilizing funding from the TDT, a State grant from FDEP, FEMA, and the CRA to conduct an emergency beach re-nourishment project for Lido Beach with about 185,000 cubic yards of sand from New Pass. The project began in November 2019 and is expected to be completed Spring 2019. This project is a partnership between the City, Sarasota County, and FEMA. The total cost is \$3.9 million, with the City's cost being approximately \$600,000.

8. Prior to locating new public facilities or public infrastructure in the coastal high hazard area (CHHA), alternative locations outside of the CHHA shall be explored and evaluated.

Action: Review of proposed development approvals to locate public facilities or infrastructure in the CHHA shall include consideration of alternative locations outside of the CHHA.

Budget: Staff time (Operating funds)

Staff Update Comment: Staff reviews any proposals for public facilities to be in the Coastal High Hazard Area (CHHA) to determine if it is possible to locate the facility outside of the CHHA. When it is not possible to do so, staff ensures that the facility is constructed in compliance with all regulations for development in such areas so that potential flooding or storm damage is minimal. Additionally, the City completed a climate vulnerability assessment and adaptation planning process in 2018. This effort will apply scientific projections related to extreme heat days, precipitation patterns and inland flooding, sea level rise, and storm surge, and assess how projections may impact public infrastructure and municipal services. Public vulnerabilities will be identified and prioritized, and adaptation strategies created. New public facilities and infrastructures will likely consider locations identified as not vulnerable, as well as locations outside of the CHHA.

In May 2017, the City adopted new policies in the comprehensive plan providing for

- *Protection through engineered mitigation techniques designed to decrease vulnerability of facilities;*
- *Accommodation by altering the design of facilities through measures such as elevation or stormwater improvements to allow facilities to stay intact;*
- *Managed relocation of existing facilities to lower risk locations; or*
- *Avoidance of future development in high risk areas unless the location is necessary to provide for the health, safety, and welfare of the general public.*

9. The City will consider measures, including the acquisition of coastal property subject to frequent damage during natural disasters, to reduce the exposure of life and property to future disasters.

Action: Annually, the Development Services Department will review the list of repetitive loss properties, and in conjunction with the Sarasota County CRS Coordinator, determine which properties may be eligible candidates for the Flood Mitigation Assistance grant program.

Budget: Staff time (Operating funds). Funding of acquisition of property would come from the Flood Mitigation Assistance grant program.

Staff Update Comment: The costs involved do not make acquisition of properties by the City of Sarasota a viable method of reducing repetitive loss properties. However, the City of Sarasota sends a mailing to owners of repetitive loss properties advising them they may be eligible to apply, jointly with Sarasota County on their behalf, for financial assistance through FEMA's Flood Mitigation Assistance Program (FMAP), which is administered by the State of Florida Department of Community Affairs. The City of Sarasota entered into an agreement with Sarasota County several years ago to administer stormwater drainage. A portion of the stormwater drainage fees paid by City residents goes toward funding the Sarasota County CRS Coordinator's position, who applies for Flood Mitigation Assistance on behalf of City residents. This provides some economies of scale in the preparation and submission of grant applications. Sarasota County Stormwater is entering into an agreement with Weiler Engineering Corporation to conduct a Repetitive Loss Area Analysis for properties within the City of Sarasota. Repetitive loss properties are defined by FEMA as "properties for which two or more National Flood Insurance Program losses of at least \$1,000 each have been paid within any 10-year rolling period since 1978.

May 2019 the Sarasota County Stormwater removed the properties of the City of Sarasota from the repetitive Loss Area Analysis. The City of Sarasota is actively looking into applying for grant opportunities.

The City of Sarasota Public Works Department recently completed an inventory of shoreline protection measures in 33 City property locations and assessed the conditions of the armoring devices. The City of Sarasota will utilize this report in prioritizing areas of need and developing remediation strategies for each.

Current Projects:

- *Bayfront Park Marina (Marina Jack) Seawall Restoration Project*
- *Shoreline Stabilization Program – Immediate actions for Brewer Avenue at Hudson Bayou, Alameda Avenue at Whitaker Bayou and 40th Street & Sarasota Bay*
- *Terrace Gardens Drainage Project*

Completed Projects:

- *O’Leary’s Shoreline Stabilization Project Phase 1 which included the installation of 250 LF of conventional seawall. This was completed weeks before Hurricane Irma struck, and the surge caused minimal damage to the shoreline*
- *O’Leary’s Shoreline Stabilization Project Phase 2 which included the installation of 235 LF Living Seawall comprised of Eco-Rap modules designed to reduce the impact of wave energy as well as provide habitat for a variety of marine life*
- *10th Nutrient Separating Baffle Box.*
- *Boulevard of the Arts Hybrid shoreline project which included the removal of a failing seawall and replacement with a sloped rip rap design with native plants. This project was funded by the DEP Coastal Resilience program.*
- *North Palm Avenue Drainage and Streetscape Project.*

10. The Community Rating System Coordinator/Emergency Manager will distribute an informational brochure on flooding to all property owners in the City each year. It will include information on the following topics: flood hazard areas, warnings, flood insurance, property protection measures, and flood protection assistance.

Action: This brochure will be mailed annually in the first half of the calendar year, as an enclosure with water utility bills.

Budget: Staff time (Operating funds)
Postage (Operating funds)

Staff Update Comment: Completed for 2019. The information brochure was mailed with water bills in June of 2016. 2017 2018 2019

11. The Community Rating System Coordinator/Emergency Manager will update information available to the public on the following topics: flood hazard areas, warnings, flood insurance, property protection measures, and flood protection assistance.

Action: By September 1st of each year, the Community Rating System Coordinator shall review the public information available at City Hall, Police Station, Utility Billing Center, Sarasota County Public Library, and online on the City’s web page via the Internet. The information will be updated, as necessary.

Budget: Staff time (Operating funds)
Materials (Operating funds)

Staff Update Comment: Completed for 2016, 2017, 2018, 2019. Information is updated on an ongoing basis by the Community Rating System Coordinator and the Emergency Manager, as necessary.

12. The City shall be a participating member in the Sarasota County Unified Local Mitigation Strategy (LMS) Work Group.

Action: As part of the ongoing work program, the Community Rating System Coordinator, Emergency Manager and appropriate staff from the City as necessary shall attend LMS Work Group meetings that are held throughout the year and assist as may be required with public outreach activities, reports, and other activities undertaken by the two groups regarding flooding.

Budget: Staff time (Operating funds)
Materials (Operating funds)

Staff Update Comment: Completed for 2016, 2017, 2018, 2019. City staff attends meetings of the Sarasota County Unified Local Mitigation Strategy (LMS) Work Group which are held several times throughout the year.

13. The Flood Insurance Rate Maps (FIRM's) **The Letter of Final determination (LFD) for the Sarasota County, Florida Flood Insurance Study Update was approved and issued May 4, 2016. The new Flood Maps became effective on November 4, 2016.**- These maps are in a digital format and updated using the latest topographical data and the North American Vertical Datum 1988 (NAVD 1988).

Action: **No action required**

Budget: Staff time (Operating Funds)
Materials (Operating Funds)

Staff Update Comment: Completed November 4, 2016. The Letter of Final determination (LFD) for the Sarasota County, Florida Flood Insurance Study Update was approved and issued May 4, 2016. The new Flood Maps became effective on November 4, 2016.

14. The Flood Insurance Rate Maps (FIRM's) for the coastal risk and tidal influenced flood risk areas shall be updated in the Federal Program titled "Risk Mapping". The Risk Mapping update will include the unincorporated areas of Sarasota County and the City of Sarasota. These maps shall be in a digital format and be updated using 2007 LIDAR with elevations reported in the North American Vertical Datum 1988 (NAVD 1988). **Preliminary FIRM's were released on 12/31/2019 and received by the City.**

Action: The Development Services Department, is working in conjunction with Sarasota County, FEMA, and other applicable agencies, will meet the federal requirements for public outreach which will include a community and public 90 day appeal and comment period and review by FEMA, followed by adoption to complete the Risk Mapping project.

Budget: Staff time (Operating Funds)
Materials (Operating Funds)

Staff Update Comment: City staff attend meetings and works with Sarasota County, FEMA, and other jurisdictions as necessary on this project.

Preliminary Flood Insurance Rate Maps (FIRM) were received on December 31, 2019. The City is working with FEMA, State, other Agencies, County and Jurisdictions on public roll-out of information.

15. The **Development Services Department and Engineering Division** shall continue to evaluate the use of permeable **material** as an alternative to impervious pavement surfaces to minimize runoff.

Action: On a project-by-project basis, City Departments shall evaluate the feasibility of permeable **material** to minimize runoff.

Budget: Staff time (Operating Funds)
Project Funding

Staff Update Comment: City Departments continue to evaluate on a project-by-project basis. The North Palm Drainage Project currently underway incorporates the use of permeable pavers to reduce runoff and the flooding of storefronts in that area.

16. **This project has been removed.** On July 18, 2012 Sarasota County stated the project will not go forward due to cost effectiveness, and the Hudson Bayou Basin assessments would be refunded. City staff continues to work with Sarasota County to address issues in the Pelican Drive outfall area. The County has removed this from their CIP list, but there is a downstream project which may alleviate flooding.

Staff Update Comment: On July 18, 2012 Sarasota County stated the project will not go forward due to cost effectiveness, and the Hudson Bayou Basin assessments would be refunded. County Public Utilities staff stated in August of 2014, the Hudson Bayou Basin assessments credits will be completed and reflected on the November 2014 property tax notices. City staff continues to work with Sarasota County to address issues in the Pelican Drive outfall area. The County has removed this from their CIP list, but there is a downstream project which may alleviate flooding

10. ADOPTION, IMPLEMENTATION, EVALUATION and REVISION

Once the plan has been approved by the FMP committee it will be presented to the City Commissioner's for approval. After receiving approval, the FMP will be sent to CRS for approval and CRS credit.

Implementation of the City's Plan will be administered by the Development Services Department with the assistance of the City's Emergency Manager. The department(s) listed in the Action Plan shall be responsible for overseeing implementation of the Action Plan.

The Plan will be evaluated annually by the Floodplain Management Plan Committee. Any Committee recommendations for adoption, deletions or other changes will be included in an annual report to the City Commission annually prior to October 1st.

The report will be prepared by the CRS Coordinator and the Committee. It will provide an overview of the plan and progress accomplished during the previous 12 months towards implementing the Action Plan. Any items not achieved will be specifically addressed in the annual report, and if appropriate, alternative recommendations for action provided. Any recommended amendments to the Plan will be presented to the City Commission for adoption. The annual report will be available to the public and released to the media.

This FMP serves as an appendix to Sarasota County's LMS, which is a state-approved multijurisdictional, multi-hazard plan.

The FMP committee will meet quarterly each year to evaluate progress of the projects as described in Sections 7 and 8 and make updates to the plan where necessary. Potential revisions may include updates to GIS information and statistics, addition of new City staff and public stakeholders to the committee, and development of new projects and/or revisions to existing projects.

To implement and update the FMP:

1. The City's CRS Specialist will review the FMP to evaluate what sections and data require update for that year.
2. The CRS Specialist will be responsible for coordinating with the contact person for each project to get its status.
3. After the status information is gathered, the CRS Specialist prepares a summary of required changes to the FMP and project updates for review by the FMP Committee.
4. The FMP Committee will conduct a meeting (noticed and open to the public) to review the progress and recommend additional changes to the FMP.
5. The CRS Specialist assigns the revision items to members of the committee or other designated County support staff.
6. The FMP Committee will conduct a meeting (noticed and open to the public) to review the draft document.

7. The updated plan will be posted on the City's website and flood-related outreach activities will present and educate the public about the revised FMP.

An annual evaluation report will be submitted with the City's annual CRS recertification to indicate progress of the plan implementation.

The FMP plan itself will be updated at least every five years.

11. REFERENCES

- Sarasota County Floodplain Management Plan.....June 2018
- City of Venice Floodplain Management Plan.....Aug 2019
- City of North Port Floodplain Management PlanNov 2015
- Sarasota County Unified Local Mitigation StrategyJan 2016
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- Getting Started Building Support for Mitigation Planning, FEMA, FEMA-386-1, 2002
- Local Multi-Hazard Mitigation Planning Guidance, FEMA,2008
- fema.gov <https://www.fema.gov/>
- ready.gov <https://www.ready.gov/>
- noaa.gov <https://www.noaa.gov/>
- Sarasota City Plan.....2008
- Future Land Use Chapter, Updated July 20, 2017 (May 1, 2017 Adoption)...2017
- City of Sarasota Climate Vulnerability Assessment and Adaptation PlanJan 2018