

1 Introduction

This Stormwater Master Plan Update (SMPU) has been prepared in accordance with the City of Sebastian's (City) Comprehensive Plan Policy No. 4.1.4.2 and the Stormwater Master Plan Agreement (RFQ 20-05) between the City and Arcadis U.S., Inc., executed on October 15, 2020. This update represents a substantial revision of the 2018 Stormwater Master Plan Update that was completed by CWT Engineering, LLC in August 2018. This SMPU was prepared in accordance with the scope of services to leverage existing data and resources, include a Capital Improvements Plan (CIP) that will meet City needs, be practical and feasible to implement, and provide steps needed to apply for federal and state funding for the CIP projects.

1.1 Background

The City of Sebastian is located in the northern section of Indian River County at the confluence of the St. Sebastian River and the Indian River, approximately 95 miles southeast of Orlando and 12 miles north of the City of Vero Beach. Sebastian is the largest city in Indian River County, lying along nearly 9 miles of the lower eastern and southern banks of the St. Sebastian River and occupying 8,600 acres of the approximately 100,000 acres comprising the Sebastian River Watershed. Like many cities in Florida, Sebastian's economy is heavily reliant on tourism, and it is very close to many natural and scenic areas like the Indian River Lagoon, Pelican Island National Wildlife Refuge, Sebastian Inlet State Park, and St. Sebastian River Preserve State Park. Accordingly, maintaining the quality of the natural environment and providing high quality municipal services to its residents and visitors is of paramount importance.

The first settlements in Sebastian date back to the early 1880s. First known as Newhaven, Sebastian was founded in 1882 and named St. Sebastian. Later, "St." was removed from the name of the town, but not from the river. Sebastian was incorporated as a city in 1923 and consisted of a handful of residential and commercial structures on the east side of the coastal ridge, on the banks of the Indian River Lagoon.

In the late 1950s, a significant development of the City occurred when General Development Corporation (GDC) designed and constructed the street and drainage infrastructure to support development of approximately 15,000 single-family home sites. Most of these home sites were developed by the late 1990s. Subsequent development within the City and annexations during the last few decades have further expanded the urban area, increasing the population, expanding the City's stormwater system, and increasing both the quantity and pollutant load of stormwater discharges to the St. Sebastian River and the Indian River Lagoon.

Water quality degradation in the St. Sebastian River Watershed and the Indian River Lagoon has been an issue for many years and has worsened as development within the City of Sebastian and surrounding areas has progressed. The St. Sebastian River is a major tributary of the Indian River Lagoon, and agricultural lands west of Sebastian account for a major portion of the watershed runoff and contribute significantly to the stormwater discharge volume and pollutant loading to the St. Sebastian River. The St. Sebastian River has been identified as a priority waterbody in need of water quality rehabilitation and protection by the Indian River Lagoon National Estuary Program and the Indian River Lagoon Surface Water Improvement Management (SWIM) Program.

The St. Johns River Water Management District (SJRWMD) and the South Florida Water Management District (SFWMD) previously identified several drainage concerns for the St. Sebastian River watershed. The principal concern involves the volume of stormwater (fresh water) discharged to the river and its dilution effects on the salinity within the receiving waters. Excessive freshwater drainage into the Indian River Lagoon may result in species shifts that could have significant effects on its fragile ecosystem. In addition, increased suspended matter and excessive loading of pollutants and nutrients associated with stormwater runoff may further degrade water quality.

Much of the City's existing storm drainage system was designed at a time when the quantity, not quality, of discharged stormwater was the primary design consideration. The majority of the City's stormwater runoff is collected by a system of roadside swales, culverts, ditches and canals and discharges to the St. Sebastian River, which ultimately flows into the Indian River Lagoon. Much of the stormwater collection infrastructure was constructed by GDC during the early phases of the City's development in the 1950's and was not designed to provide the stormwater conveyance capacity, storage volume, or water quality treatment in accordance with the current City ordinance (No. O-13-11) and the stormwater requirements in Chapter 62-330, Environmental Resource Permitting, of the Florida Administrative Code (FAC).

In the past, the City of Sebastian has prepared several Stormwater Management Plans to address the quantity and quality impacts of the City's stormwater on the St. Sebastian River and has been diligently working on many projects and improvements to its stormwater system that were included in those plans. The City's primary objective has been to initiate implementation of Best Management Practices (BMPs) and increase wet detention areas to reduce the pollutant loading and freshwater discharge to the St. Sebastian River and the Indian River Lagoon.

The City has also taken steps in the last few years to reduce stormwater pollutant loading into the Indian River Lagoon by installing Nutrient Separating Baffle Boxes with filters to reduce the amount of nitrogen and phosphorus discharging through the existing drainage outfalls.

In 2020, the population of the City of Sebastian recorded by the U.S. Census Bureau was 25,054. The City is presently experiencing a high population growth rate, greater than other areas in the watershed. This rapid growth is expected to continue for the foreseeable future, which will place additional stresses on the City's stormwater system and make optimizing the management and performance of the City's stormwater infrastructure even more important.

1.2 Previous Studies

The City's Stormwater Master Plan efforts began in 1996 when the consulting firm Craven Thompson & Associates developed a stormwater drainage model and prepared a Stormwater Master Plan. The consulting firm CDM, Inc. was retained by the City in 2004 to update the plan and develop a new model using the Interconnected Channel and Pond Routing (ICPR) software developed by Streamline Technologies, Inc. to identify needed drainage improvements. In 2010, Neel-Schaffer, Inc. was retained to update the plan and model using the latest version of the ICPR program and verify drainage improvements with changes in FEMA topographic data files. The 2013 model used new topographic maps to help improvement terrain modeling. In 2017, the City retained CWT Engineering, LLC, to update the plan and model, which resulted in the production of the most recent Stormwater Master Plan Update dated August 31, 2018. This Stormwater Master Plan Update builds on the previous Master Plans and is also aligned with the City's Coastal Resiliency Plan developed in 2019 by Kimley Horn, the Consolidated Plan, 2019 – 2024, prepared by Guardian CRM Inc., and the Infrastructure and Coastal Conservation Elements of the City's 2040 Comprehensive Plan (adopted in June 2021).

1.3 Extent-of-Service and Level-of-Service

Arcadis reviewed available documentation and discussed with City staff the Extent of Service (EOS) and Level of Service (LOS) provided by the City's stormwater system. Currently, the EOS of the City's system covers most of the area within the City boundaries, except for a few developments that have separate stormwater systems not connected to the City's system. The LOS is used to determine the performance of the stormwater management system compared to the objectives and standards established by the City.

As for the LOS, the City's 2040 Comprehensive Plan (Infrastructure Element) includes the following objectives and policies:

- Ensure adequate stormwater drainage to protect against flood conditions and prevent degradation of surface water and groundwater quality (Objective 4-1.4)
- Provide updates to the City's Stormwater Management Master Plan in order to address deficiencies and meet stormwater needs for future growth (Policy 4-1.4.2)
- Ensure that drainage system components are monitored, inspected, and maintained pursuant to best management practices (Policy 4-1.4.9)

The first objective above sets a qualitative LOS for both flood conditions and water quality, while the second policy establishes a requirement for the City to pursue updates of the Stormwater Master Plan on a regular basis. The third policy establish a requirement for the City to maintain the drainage system. In addition, the City's adopted standard (Policy 4-1.1.2: LOS Standards) for determining the drainage capacity for a development is that *"Post development runoff shall not exceed the pre-development runoff rate for a 25-year, 24-hour storm event. Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in Chapter 17-25, [Florida Administrative Code] FAC, with treatment of the runoff from the first one inch of runoff on the site to meet the water quality requirements of Chapter 17-302, FAC"*.

This adopted LOS standard applies to the calculated peak rate of runoff for new development, but does not address the available drainage capacity of the downstream systems or the effects of larger storm events, both of which contribute to flooding conditions. Further, this standard incorporates by reference Chapter 17 of the FAC, which has been replaced with updated stormwater system design requirements as Chapter 62-330, FAC, which also incorporates by reference updated water quality standards set forth in Chapters 62-4, 62-302, 62-520, and 62-550, FAC. These references should be updated in the City Policy mentioned above.

Section 54-3-12.10 of the City's Land Development Code (LDC) includes a LOS requirement for new local roads regarding flood conditions, which provides a good reference point for a LOS analysis for the Master Plan. The sections below detail how the target LOS was determined to address both flooding protection and water quality.

1.3.1 Flooding

In order to establish an appropriate LOS for flooding, Arcadis reviewed LOS information from a variety of sources, which are summarized in Table 1 below.

Table 1-1. Level of Service from Available Sources

Source	Recommended Level of Service
<p>City of Sebastian Land Development Code (LDC) Sec. 54-3-12.10.</p>	<p>g. Flood routing analysis for all new local road facilities shall show that the water elevation shall at no time during the design storm duration exceed an elevation that would:</p> <ol style="list-style-type: none"> 1. Permit floodwater encroachment outside existing drainage easements or right-of-way for a three-year/24-hour duration storm. 2. Place more than 20% of the front yard or rear yard area below floodwater elevation any time during a ten-year/24-hour duration storm. 3. Exceed two inches above the lowest elevation on the centerline profile of the roadway for a 25-year/24-hour duration storm. 4. Exceed the finished-floor elevation of any structure for a 100-year/three-day duration storm for projects located in a flood hazard area.
<p>City of Sebastian <i>2018 Stormwater Master Plan</i></p>	<p>Flooding conditions defined as:</p> <ul style="list-style-type: none"> • Top of road elevations were exceeded for the 25-year/24-hour or 100-year/24-hour storm event; or • Top of channel bank elevations were exceeded for the 25-year/24-hour or 100-year/24-hour storm event.
<p>City of Sebastian <i>2040 Comprehensive Plan</i> <i>(Policy 4-1.1.2: LOS Standards)</i></p>	<p>Post development runoff shall not exceed the pre-development runoff rate for a 25-year, 24-hour storm event. Stormwater treatment and disposal facilities shall be designed to meet the design and performance standards established in Chapter 17-25, FAC, with treatment of the runoff from the first one inch of runoff on the site to meet the water quality requirements of Chapter 17-302, FAC.</p>
<p>Florida Dept of Transportation <i>Drainage Design Guide</i></p>	<ul style="list-style-type: none"> • Roadside or median ditches or swales, including bypass and interceptor ditches: 10-year/24-hour storm event • Outfall ditches & canals: 25-year/24-hour storm event • Habitable structures: 100-year/24-hour storm event
<p>St. John's River Water Management District (SJRWMD) <i>Permit Information Manual (2018)</i>¹</p>	<p>(a) The post-development peak discharge rate must not exceed the pre-development peak rate of discharge for the mean annual 24-hour storm for systems serving both of the following:</p> <ol style="list-style-type: none"> (1) New construction area greater than 50% impervious (excluding waterbodies) <p>(b) Projects for the construction of new developments that exceed the thresholds in paragraphs 62-330.020(2)(b) or (c), F.A.(b) The post-development peak rate of discharge must not exceed the pre-development peak rate of discharge for the 25-year frequency, 24-hour duration storm for all areas of the District except:</p> <ol style="list-style-type: none"> (1) For those systems which discharge directly into the St. Johns River north of Lake George, the man-made portions of the Intracoastal Waterway, the Intracoastal Waterway north of the Matanzas Inlet, or the Atlantic Ocean. <p>Where separate basin criteria have been adopted (see section 13.0 of this Volume). Projects located in areas for which separate basin</p>

¹ Permit Information Manual. St. John's River Water Management District, 1 June 2018.

Table 1-1. Level of Service from Available Sources

Source	Recommended Level of Service
	<p>criteria have been developed must meet the flood protection design standards specified by the basin criteri©</p> <p>(c) The post-development volume of direct runoff must not exceed the pre-development volume of direct runoff for the 25-year frequency, 96-hour duration storm for systems discharging to landlocked lakes which are adjacent to properties of more than one ownership. These systems shall not cause an increase in the total pre-development flood stage. This can be accomplished through retention with percolation or, if the soil conditions are not sufficient for percolation, then through detention for a duration sufficient to mitigate adverse impacts on flood stages.</p> <p>(d) Systems which are within areas for which separate basin criteria have been adopted pursuant to Chapter 40C-41, F.A.C., must meet the applicable volume and rate requirements found in section 13.0 of this Volume.</p>

The following is an excerpt from the Florida Department of Transportation (FDOT) Drainage Design Guide (2022):²

Roadside or median ditches or swales, including bypass and interceptor ditches, usually are designed to convey a 10-year frequency storm without damage; outfall ditches or canals should convey a 25-year frequency storm without damage. However, because the risks and drainage requirements for each project are unique, site-specific factors may warrant the use of an atypical design frequency. Regardless of the frequency selected, you should always consider the potential for flooding that exceeds standard criteria. Predevelopment stages for all frequencies up to and including the 100-year event must not be exceeded unless flood rights are obtained or the flow is contained within the ditch.

Since the majority of the City’s stormwater infrastructure is directly associated with roads, the City’s desired LOS for protection against flooding was set to be similar to the FDOT LOS, while also incorporating, at a minimum, the City’s LOS requirements as stated in the LDC.

1.3.2 Water Quality

Protection of surface water and natural resources, such as the Indian River Lagoon, is critically important to the City and its residents.

The City LDC has an adopted LOS in Section 54-3-9.7 for drainage facilities. The City’s 2018 Master Plan update and the 2040 Comprehensive Plan did not contain a Water Quality LOS. Arcadis reviewed applicable Florida water quality requirements for stormwater design standards, Total Maximum Daily Loads (TMDLs) (Florida Department of Environmental Protection [FDEP 2009 and 2013], and the Indian River Lagoon Basin: Central Indian River Lagoon Basin Management Action Plan (FDEP 2021) summarized in Table 1-2. The Municipal Separate Storm Sewer System (MS4) TMDL waste load allocations are the same percent Total Nitrogen (TN) and Total Phosphorus (TP) reductions required for the load allocation (LA) assigned to the nonpoint sources in the river segments.

² Drainage Design guide. State of Florida Department of Transportation, Office of Design, Drainage Section, January 2022.

Table 1-2. Water Quality Requirements

Source	Requirements
City of Sebastian <i>Comprehensive Plan 2040</i>	No numerical standards related to water quality
<i>Florida Water Quality Standards</i>	Chapter 62-302, FAC (Attachment 2)
St. John's River Water Management District (SJRWMD) <i>ERP Applicant's Handbook – Vol II</i>	Chapter 62-302, FAC
<i>TMDL Report: Nutrient and Dissolved Oxygen TMDLs for the Indian River Lagoon and Banana River Lagoon (FDEP 2009)¹</i>	South Central Indian River Lagoon (WBID ² 5003D) & Indian River above Sebastian Outlet (WBID ² 2963A) (Class II) Total Nitrogen Load Allocation Target 577,183 (lbs/yr) Total Phosphorus Load Allocation Target 109,055 (lbs/yr)
<i>TMDL Report: Dissolved Oxygen and Nutrient TMDLs for Eight Tributary Segments of the Indian River Lagoon (FDEP 2013)</i>	South Prong St. Sebastian River Estuary Segment (WBID 3129B1) (Class III) Total Nitrogen – Use Central IRL Target Total Phosphorus – Use Central IRL Target BOD – TMDL 1411 (lbs/day) South Prong St. Sebastian River Freshwater Segment (WBID 3129B2) Class III Total Nitrogen – Use Central IRL Target Total Phosphorus – Use Central IRL Target BOD – TMDL 1411 (lbs/day)
<i>Central Indian River Lagoon Basin Management Action Plan (FDEP 2021)</i>	Central Indian River Lagoon Project Zone SEB (for the City of Sebastian) Total Nitrogen Allowable Load Allocation – 7,906 lbs/yr Total Phosphorus Allowable Load Allocation – 2,885 lbs/yr

Notes:

- 1 Excludes Atmospheric Deposition
- WBID – Water Body Identification used for TMDL

1.3.3 LOS Summary

Considering the City's current stormwater infrastructure and its condition, as well as the budget constraints, the Stormwater Master Plan Update uses the following practical and achievable LOS goals for both protection against flooding and compliance with water quality requirements:

- For roadside swales and their associated culverts: convey a 10-year, 24-hour storm event (7.24 inches of rainfall) with peak water surface at or below the edge of pavement.
- For backyard ditches and side yard swales and their associated culverts: convey a 25-year, 24-hour storm event (9.17 inches of rainfall) without damage to habitable structures. For roadways, do not exceed two inches above the lowest elevation on the centerline profile of the roadway for a 25-year, 24-hour duration storm.

- For canals: convey a 100-year, 72-hour storm event (14.9 inches of rainfall) without damage to habitable structures.
- For all stormwater discharges, maintain compliance with established TMDL limits and the Florida Water Quality Standards in Chapter 62-302, FAC.
- These LOS were agreed by the City and used to guide the evaluation of alternatives and CIP projects.

1.4 Regulatory and Intergovernmental Framework

The City of Sebastian, located in Indian River County, falls under the jurisdiction of many Federal, State, and local government agencies with respect to stormwater management. This section provides an overview of these various agencies and their role in the regulation of the City's stormwater program and its stormwater management system (SWMS). The City's goals and objectives regarding runoff water quality and volume reduction are based on the regulatory requirements set forth by the US Environmental Protection Agency's (USEPA's) Clean Water Act and its provisions, the Federal Emergency Management Agency (FEMA) National Flood Insurance Program and its regulations, the Florida Department of Environmental Protection (FDEP), the St. John's River Water Management District (SJRWMD), the Sebastian River Water Control District (SRWCD), and other regulatory agencies. A brief discussion of these agencies and their role in the regulation of the City's SWMS are in the sections that follow.

1.4.1 Agencies Having Jurisdiction

1.4.1.1 United States Environmental Protection Agency (USEPA)

The USEPA reviews dredge and fill permit applications under the United States Army Corps of Engineers (USACE) permitting authority. Both agencies monitor and permit fill activity along the Indian River Lagoon (IRL), where flood prone wetlands provide floodwater storage. Under authority of the Water Quality Act of 1987 (a.k.a. Clean Water Act [CWA]) and its amendments, the USEPA delegated the authority for issuing National Pollutant Discharge Elimination System (NPDES) permits for point source discharges to the Florida Department of Environmental Protection (FDEP). Regulated point source discharges include Municipal Separate Storm Sewer Systems (MS4s), construction activities, and industrial activities.

Besides creating the NPDES program, the CWA established the National Estuary Program (NEP). Under that program, the Indian River Lagoon was identified as being an estuary of national significance threatened by pollution, overuse, and development. In 1991, the USEPA initiated the Indian River Lagoon National Estuary Program (IRLNEP). The IRLNEP was charged with developing a Comprehensive Conservation and Management Plan to ensure preservation of the IRL's fragile ecosystem. Final adoption of the Indian River Lagoon Comprehensive Conservation and Management Plan (IRLCCMP) was completed in 1996. The four program goals adopted in the IRLCCMP are as follows:³

- To attain and maintain water and sediment of sufficient quality to support a healthy estuarine system.
- To attain and maintain a functioning healthy ecosystem which supports endangered and threatened species, fisheries, commerce, and recreation.

³ Indian River Lagoon Comprehensive Conservation and Management Plan Update 2008, Indian River Lagoon National Estuary Program (2008).

- To achieve heightened public awareness and coordination of interagency management of the Indian River Lagoon ecosystem; and
- To identify and develop long-term funding sources for prioritized projects and programs to preserve, protect, restore, and enhance the Indian River Lagoon system.

1.4.1.2 Federal Emergency Management Agency (FEMA)

FEMA regulates flood plain management in Indian River County and prepared county wide Flood Insurance Rate Maps. FEMA's regulations for the National Flood Insurance Program (NFIP) are implemented by the City and the County. As a participating community in the NFIP, the City of Sebastian must comply with FEMA requirements.

1.4.1.3 State of Florida Department of Environmental Protection (FDEP)

The FDEP, under the authority of FAC Chapter 62-3, reviews and permits stormwater discharge into waters of the State to ensure that state water quality standards are not exceeded. In 1986, permit authority was delegated to the St. Johns River Water Management District.

Additionally, in 1969 two (2) aquatic preserves were established in Indian River County. Aquatic Preserve #7 extends from Malabar in Brevard County to the northern City limits of Vero Beach. Aquatic Preserve A-9 extends from the southern City limits of Vero Beach to the Ft. Pierce Inlet in St. Lucie County. In 1975, the Florida Aquatic Preserve Act delegated the responsibility of managing those aquatic preserves to the Florida Department of Natural Resources (now FDEP).

1.4.1.4 St. Johns River Water Management District (SJRWMD)

The SJRWMD, under the authority of 40C-4, Florida Administrative Code, regulates the management and storage of surface waters within the St. Johns River Basin. The SJRWMD encompasses an area of over 12,400 square miles. Within its boundaries are the St. Johns River Basin, the Nassau River Basin, the Florida portion of the St. Mary's River Basin, and several coastal drainage basins, including a majority of the Indian River Lagoon. Indian River County, which has within its boundaries the upper basin or headwaters of the St. Johns River, is one of 18 counties that are under the jurisdiction of the SJRWMD.

Adopted in 1987, the Surface Water Improvement Management (SWIM) Act directed the SJRWMD to develop a SWIM Plan for the IRL. The scope of the IRL SWIM Plan is like that of the IRLCCMP. Due to the mutual similarities of those two programs, the IRLNEP was integrated with the IRL SWIM program upon adoption of the IRLCCMP.

1.4.1.5 Florida Department of Transportation (FDOT)

Under the authority of Florida Statutes Chapter 335.02, the FDOT owns and maintains numerous facilities which provide drainage for major arterial roads within Indian River County. The U.S. Highway 1 corridor, for example, is drained by many outfall ditches and canals. Those canals have defined drainage basins east of the Atlantic Coastal Sand Ridge. The FDOT permits connections to stormwater management facilities within FDOT rights-of-way.

While stormwater management facilities within the city limits of Sebastian are under the jurisdiction of the City, except for CR 512 (Fellsmere Road), small areas of the unincorporated county, between CR 512 and the southern limits of the City, drains north to the Elkcam Waterway. Sections of the St. Sebastian River-South Prong are under the jurisdiction of the City, the Sebastian River Improvement District (SRID), Indian River County, and the State of Florida.

1.4.1.6 Local Government - Indian River County

Indian River County has primary stormwater jurisdiction over major outfalls within the following areas:

- Unincorporated areas not included within the limits of Special FS Chapter 298 Drainage Districts, State of Florida road rights-of-way, private undeveloped land where no development has occurred, and property owned by the State of Florida or the Indian River County School District.
- Incorporated areas within county road rights-of-way.
- Secondary drainage facilities (minor swales and facilities leading to outfalls) which are maintained by the County and located within dedicated easements or rights-of-way in the unincorporated area. While County Ordinance 82-28 established the County's authority to regulate stormwater management practices, that authority was incorporated into the Flood Protection and Stormwater Management chapter of the County's land development regulations that was adopted by LDR Chapter 930. The Indian River County Public Works Department is charged with administering LDR Chapter 930.

1.4.1.7 F.S. 298 Special Drainage Districts

Water Control Districts have the authority to construct and maintain primary drainage facilities within their statutory boundaries. At the present time, there are five active drainage districts within Indian River County. These are: the Indian River Farms Water Control District (IRFWCD), the Sebastian River Improvement District (SRID), the Fellsmere Water Control District (FWCD), the St. Johns Improvement District, and the Delta Farms Water Control District.

1.4.1.8 Incorporated Municipalities

Incorporated municipalities have home rule powers to construct and maintain stormwater management facilities within their city owned easements, rights-of-way, and property. The incorporated municipalities within Indian River County include the City of Vero Beach, the City of Sebastian, the Town of Indian River Shores, the City of Fellsmere, and the Town of Orchid.

1.4.1.9 Private Systems

Privately owned agricultural operations in the County and developments within and outside the City own and maintain private stormwater management facilities. Although such facilities may not discharge directly to the City's SWMS, in many cases they discharge to the same receiving waters and may affect downstream water quantity and quality. The City only has jurisdiction over the private systems within its municipal boundaries.

1.4.2 City of Sebastian Goals and Regulatory Requirements

1.4.2.1 City Goal

The City's goal is to operate and maintain its stormwater system in full compliance with the Federal Clean Water Act and all applicable requirements of Federal, State and local agencies, providing the highest level of service possible to the City's residents and businesses, while effectively managing the quality and quantity of stormwater discharges to protect the sensitive natural environment and waterways in the area.

1.4.2.2 NPDES MS4 Permit Requirements

The City is covered under NPDES Permit No. FLR04E124 - Generic Permit to Discharge Stormwater from Phase II Municipal Separate Storm Sewer Systems (MS4), which expires on March 1, 2025. The permit is issued under

Section 403.0885, Florida Statutes (F.S.), and implemented through applicable provisions of Chapters 62-4, 62-620, 62-621, and 62-624, Florida Administrative Code (F.A.C.). Coverage under the generic permit constitutes authorization to discharge stormwater from Phase II Municipal Separate Storm Sewer Systems (MS4s) to surface waters of the State pursuant to the Department of Environmental Protection's (Department) federally approved National Pollutant Discharge Elimination System (NPDES) stormwater program consistent with Section 402(p)(6) of the Federal Clean Water Act. The generic permit is adopted and incorporated by reference at paragraph 62-621.300(7)(a), F.A.C. Under the generic permit, the operators of regulated Phase II MS4s must develop a Stormwater Management Program (SWMP) that includes best management practices (BMPs) with measurable goals and a schedule for implementation to meet the following six minimum control measures:

- **Public Education and Outreach** – Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff.
- **Public Participation/Involvement** – Implement a public participation/involvement program that complies with state and local public notice requirements.
- **Illicit Discharge Detection and Elimination** – Subsection 62-624.200(2), F.A.C., defines an illicit discharge as "...any discharge to an MS4 that is not composed entirely of stormwater..." except discharges under an NPDES permit, or those listed in rule that do not cause a violation of water quality standards. Illicit discharges can include septic/sanitary sewer discharge, car wash wastewater, laundry wastewater, the improper disposal of auto and household toxics, and spills from roadway accidents.
 - Develop, if not already completed, a storm sewer system map showing the location of all outfalls, and the names and location of all surface waters of the state that receive discharges from those outfalls.
 - To the extent allowable under state or local law, effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into the storm sewer system and implement appropriate enforcement procedures and actions.
 - Develop and implement a plan to detect and address non-stormwater discharges, including illegal dumping, to the storm sewer system.
 - Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper waste disposal.
- **Construction Site Stormwater Runoff Control**
 - Implement a regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to reduce pollutants in any stormwater runoff to the Phase II MS4 from construction activity that results in a land disturbance greater than or equal to an acre. Construction activity disturbing less than one acre must also be included if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.
 - Develop and implement requirements for construction site operators to implement appropriate erosion and sediment control BMPs.
 - Implement requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.
 - Develop and implement procedures for site plan review that incorporate the consideration of potential water quality impacts.
 - Develop and implement procedures for receiving and considering information submitted by the public.

- Develop and implement procedures for site inspection and the enforcement of control measures.
- **Postconstruction Stormwater Management** – Implement and enforce a program to address the discharges of postconstruction stormwater runoff from areas with new development and redevelopment. (Note: In Florida, Environmental Resource Permits issued by water management districts typically serve as a Qualifying Alternative Program for purposes of this minimum control measure.)
- **Pollution Prevention/Good Housekeeping** – Implement an operations and maintenance (O&M) program that has the ultimate goal of preventing or reducing pollutant runoff from MS4 operator activities, such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, stormwater system maintenance, and staff training in pollution prevention.

1.4.2.2.1 *Required Minimum Control Measures*

Appendix A of the “Notice of Intent to Use Generic Permit for Discharge of Stormwater from Phase II Municipal Separate Storm Sewer Systems [FDEP Form 62-621.300(7)(b)] serves as written documentation of the required stormwater management program, further described in Part V of the generic permit. Appendix A includes a list of best management practices (BMPs) to be implemented by the City, as well as proposed measurable goals for each of the required elements under the six minimum control measures (MCM), set forth in Part V.B of the generic permit. A copy of the City’s current NPDES MS4 permit and Appendix A of the permit is included as Appendix A of this Master Plan Update.

1.4.2.3 **Adopted Total Maximum Daily Load (TMDL) Requirements**

FDEP defines a TMDL as a “scientific determination of the maximum amount of a given pollutant that a surface water can absorb and still meet the water quality standards that protect human health and aquatic life.” The Indian River Lagoon (IRL) TMDLs are targeted towards seagrass regrowth at water depths where seagrass historically grew in the lagoon. The seagrass coverage in the IRL has decreased over the years because of the degradation of water quality conditions.

Chapter 62-304.520, FAC contains the IRL TMDLs, which are divided into several areas of the IRL. The TMDLs for the Central and southern South Indian River are 278,273 lbs/year of TN and 53,599 lbs/year of TP, which represent a 56% reduction of TN and a 48% reduction of TP based on the year 2000 land use.⁴

1.4.2.4 **Central Indian River Lagoon Basin Management Action Plan for Adopted TMDLs**

A Basin Management Action Plan (BMAP) is a comprehensive plan for water quality restoration by reducing pollutant loading through current and future projects and activities. BMAPs contain a variety of physical and regulatory tools, such as permit limits on wastewater facilities, urban and agricultural best management practices

⁴ Central Indian River Lagoon Basin Management Action Plan, FDEP, 2021.

(BMPs), and conservation programs designed to achieve pollutant reductions established by a TMDL. BMPs are developed with and depend on local stakeholders for successful implementation, and are legally enforceable.

The Central Indian River Lagoon (CIRL) BMAP was first adopted in February 2013 and addresses adopted TMDLs for certain tributaries to the CIRL, including the South Prong of the St. Sebastian River. The CIRL BMAP is divided into four Project Zones as shown in Figure 1-1. A copy of the current approved Central Indian River Lagoon BMAP dated February 2021 is included in Appendix B.

The City of Sebastian is located in Project Zone SEB, which covers more than 117,881 acres of the CIRL BMAP. Urban land use makes up the largest portion of the project zone with 22.5 % of the area, followed by agriculture with 21.0 %. Stakeholders in Project Zone SEB are agricultural producers, Brevard County, City of Fellsmere, City of Palm Bay, City of Sebastian, FDOT District 4 and District 5, Fellsmere WCD, Indian River County, Sebastian River Improvement District, Town of Grant-Valkaria, Town of Orchid, and Vero Lakes WCD.

Management actions provided by stakeholders, including projects, programs, and activities that may reduce nutrient loads to the CIRL, are included in the BMAP and have to meet several criteria to be considered eligible for credit.

The projects and activities in the CIRL BMAP are critical to the goal of recovering seagrass in the IRL, and their level of completion are tracked to show stakeholder efforts and progress towards the total required milestone reductions. FDEP conducts an assessment of progress towards the BMAP milestones every five years, and plan revisions are made as appropriate. FDEP has established milestones for the years 2025, 2030, and 2035 as follows:

5-year milestone in 2025: 35 % or 320,614 lbs/yr of TN and 77,290 lbs/yr of TP.

10-year milestone in 2030: 70 % or 641,228 lbs/yr of TN and 154,580 lbs/yr of TP.

15-year milestone in 2035: 100 % or 916,040 lbs/yr of TN and 220,828 lbs/yr of TP.

Under the 2021 CIRL BMAP, the City of Sebastian has the following TMDL allocations:

- Total Nitrogen (TN) = 28,624 lbs/year (adjusted for natural per acre load)
- Total Phosphorus (TP) = 2,885 lbs/year

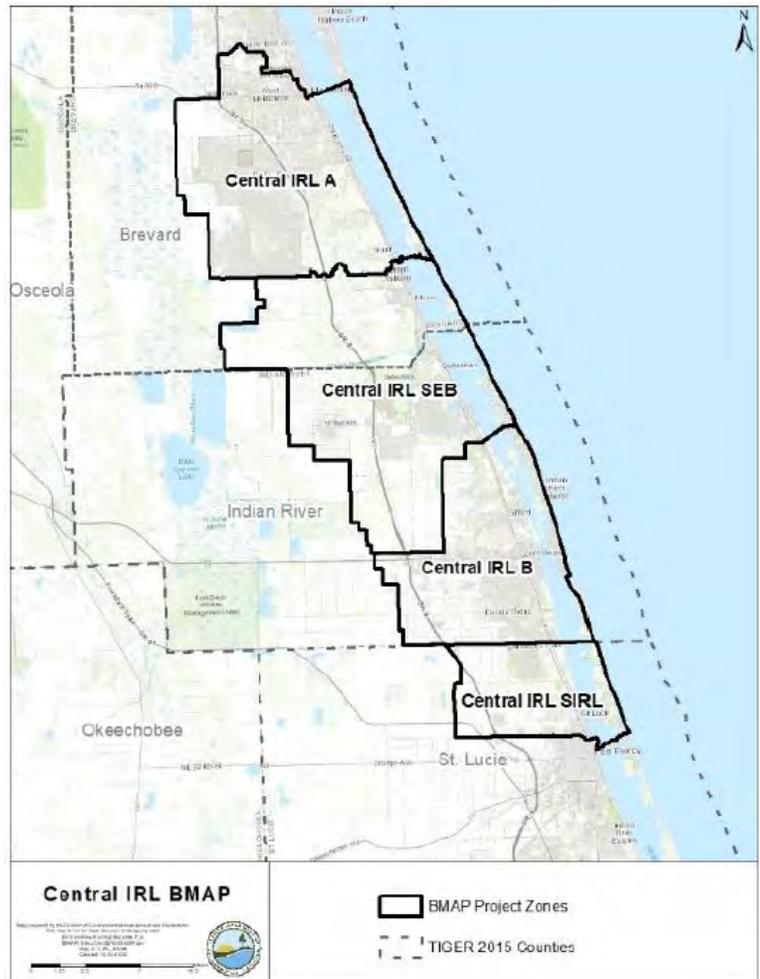


Figure 1-1. Central Indian River Lagoon BMAP Project Zones

The Florida Watershed Restoration Act (FWRA) includes an adaptive management process for BMAPs that continues until the TMDLs are met by incrementally reducing loadings through the implementation of projects and programs.

As mentioned previously, the City of Sebastian is a designated Phase II MS4 and is regulated by the Florida NPDES Stormwater Program. The City is identified as a contributor in the BMAP, and in accordance with Part X.B of the NPDES MS4 Permit No. FLR04E124 and Section 403.067, F.S., must comply with the adopted provisions of the Central Indian River Lagoon BMAP that specify activities to be undertaken by the City. If a BMAP is in development and scheduled to be adopted within two years by FDEP and watershed stakeholders, the City must continue to participate in the BMAP process and comply with the adopted provisions of the BMAP that specify activities to be undertaken by the City during the permit cycle.

Phase I and Phase II MS4s are required to implement stormwater management programs (SWMPs) to reduce pollutants to the maximum extent practicable and address applicable TMDL allocations. Both Phase I and Phase II MS4 permits include provisions for the modification of SWMP activities, at the time of permit renewal, for consistency with the assumptions and requirements of the adopted BMAP.

The CIRL BMAP is a broad, basin-wide approach to reduce the primary sources of human-caused nutrient loading throughout the CIRL Subbasin. The primary sources included in the CIRL BMAP are agricultural runoff, septic systems, urban stormwater, and wastewater. The sources that are applicable to the City are the last three and are briefly discussed in the sections below.

Septic Systems - Florida Department of Health (FDOH) data indicates there are 78,363 known and likely septic systems located throughout the CIRL Subbasin. Each local government within the CIRL is required to develop an onsite sewage treatment and disposal system (OSTDS) remediation plan to be adopted as part of the BMAP no later than July 1, 2025.

The OSTDS remediation plan requires entities to identify and address the following:

- Cost-effective and financially feasible projects necessary to achieve the nutrient load reductions required for OSTDS (e.g., sewerage, advanced septic system retrofits, prohibiting the installation of new conventional septic systems).
- An inventory of OSTDS based on the best information available.
- OSTDS that would be eliminated through connection to existing or future central domestic wastewater infrastructure in the jurisdiction or domestic wastewater service area of the local government.
- OSTDS that would be replaced with or upgraded to enhanced nutrient-reducing systems.
- Cost of improvements and sources of funding.

The CIRL BMAP requires stakeholders to submit projects describing how septic loads are addressed as part of BMAP reporting and estimate the load reductions associated with each project.

The City of Sebastian has included Policy 4-1.2.3 regarding septic-to-sewer conversion in the 2040 Comprehensive Plan but has not yet filed an OSTDS remediation plan.

Urban Stormwater – Urban runoff is a significant source of nutrient loading to the CIRL but is already regulated under NPDES permits. MS4 permittees within the CIRL are required to develop and implement a stormwater management program. As mentioned in section 1.4.2.2.1, Appendix A of the City's NPDES MS4 permit serves as written documentation of its required stormwater management program. The FDEP and water management districts periodically update the stormwater design and operation requirements in Environmental Resource Permit rules to improve nutrient reduction in stormwater systems.

Wastewater – The USEPA has delegated authorization to FDEP to issue permits for discharges to surface waters under the NPDES Program. FDEP also issues permits for facilities and activities to discharge wastewater to surface waters and groundwaters of the state in accordance with state statutes and rules. These wastewater permits establish specific effluent limitations and other requirements based on the location, type of facility or activity, and type of industrial or domestic wastewaters discharged from a point source.

The CIRL BMAP dated February 2021 indicated that as of September 2020, there were 41 individually permitted wastewater facilities or activities in the CIRL Subbasin. All new or existing wastewater facilities that dispose of or discharge effluent in the BMAP area are subject to the BMAP provisions, regardless of whether the facility is listed in the BMAP.

As mentioned previously, the City is presently experiencing a high population growth rate, which is expected to continue for the foreseeable future. Therefore, adequate treatment capacity of domestic wastewater is essential. Domestic wastewater is treated through either wastewater treatment facilities (WWTFs) or OSTDS (septic systems). In the City, the majority of domestic wastewater is treated through septic systems.

Reducing the City's reliance on septic systems and moving towards a more conventional sanitary sewer collection system and wastewater treatment facilities also has its challenges. Current Florida law requires all existing and new domestic wastewater facilities discharging to surface waters of the state within or connected to the IRL to meet advanced waste treatment requirements no later than July 1, 2025 and must meet the stringent nutrient wastewater limitations set forth in the CIRL BMAP.

1.4.2.5 Indian River Lagoon Comprehensive Conservation and Management Plan

This section contains a brief summary of the Draft Indian River Lagoon National Estuary Program (IRLNEP) 2030 Comprehensive Conservation and Management Plan (CCMP), a copy of which is included in Appendix C.

The National Estuary Program (NEP) is a Federal non-regulatory program authorized by Section 320 of the Clean Water Act and administered by the USEPA. Each estuary in the NEP was designated by the U.S. Congress as an "Estuary of National Significance", and the Indian River Lagoon received its designation in 1990. Today, 28 estuaries in the U.S. and Puerto Rico have been designated as estuaries of national significance.

The 28 NEPs create long-term Comprehensive Conservation and Management Plans (CCMPs) that contain actions to address challenges and priorities related to water quality and living resources. Each NEP is governed by a Management Conference that is typically comprised of Federal, State, and local agencies and municipalities that provide funding, technical resources and policy guidance. NEPs create and implement CCMP action plans to meet the objectives of the Clean Water Act and to restore and maintain the ecological integrity of estuaries of national significance.

The first Indian River Lagoon National Estuary Program (IRLNEP) Management Conference was convened in 1991 and adopted its original CCMP in 1996. The SJRWMD served as the host agency for the IRLNEP from 1991 to 2015 and oversaw the implementation efforts of the original CCMP and its most recent update in 2008. However, the scope and direction of the IRLNEP CCMP was fundamentally altered following an unprecedented pico-cyanobacterial bloom in 2011 and damaging freshwater releases from Lake Okeechobee to the southern IRL. These events caused concerns for the future of the IRL among regulators, scientists, and the public.

As a result, the IRLNEP Management Conference structure was reorganized and a new host agency for the IRLNEP, the IRL Council, was created by interlocal agreement as an independent special district of the State of Florida. In accordance with the interlocal agreement, as amended, the FDEP, SJRWMD, SFWMD, Volusia County, Brevard County, St. Lucie County, Martin County, and the Indian River County Lagoon Coalition (representing three cities in Indian River County (Vero Beach, Sebastian, and Fellsmere) serve as the Board of

Directors of the IRL Council and as the policy board of the IRLNEP. The first operational fiscal year of the IRL Council began on October 1, 2015. Together, the IRL Council and its Management Board and advisory and oversight committees represent the IRLNEP Management Conference.

The reorganization of the IRLNEP resulted in increased financial support for IRL restoration to \$2,100,000 annually of mixed federal, state, and local funding for IRL restoration projects.

The draft 2030 IRLNEP CCMP adopted the following goals:

1. To attain and maintain water and sediment of sufficient quality to support a healthy estuarine lagoon ecosystem;
2. To attain and maintain a functioning, healthy ecosystem which supports endangered and threatened species, fisheries, commerce, and recreation;
3. To achieve heightened public awareness and coordinated interagency management of the IRL ecosystem; and
4. To identify and develop long-term funding sources for prioritized projects and programs to preserve, protect, restore, and enhance the IRL.

In addition, the CCMP identified 32 Vital Signs for IRL health, and for each of them, specific indicators were identified and will be measured to assess the condition of the Vital Sign and document how that condition changes through time. The selection and monitoring of these indicators is a complex process, and some may be reconsidered, modified, or replaced as new information becomes available.

For each Vital Sign, the following information is provided:

- Goals: The specific goals that will be achieved by implementing the actions for the Vital Sign.
- Issue Summary: Description of the issues facing the IRL system for the Vital Sign, using the best available information.
- Strategies: Approaches that should be implemented to achieve the goals for the Vital Sign.
- Action Plan Outputs (Deliverables): Specific deliverables including the responsible and partner entities, estimated costs, potential funding sources, and the IRLNEP role in delivering the output.
- Outcomes: Short-, medium-, and long-term outcomes expected from implementation of the outputs.
- Challenges to Success: Potential challenges to achieving the goals of the Vital Sign.
- Citations: Literature referenced in the above items for each Vital Sign.

In support of the CCMP revision, the IRLNEP proposed a list of projects that will improve wastewater infrastructure, reduce reliance on conventional septic systems, retain and treat stormwater, rehabilitate habitats, and enhance planning for resilient communities.

1.4.2.6 Integrated Pest Management Plan

The City of Sebastian, in an effort to best manage pests within the stormwater system, adopted the Integrated Pest Management (IPM) Plan as its aquatic vegetation maintenance control program. The Plan uses the following definition of Integrated Pest Management: "To promote the most sustainable pest management methods, based on planning and prevention, which aim to minimize risks to human and environmental health through the limited use of pesticides, while also remaining economically feasible." A copy of the IPM is located in Appendix D.

The goals of the IPM Plan are:

- Protect environmental resources by reducing the amount of pollutants entering surface and ground water and minimizing effects on native plants, animals, and habitats
- Ensure effective economic pest management within the City's stormwater conveyance system, while minimizing health risks to the public, City staff, and the environment.
- Promote the transparency of the City's pest management activities.
- Increase public awareness of IPM methods and benefits.

Noxious aquatic vegetation is the only "pest" addressed in the plan. While there are species of fish, shellfish and insects present within the stormwater system, which are classified as "invasive," none besides the mosquito have achieved populations which require management. Mosquito Control is handled by the Indian River County Mosquito Control District and is exempt from the City's IPM Plan. The plan does not apply to any stormwater features located within any planned unit development (PUD), as these subdivisions have permits with the SJRWMD with requirements to maintain their own stormwater system. Also not covered by the IPM plan is the City's cemetery, parks, or other properties, as these assets are managed collectively by the City's Leisure Services Department and are addressed in a separate "Parks and Properties IPM Plan," which was adopted by City Council on October 14th, 2020.

The City's IPM Coordinator handles reporting to regulatory agencies, which credit the adoption of the IPM Plan as a Best Management Practice (BMP). Other goals for the IPM Plan include the following:

- Incorporate the IPM Plan into the Florida Department of Environmental Protections (FDEP)'s National Pollutant Discharge and Elimination System (NPDES) Phase II, MS4 Permit Cycle 4, Year 2 Annual Report (September 2022) and the Cycle 5 Notice of Intent (NOI) (September 2024) as a new BMP for Element 6: Pollution Prevention/ Good Housekeeping.
- Add as new project and update through the statewide Basin Management Action Plan (BMAP) annual report on water quality projects.
- Add as recent activity and provide updates to the Indian River Lagoon Council for the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) annual report on lagoon-related accomplishments.

1.4.2.7 City Ordinances Related to the NPDES MS4 Permit SWMP

Illicit Discharge Ordinance

In accordance with SWMP Element 1a, BMP No. 4, the City enacted Article VI: Urban Stormwater Quality Management and Discharge Control, which prohibits non-stormwater discharges into the MS4 system and implements inspection, reporting, and enforcement procedures.

Surface Water Management Ordinance

SWMP Element 1a, BMP No. 4 is addressed by Article XII, which requires that any land development, which disturbs the soil, implement an erosion and sediment control plan. Such sites are subject to frequent inspections. Chapter 1, Article I and II provides for the general administration of violation and enforcement procedures for non-compliance with the Land Development Code. The Surface Water Management Ordinance requires that all construction site operators control discarded materials and provide a sanitary waste facility. Waste management on each site is inspected as part of the scheduled "Erosion Control" inspections.

Erosion and Sediment Control on Construction Sites

Article XVIII Sec.54-4-18.4 requires that sites greater than an acre, submit a SWPPP (Stormwater Pollution Prevention Plan) as part of their site plans that meets all City Land Development Ordinances, as well as apply for an NOI with the FDEP. The Stormwater Pollution Prevention Plan (SWPPP), or Erosion and Sediment Control Plan will be reviewed for BMPs as they relate to the proposed construction.

Site Plan Review

Article XVII outlines the site plan review procedures. Site plans are thoroughly reviewed by a committee of staff to ensure no adverse effects on water quality or environmentally sensitive areas.

1.5 Project Goals

The specific goals for this Stormwater Master Plan Update project are to:

- Develop a programmatic approach to address the current significant and costly backlog of stormwater capital improvement and system rehabilitation projects, while also anticipating future needs.
- Provide a systematic and defensible process for preparation of a 10-yr CIP Program and prioritization of capital projects, including establishment of strategic goals.
- Establish 10-year CIP with budget requirements.
- Identify specific federal and state sources for funding (grants, general funds or other funding mechanisms) and include the steps and process to pursue grants and meet reporting requirements for eligible CIP projects.
- Leverage digital tools for Geographic Information System (GIS) mapping of major stormwater assets and rehabilitation assessments.
- Develop a hydrologic and hydraulic (H&H) model to identify specific capital projects and support grant funding applications.
- Incorporate a multi-objective framework for the Master Plan organized by watershed that considers conveyance issues, flooding problems, maintenance needs, and water quality requirements and is integrated with local mitigation strategies and floodplain management requirements.