

# INFRASTRUCTURE ELEMENT DATA AND ANALYSIS

## INTRODUCTION

The purpose of the Infrastructure Element is to provide for necessary public facilities and services related to future land use projections. It includes plans for sanitary sewer, solid waste, potable water and drainage facilities. Palm Beach contains no significant recharge area; still, specific standards and governmental actions geared to stabilizing water table levels in surficial deposits are addressed in this Element.

This Element of the Plan has been developed based upon:

1. Identification and analysis of the appropriate public facilities and their service areas, design capacities, and levels of service provided by each;
2. Analysis of existing conditions, problems and opportunities, and existing and projected needs for each facility; and,
3. Analysis of major natural drainage features and natural groundwater aquifer recharge areas.

While this Element is not an engineering study, it provides information essential for engineering analysis and design. Its major orientation is toward reasonable determination of existing, and future supply and demand relationships for each of the major facility areas.

## EXECUTIVE SUMMARY

### EXISTING AND FUTURE LAND USES

The geographic area served by the infrastructure facilities is the Town of Palm Beach, an urban, built-up area approaching saturation. These public facilities, providing service in and to the Town of Palm Beach, predominantly serve the following uses in the Town: residential, commercial, public, private group use, recreational and conservation uses. There are no agricultural or industrial uses in the Town. More detailed discussion of the patterns, and extent of land uses and land use maps, are provided in the Future Land Use Element. Because of the very limited amount of vacant land in the Town, the pattern of land uses in the future will remain essentially the same as now existing in the Town.

The purpose of the Infrastructure Element is to provide necessary public facilities and services for the current and future residents of the Town of Palm Beach. The Infrastructure Element is comprised of the Sub-Elements for Drainage (Stormwater Management), Potable Water, Sanitary Sewer, and Solid Waste. The Town of Palm Beach contains no significant Natural Groundwater Aquifer Recharge Area. Irrespective, specific standards and governmental actions geared to stabilizing water table levels in surficial deposits are addressed in the Potable Water Sub-Element. Additionally, the Town commissioned a bond approved by Town referendum, for the

undergrounding of power and communication utilities. A summary of the status and impacts is provided within this Element.

The Infrastructure Element of the Town of Palm Beach Comprehensive Plan has been developed based upon the identification and analysis of the appropriate public facilities and their service areas, design capacities, and the ability to maintain standards required by Federal, State, and Town regulations, all provided within each Sub-Element.

The Town of Palm Beach Public Works Department is responsible for ensuring the adequacy of the components of the Town's infrastructure system to support the residents, businesses, visitors, and employees. The Public Works Department applies both proven and innovative techniques and systems to provide for excellence in the operation, construction, maintenance, and repair to achieve this purpose. The continuous stewardship of the Town's infrastructure is achieved through the dedicated efforts of a diverse group of operational, administrative, engineering, and construction professionals.

## **THE INFRASTRUCTURE ELEMENT OF THE TOWN OF PALM BEACH**

### **DRAINAGE**

~~Prior to development, the Palm Beach coastal barrier was characterized by a high coastal ridge along the Atlantic, and a low, swampy shoreline along Lake Worth. A marshy slough separated the beach ridge and lake hammocks. Surface accumulation either percolated to the surficial aquifer through permeable soils on the ridges, collected in the slough, or ran through poorly drained tidal swamps into Lake Worth.~~

~~Extensive shoreline and surface water changes have occurred since 1883. The slough and low lake shorelines have been filled for urban development, and the Atlantic shoreline has receded due to beach erosion. The urbanization of the Town has reduced the amount of water infiltrating to the surficial aquifer, and has increased runoff from impermeable surfaces. The coastal ridge still dominates the island's topography, acting as a seaward barrier to surface drainage. In addition, remnants of slough areas are prone to flooding.~~

~~In order to facilitate the removal of stormwater, a system of storm sewers and pumping stations was created during the early development of the Town. That same system, with major modifications, remains intact today.~~

~~The Town's drainage system consists of a combination of pumping stations and gravity outfalls. Pumping stations are necessary because areas of the Town are below Lake Worth's high tide level, causing backflow through stormwater outfalls when above normal tides are experienced in the Lake.~~

~~The Town's code supports the South Florida Water Management District's stormwater retention requirements for new development and redevelopment. All new development and redevelopment must provide minimum retention of the first two inches of rainwater prior to discharging into the~~

~~Town drainage system. Residential development of less than one-half acre is required to route discharge and sheet flow through grassy areas prior to discharge into the Town system.~~

~~Consulting engineers have extensively studied the storm drainage situation in the Town. The Town's engineering design criteria are meant to ensure that flooding will not occur during a one-year storm for systems served by pumping stations, or during a three-year storm for systems with gravity outfalls, and the minor flooding associated with a five-year storm would be carried off within sixty minutes. Accumulated runoff from a fifty year storm would require only ninety minutes for removal. These standards supersede the less restrictive three-year/one hour design requirements of the Water Management District.~~

~~Demand upon drainage systems is related to the area and amount of water to be drained. As the Town is virtually "built out", the area to be drained will remain essentially constant, with most increases in impervious surfaces being addressed by retention requirements. The amount of water to be drained remains variable, depending upon the actual storm events. Therefore, the demand on the Town's system is primarily based on the intensity and duration of storm events.~~

~~The drainage system is generally considered to be in good condition. According to the Public Works Department, the expected service life of the drainage system components exceeds 50 years. The town needs to continue evaluating the drainage system and replace deteriorated and undersized components.~~

~~No water quality data is available for areas within the Town, consequently, the quantity, quality and effects of stormwater runoff originating in the Town are unknown. However, it is generally recognized that stormwater may contaminate surface waters with sediments, nutrients, heavy metals, oils, grease and pathogens.~~

~~Unfortunately, the Town is limited in its ability to improve discharge quality through stormwater management, because of the following:~~

- ~~1. The water table on the island is very high. Some areas in the Town are below the high tide line of Lake Worth. Retention or detention areas would, therefore, have to be shallow and wide, requiring large surface areas.~~
- ~~2. There are no large undeveloped land areas which could realistically provide retention or detention of stormwater, and real estate prices for purchase or condemnation of land are prohibitively high.~~
- ~~3. Most soils in the Town are poorly drained, resulting in slow infiltration rates, and complicating the use of exfiltration systems.~~
- ~~4. The Town is almost entirely developed. Therefore, the existing drainage system will not be affected significantly by new stormwater regulations. In addition, the Town's existing drainage system was installed many years ago, prior to the development of best management practices.~~

~~The Town recognizes the importance of improved water quality in Lake Worth, but also realizes~~

~~that any major retrofitting of the system will require study and time. The National Pollutant Discharge Elimination System Permit establishes, on a countywide basis, the best management practices (BMP's) and goals concerning the quality of stormwater runoff.~~

~~The Town has been making steady progress toward decreasing the quantity and improving the quality of stormwater runoff by requiring a minimum of one inch of stormwater retention on all new and redeveloped areas of one-half acres or more. All parking lot areas being built or reconstructed are required to provide one inch water quality retention, where water table and soil conditions permit.~~

~~In addition to the stormwater management practices, the Town is proposing restoration of native shoreline habitat along Lake Worth which would provide natural water purification. Restoration plans are described in more detail in the Coastal Zone Management/Conservation Element under "Restoration of Native Habitat." The Town has also identified the need for an intergovernmental Lake Worth Management Committee, which would facilitate water quality management on a regional scale.~~

~~Previous text and illustrations indicate that the Town's natural drainage features have already experienced the major changes which accompany urban development.~~

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~~In a continuous pursuit to address infrastructure problems in the Town, from March 2001 to April 2003 the Palm Beach Town Council empowered the Strategic Planning Board to create a long-range (10+ years) Strategic Plan. In their study the Strategic Planning Board studied current drainage problems and the status of stormwater runoff handling and retention systems, improvements and components. The Strategic Planning Board also worked to enhance and improve the runoff collection and retention system as set out below.~~

~~During the mid 1970's, the Town commissioned an engineering report to recommend infrastructure needed to provide better protection against flooding in major rainstorms. The "Smith & Gillespie Long Range Public Works Plan" provided the blueprint for major improvements subsequently constructed during the 1980s and 1990s. Flooding throughout the Town has been greatly reduced by these improvements.~~

~~However, some of the residential neighborhoods of the North End experienced severe flooding of homes during heavy rainfalls in 2000 and 2001, and less severe flooding (still resulting in private property damage) on other occasions between the late 1990s and 2001. In response, the Town staff improved its procedures for the field operations involved in preparing for and responding to storms that pose a threat of flooding. The Town also undertook a new study of the drainage system throughout the affected area (five drainage basins covering the area from Wells Road north to the Lake Worth Inlet), and developed an ambitious multi-year plan to increase the capacity of the storm drainage system. The Town's retention design flood protection parameter in the Zoning Code is 2".~~

~~On September 10, 2002, the Town Council approved a 10-year, \$23.7 million pay as you go program to provide new pump stations, new and larger pipes along the "trunk lines" connecting smaller pipes to the trunk lines, and new and larger pipes along some of the residential side streets.~~

~~Permits to implement this program were obtained and the first five years of the program were constructed.~~

~~While developing this program for improving the public infrastructure necessary to better protect against flooding, the Town's elected officials, staff, and consultants also developed strategies for reducing the impacts of storm water run-off from private properties into the public drainage system. Town regulations were substantially strengthened in this regard in 2001 and 2002. Additional measures will be considered in the future.~~

~~In addition to considering what regulations and storm drainage improvements are needed to prevent future flooding, the Strategic Planning Board considered how system improvements will be made. Specifically, the Strategic Planning Board explored whether or not changes are needed in Town policy governing construction contracts and construction project management to ensure that these major projects are completed successfully.~~

~~Engineering analyses have indicated that construction of the foregoing improvements will protect all but the 14 lowest elevation homes (some of which have a first floor elevation almost 3 feet lower than the Town's current flood prevention standard of 7.5 feet above sea level) from being flooded during a storm of such intensity that it is expected to occur once every 100 years. Street flooding and some garage flooding are expected, not only during a "100-year storm" but also during less intense storms.~~

~~Starting in 2009 as part of the Accelerated Capital Improvements Program (ACIP) the Town has upgraded multiple stormwater pump stations and replaced, lined or abandoned corrugated metal pipes. The ACIP is currently ongoing and is expected to be completed by the end of 2018.~~

#### **Resulting Problems or Opportunities:**

~~While developing this program for improving the public infrastructure is necessary to better protect against flooding, the Town's elected officials, staff, and consultants also have been developing strategies for reducing the impacts of storm water run-off from private properties into the public drainage system. Town regulations were substantially strengthened in this regard in 2001 and 2002. Additional measures are also being considered.~~

### **DRAINAGE SUB-ELEMENT (STORMWATER MANAGEMENT)**

#### **State of Florida Stormwater Management**

Unmanaged urban stormwater creates a wide variety of effects on Florida's surface and groundwaters. The Florida Department of Environmental Protection (FDEP) is the state's lead agency for environmental management and focuses on protecting the air, water, and land of the state. According to FDEP, development of land can lead to the following effects.

- Compaction of soil
- Addition of impervious surfaces, such as roads and parking lots

- Alteration of natural landscape features, such as natural depressional areas that hold water, floodplains, and wetlands
- Addition of pollutants from everyday human activities
- Construction of highly efficient drainage systems

These alterations within a watershed decrease the amount of rainwater that can seep into the soil to recharge both the Biscayne and Floridian aquifers, among other things. Consequently, the volume, speed and pollutant loading in stormwater that runs off developed areas increases, leading to flooding, water quality problems and loss of habitat. To manage urban stormwater and minimize these impacts to the state's natural systems, According to FDEP, Florida was the first state in the country to adopt a rule requiring the treatment of stormwater to a specified level of pollutant load reduction for all new development. Florida's original stormwater rule was adopted in 1981 and went into effect in February 1982.

Pursuant to Section 373.403(10), F.S., a *stormwater management system* means a system which is designed and constructed or implemented to control discharges which are necessitated by rainfall events, incorporating methods to collect, convey, store, absorb, inhibit, treat, use, or reuse water to prevent or reduce flooding, over-drainage, environmental degradation, and water pollution or otherwise affect the quantity and quality of discharges from the system.

In 1990, in response to legislation, the FDEP developed and implemented the State Water Resource Implementation Rule (originally known as the State Water Policy rule). This rule sets forth the broad guidelines for the implementation of Florida's stormwater program and describes the roles of DEP, the five (5) water management districts (Exhibit 5-1) and local governments. The rule provides that one (1) of the primary goals of the program is to maintain, to the degree possible, during and after construction and development, the predevelopment stormwater characteristics of a site..<sup>1</sup>

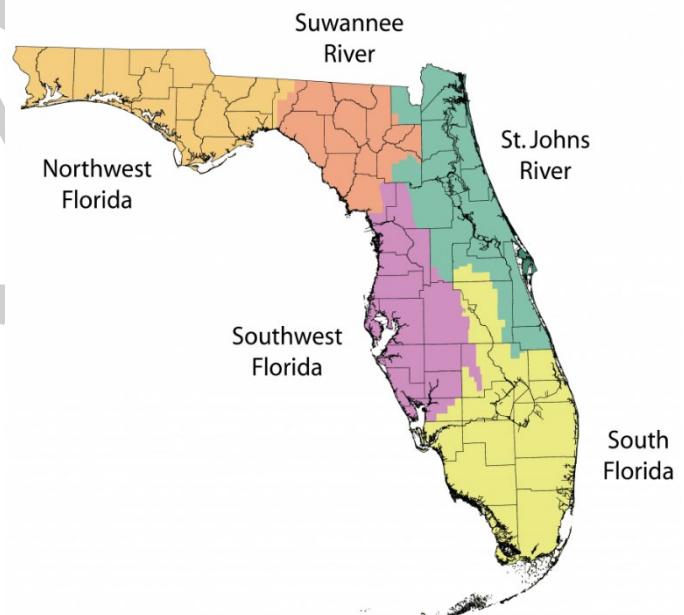


Exhibit 5-1 Water Management Districts in Florida

The FDEP regulations outlined in the Florida Administrative Code (FAC) require notification of work to be completed and potentially the issuance of a National Pollutant Discharge Elimination System (NPDES) permit for any stormwater discharges that result from large or small construction activities. The FDEP also regulates subsurface drainage systems and water quality.

<sup>1</sup> <https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/erp-stormwater>

## Town of Palm Beach Drainage System

The Town of Palm Beach is a member of the Palm Beach County National Pollutant Discharge Elimination System (NPDES) MS4 Permit. The PBC MS4 NPDES permit is held jointly by most MS4 owners within the geographic area of Palm Beach County. The permittees have taken a cooperative approach to permit compliance, jointly conducting several permit activities, and collectively developing a number of tools used to carry out the permit programs.

Prior to Palm Beach settlement, the Town was characterized as a coastal barrier island with a high coastal ridge along the Atlantic, and a low, swampy shoreline along Lake Worth, that would later become the Lake Worth Lagoon, due to the dredging of the Palm Beach Inlet. A marshy slough separated the beach ridge and lake hammocks. Surface accumulation either percolated to the surficial aquifer known as the Biscayne Aquifer, through permeable soils on the ridges, collected in the slough, or ran through poorly drained tidal swamps into Lake Worth Lagoon.



[Historical Photo of Lake Worth Lagoon](#)

Extensive shoreline and surface water changes have occurred since 1883. The slough and low lake shorelines have been filled for development, and the Atlantic shoreline has receded due to beach erosion. The development of the Town has reduced the amount of water infiltrating to the Biscayne Aquifer and has increased runoff from impermeable surfaces. The coastal ridge still dominates the island's topography, acting as a seaward barrier to surface water drainage. Remnants of slough areas are prone to flooding. To facilitate the removal of stormwater, a system of storm sewers and pumping stations was created during the early development of the Town. That same system, with major modifications, remains intact today.

Lake Worth Lagoon estuary started out as a freshwater lake sealed off from the ocean by barrier islands. Water would flow into the lake from the western interior wetland forests, prairies, and marshes. The lake was an important source of freshwater along the east coast provided wildlife and indigenous people with drinking water, food, and transportation. The Seminoles called it “Hypoluxo” meaning “water all around, no get out.” As settlers began to move into the area in the mid-1800s, the freshwater lake was changed into a brackish estuary when pioneers dug the first stable inlet just north of Lake Worth Inlet. The estuary was further altered when the Atlantic Intracoastal Waterway dredging was completed in the early 1900s.  
*Palm Beach County Website, Lake Worth Lagoon*



An example of the Town's pioneering efforts at stormwater management is the "Coral Cut", which combined drainage with site planning that led to one of the most significant and breathtaking geological features. The Town's early pioneers recognized the need to ensure proper drainage of the land that was, in its original form, comprised up high and low elevations that provided the drainage of water necessary to protect the people and property of the Town of Palm Beach.

The Coral Cut was the engineering feat that led from the Lake Trail, located on the west side of the Island, east along the south side of the Palm Beach Country Club Golf Course on what became Country Club Road. Captain W. S. Holloway, a Town of Palm Beach pioneer, headed the excavation, dredging, and dynamiting, arriving with "an army of men" who set up a tent camp at the site. While the ten-ton Sullivan channeling machine was apparently successful in cutting the initial coral cut that would drain the swamp to the south, allowing wheelchair traffic to transport guests from the Lake Trail to the clubhouse, plans for the yacht basin were apparently tabled.<sup>2</sup>



The Coral Cut, c, 1915-1920 Image courtesy Historical Society of Palm Beach County

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<sup>2</sup> New York Social Diary Palm Beach Greening of Palm Beach Country Club, September 22, 2020.



The trail dredging started out a century ago as a narrow alley just wide enough for bicycle traffic. Today, it is part of the Town's drainage system that is actually the site of a water pumping station. According to "The Cut" article, courtesy of the *Chronicling America, Library of Congress*, the purpose of the Cut was two-fold. It provided a wheelchair path connecting County Road with Lake Trail, in addition to providing a run-off for water from the hydraulic dredge used in-filling the land which is now the golf course of the Palm Beach County Club. With the passing of the years, the Cut has grown more beautiful from year-to-year due to the vines and tropical foliage which has grown. It is also used by bicycle riders who have greatly increased in the last years.<sup>3</sup>



The Coral Cut on Country Club Road Today

During the mid-1970s, the Town commissioned an engineering report to recommend infrastructure needed to provide better protection against flooding in major rainstorms. The "Smith & Gillespie Long Range Public Works Plan" provided the blueprint for major improvements subsequently constructed during the 1980s and 1990s. As a result, flooding throughout the Town has been greatly reduced by those improvements.

In February 1991, EPA Region IV notified all MS4 owners within Palm Beach County that they had been designated as a part of the County's MS4 for the purposes of obtaining NPDES permit

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<sup>3</sup> Ibid

coverage. EPA Region IV further recommended that all MS4 owners within the County participate as co-applicants under a lead permittee, selected by the group. Presumably based on meeting(s) of the future co-applicants, Northern Palm Beach County Water Control District (Northern) emerged as the lead applicant. Between the months of June 1991 and January 1992, Northern entered into inter-local agreements with all other co-applicants. The Steering Committee was also formed during this time period, for the purposes of providing for representation of the group members and for coordinating the application (and future joint program). The Steering Committee is currently comprised of one representative from the lead permittee, two representatives of larger municipalities, two representatives of smaller municipalities, one representative of a special district, and one representative from Palm Beach County.

The permit application was a two-part process; Part 1 was due on May 18, 1992 and Part 2 was due May 17, 1993.

Permits are issued for a 5-year period; however, each permit remains in effect until a subsequent permit is issued. For the Palm Beach County group, the following permits have been issued.

- Cycle 1 - February 1, 1997
- Cycle 2 - November 18, 2002
- Cycle 3 - March 2, 2011
- Cycle 4 - September 8, 2016

The Cycle 5 Phase I permit template is currently being drafted by FDEP and negotiated with the U.S. EPA. Once the template is approved, FDEP will begin drafting the individual Cycle 5 permits for each of the Phase I permittees in Florida.

In 2000 and 2001, a number of the residential neighborhoods of the north end of the Town experienced severe flooding during heavy rainfalls. In response, the Town staff improved the operating procedures related to preparing for and responding to storms that pose a threat of flooding. The Town considered a new study of the drainage system throughout the affected area from Wells Road north to the Lake Worth Lagoon and that would develop an ambitious multi-year plan to increase the capacity of the storm drainage system. Due to the cost of the study, the Town did not pursue the findings. In its place, the Town implemented a requirement for private properties to retain the first two (2) inches of runoff onsite prior to discharge.

Today, the Town's drainage system consists of a combination of pumping stations and gravity outfalls. Pumping stations are necessary discharge structures within the Town that are below Lake Worth Lagoon's high tide level, causing backflow through stormwater outfalls when above normal tides are experienced. King Tide flooding occurs throughout South Florida. The images below demonstrate some of the impacts the King Tide has caused in the Town.



King Tide Flooding on the Lake Trail in 2018 and 2019  
Woods Hole Group, Coastal Resilience Implementation Plan 2021

The Town's stormwater system is unique for the east coast of Palm Beach County as it is a mostly "pumped" system. A majority of each drainage basin's runoff is collected and pumped into the Intracoastal Waterway (Lake Worth Lagoon) rather than being gravity discharged. The Town owns, operates, and maintains 13 stormwater pump stations, in addition to a very extensive drainage collection system to convey runoff to the pumping stations. The stormwater pump stations are designated by Town staff as "D-stations" to help differentiate them from the Town's sanitary sewage pump stations and pneumatic ejector stations.



The Town's stormwater collection and pumping system is divided into the following sections and approximate areas of coverage.

#### North Collection System: D-2, D-9, and D-10 Stormwater Pump Station

Shown on Exhibit 5-2 and detailed below are the Stormwater Pump Station located at various locations in the Town.

- D-9 Stormwater Pump Station:  
Area of coverage from East Inlet Drive south to Ocean Terrace

- D-2 Stormwater Pump Station:  
Area of coverage from Osceola Way south to La Puerta Way

- D-10 Stormwater Pump Station n:  
Area of coverage from La Puerta Way south to Bahama Lane

#### North Central System: D-3, D-4, D-8 and D-12 Stormwater Pump Station

- D-8 Stormwater Pump Station:  
Area of coverage from south of Bahama Lane to Southland Road

- D-3 and D-4 Stormwater Pump Station: Area of coverage from Planta on Road to Wells Road

- D-12 Stormwater Pump Station:  
Area of coverage from Wells Road to Royal Poinciana Way



Exhibit 5-2 Pump Station Locations

#### Central Collection System: D-6, D-7, and D-14 Stormwater Pump Station

- D-14 Stormwater Pump Station: Area of coverage from Pine Walk to Royal Palm Way

- D-6 Stormwater Pump Station: Area of coverage from south of Royal Palm Way to Australian Avenue

- D-7 Stormwater Pump Station: Area of coverage from Chilian Avenue to Gulf Stream Road

## South Collection System: D-16, D-17, and D-18 Stormwater Pump Station

- D-18 Stormwater Pump Station: Area of coverage from El Bravo Way to El Brillo Way
- D-16 Stormwater Pump Station: Area of coverage from El Vedado Road to Jungle Road
- D-17 Stormwater Pump Station: Area of coverage from Via Vizcaya to Clarendon Avenue

In December 2019, the Town of Palm Beach completed a National Flood Insurance Program Community Rating System (CRS) audit which is managed by the Federal Emergency Management Agency (FEMA). The CRS program is a voluntary incentive program which recognizes community floodplain management efforts. As part of the audit, the Town's drainage requirements were evaluated to determine how prepared the Town, its residents and business owners are for a major storm event. Although evaluation of the Town's regulations resulted in an improved score over previous years, the Town noted some areas of deficiency.<sup>4</sup>

In May 2021, the Town authorized Kimley-Horn and Associates, Inc. (KHA) to provide general engineering services for completion of a stormwater regulation review and analysis of private property drainage requirements by other regional regulatory agencies. The goal of the study was to determine how requirements applicable to Town properties could be modified to positively impact future CRS audit scores.<sup>5</sup>

After identifying agencies with jurisdictional authority over stormwater and drainage within the Town, regulatory documents were reviewed and compared. The CRS encourages the adoption of a "design storm", which refers to a calculated, hypothetical storm event of a particular duration, rainfall intensity, return frequency and total depth of rainfall. Selection of a meaningful design storm for stormwater management will result in the design of optimal infrastructure intended for appropriate flood protection.<sup>6</sup>

At this time, the Town regulatory documents do not reference a design storm for private, on-site stormwater management systems. According to Activity 450 in the CRS Coordinator's Manual, the minimum points available for municipalities who have a regulated design storm would be achieved if a storm with a minimum return frequency of 10-years were cited. Increased points could be obtained by citing a larger storm event (i.e., 25, 50 or 100-year storm). While maximum points would be ideal, any recommendations for adoption of a design storm would only be feasible if implementation is reasonable for the various property sizes and types within the Town while also being congruent with existing Town infrastructure.

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<sup>4</sup> Technical Memorandum from Samantha C. Graybill, P.E., Kimley-Horn to Patricia Strayer, P.E, Town Engineer, October 8, 2021

<sup>5</sup> Ibid

<sup>6</sup> Ibid

<b>TABLE 5-1</b> <b><u>CURRENT TOWN LEVEL OF SERVICE (LOS) STANDARDS FOR PUBLIC STORMWATER INFRASTRUCTURE</u></b>		
<b><u>Infrastructure Type</u></b>	<b><u>Storm Event</u></b>	<b><u>Required Runoff Removal Time</u></b>
<b><u>Systems Served by Pumping Stations</u></b>	<b><u>1-Year</u></b>	<b><u>No Flooding Permitted</u></b>
<b><u>Systems Served by Gravity Outfalls</u></b>	<b><u>3-Year</u></b>	
<b><u>General Town Ponding</u></b>	<b><u>5-Year</u></b>	<b><u>60 minutes</u></b>
	<b><u>50-Year</u></b>	<b><u>90 minutes</u></b>

In addition to design storms, the referenced regulations were also reviewed for base flood elevations. A “base flood elevation” refers to the elevation of flood waters with a 1% chance of equaling or exceeding that level within a year. In other words, this 1% exceedance is associated with flooding anticipated from a 100-year design storm. Currently, the Town regulatory documents that reference the base flood elevation are compliant with information published by the Florida Building Code (FBC). The FBC notes the base flood elevation as the FEMA base flood elevation with 1.0-ft of freeboard equating to 7.0-ft above sea level for much of the Town. The Town’s Comprehensive Plan references the current flood prevention standard as 7.5-ft above sea level which makes the Town compliant with the FBC.<sup>7</sup>

The Town is in compliance with the South Florida Water Management District (SFWMD) stormwater retention requirements for new development and redevelopment. All new development and redevelopment must provide minimum retention of the first two (2) inches of rainwater prior to discharging into the Town drainage system. Residential development of less than one (1)-half acre is required to route discharge and sheet flow through grassy areas prior to discharge into the Town system. As a result of the KHA technical review of the Town’s stormwater management system, the Town is reviewing additional retention levels for development.

## **SUMMARY**

The Town of Palm Beach has employed Lucity to monitor public facilities and services. Lucity, Inc. supports an enterprise asset and maintenance management needs for hundreds of municipal agencies and thousands of users nationwide. LucityAM is a comprehensive, flexible and scalable GIS and Web enabled “office-to-mobile” software solution for Local Governments, Public Works and Utility Departments. LucityAM enables agencies to extend the useful life of capital assets while managing customer requests, Capital Improvement Project work orders and preventive maintenance. Lucity is able to integrate fully with GIS to harness the advantages of thinking and working geographically.<sup>8</sup>

The Town of Palm Beach’s drainage system operates an ongoing maintenance program with the assistance of Lucity. The Town has completed drainage pump station improvement and modifications identified in a 2017 Condition Assessment Report. In 2023, the Town initiated an

<sup>7</sup> Ibid

<sup>8</sup> <https://www.linkedin.com/company/lucity-inc->



updated drainage pump station condition assessment that will provide the Town with a prioritized 10-year capital plan associated with drainage pump stations. The Lucity program is also implementing the next steps with drainage that will include tracking capital improvements and life cycle costs.

The drainage system is generally considered to be in good condition. According to the Public Works Department, the expected service life of the drainage system components exceeds 50 years. The Town needs to continue evaluating the drainage system and replace deteriorated components. Currently, the Town of Palm Beach Public Works Department and consultants are investigating options for additional pollution control tools for implementation at pump stations. Over the next 20 years Public Works will perform capital improvement work on all the drainage pump stations. As displayed below, a five (5)-year Capital budget for drainage demonstrates continued upgrades that will maintain the level of service standard over the 20-year planning horizon.

**TABLE 5-2 Pay-as-you-go Capital Improvement Plan FY2024 - Drainage System**

Location	Accumulated Project Budget through FY23	FY2023 Available Balance as of 6/16/23	FY2024 Estimated	FY2025 Estimated	FY2026 Estimated	FY2027 Estimated	FY2028 Estimated	FY2024-2028 Total
Drainage System	\$5,549,386	\$868,446	\$350,000	\$2,050,000	\$515,000	\$1,440,000	\$175,000	\$4,530,000
D-2 Palmo Way	\$396,370	\$350,000	-	-	\$200,000	\$1,000,000	-	\$1,200,000
D-3 Tangier Ave	-	-	\$200,000	\$1,400,000	-	-	-	\$1,600,000
D-6 Royal Palm Way	-	-	-	-	\$140,000	-	-	\$140,000
D-7 Australian Ave	\$20,000	\$-	-	-	-	\$140,000	-	\$140,000
D-8 Country Club Rd	\$1,675,683	\$193,057	-	-	-	-	-	\$-
D-12 Everglade Ave	\$1,345,832	\$160,152	-	-	-	-	-	\$-
D-14 Four Arts	-	-	-	-	-	\$125,000	-	\$125,000
D-17 Clarendon Ave	-	-	\$125,000	\$475,000	-	-	-	\$600,000
D-18 El Brillo Way	\$1,898,405	\$-	-	-	-	-	-	\$-
Stormwater Pumpstation Condition Assessment	\$100,000	\$100,000	-	-	-	-	-	\$-
Resiliency Implementation	-	-	-	\$100,000	\$100,000	\$100,000	\$100,000	\$400,000
Seagreass Surveys – Stormwater	\$20,000	\$-	-	-	-	-	-	\$-
Stormwater Pump/R&R	\$25,000	\$11,390	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$125,000
Minor Drainage Improvements	\$68,096	\$53,847	-	\$50,000	\$50,000	\$50,000	\$50,000	\$200,000

## POTABLE WATER

The City of West Palm Beach owns and operates the water system providing potable water to the Town of Palm Beach, City of West Palm Beach and Town of South Palm Beach. The City of West Palm Beach Potable Water Utility Service Area exceeds 120,000 residents and covers 61 square miles of area. Since the system serves primarily urbanized areas, the predominant land uses in the service area are residential, commercial, industrial, recreational, and public and semi-public uses. The system consists of a raw water supply, water treatment plant, storage reservoirs and distribution system. A 30-year renewable contract between the Town and the City of West Palm Beach was signed in 1965 and expired in January, 1995. The Town subsequently renegotiated the contract with the City, and a new franchise agreement was signed on June 16, 1999 and is effective until 2029. It should also be noted that the City of West Palm Beach is currently expanding and improving their water infrastructure.

The City of West Palm Beach collects its raw water from Clear Lake, a surface water source. The South Florida Water Management District granted the City a water use permit on February 14, 2013 for 67 MGD. See the City of West Palm Beach Comprehensive Plan for more information on their consumptive use permit and yearly allocations and sources.

The capacity of the water treatment plant is 47.3 MGD. The plant's pumping system can provide maximum hour demand and fire flow demand pumping capacity throughout the distribution system. West Palm Beach has 18 million gallons of storage capacity in its distribution system and water treatment plant, including a one million gallon ground reservoir located at the Palm Beach Country Club.

The City allocates no specific portion of its treatment capacity to individual users or municipalities. See the City of West Palm Beach Comprehensive Plan for more information on its entire system, historic water use, and projected water use.

Raw water reaches Clear Lake through a system of canals and water catchment areas. Water travels from Lake Okeechobee through the L-8 canal to Canal M-1, and then to a naturally vegetated water catchment area. The catchment area serves as an initial water purifier; wetland plants provide nutrient uptake, and sediments settle out of the water column. After leaving the catchment area, the water travels to Lake Mangonia and then to Clear Lake. A diking system around Clear Lake, Canal M, and the catchment area prevent degradation of the surface water from stormwater or irrigation runoff. Water quality in Clear Lake has been consistently good.

Raw water is treated by West Palm Beach according to FDEP water quality standards. Potable water emerging from the plant is tested daily for quality. Monthly reports, including tabulations of daily testing, are sent to the FDEP for review. The City prepares an annual Water Quality Report which can be reviewed on the City's website. Potable water quality has been consistently good, winning awards in recent years for its outstanding taste.

According to West Palm Beach sources, water quality is expected to remain good, and no measures for further protection of quality are necessary.

~~The Palm Beach/South Palm Beach service area is fed by five mains crossing Lake Worth from West Palm Beach, four of which connect directly into the Town. These crossings are located at the Flagler Bridge, Island Road, Southern Boulevard, and Sloan's Curve. The fifth is at Orange Grove Road. In addition, there are water meters, private fire lines, and fire hydrants located in Palm Beach.~~

~~The City of West Palm Beach has established 243.3 gallons per capita per day (gpcpd), based upon the 2020 Capacity Analysis Report (CAR), submitted in January 2020, as the level of service standard for provision of potable water to the entire Potable Water Utility Service Area which includes the Town of Palm Beach.~~

~~In order to reduce potable water consumption, the Town has pursued a water conservation program. The Town supports the City of West Palm Beach, its water provider, in its efforts to conserve water and expand alternative water supply projects and reuse initiatives. See the City of West Palm Beach Comprehensive Plan for more detail on conservation, alternative water supply, and reuse.~~

## **~~AQUIFER RECHARGE~~**

~~The Town of Palm Beach is underlain by two aquifer systems; the surficial aquifer and the more deeply located Floridan aquifer. These are separated from each other by the Hawthorn Formation which prevents any recharge from reaching the Floridan aquifer. Neither aquifer is used as a source of potable water.~~

~~Urban development in the Town, including the placement of poorly drained urban fill, has affected the quantity of recharge to the surficial aquifer. Pomello fine sand and, to a lesser extent, Palm Beach Urban Complex, are probably the most active recharge soils. According to the Palm Beach County Soil Survey, most native sandy soils are located along the beach ridge, and in the north end of Town, directly behind the beach ridge.~~

~~The surficial aquifer is not considered a suitable source of potable water, nor as a major source for irrigation because of its high chloride (salt) content.~~

~~Fresh water is less molecularly dense than salt water. Therefore it tends to "float" on top of salt water forming a fresh water lens. Often this lens can supply usable water so long as it is sufficiently replenished by infiltration. The extent and quality of the fresh water lens under the Town has not been determined, however, the SFWMD is testing the surficial aquifer in a comparable location in West Palm Beach.~~

~~The Biltmore condominium has a consumptive use permit from the South Florida Water Management District (SFWMD) for groundwater to cool its air conditioning system. The Breakers has received SFWMD permitting for use of a non-potable shallow water well for its golf course irrigation system. Small cooling or irrigation wells exist which did not require a SFWMD permit. Such wells, however, do require a permit by the Town. There is no evidence to suggest that the existing limited use of the aquifer has caused, or will cause, degradation of the aquifer.~~

~~The Town protects recharge through its storm water retention requirements and its minimum landscaped area requirements, which ensure pervious areas for water percolation to the aquifer. In~~

~~addition, there are few septic tanks in the Town; no existing or potential identified problems with hazardous waste contamination; and no known sources of aquifer contamination or depletion. In the event that the Town chooses to utilize the surficial aquifer as a non-potable water source for irrigation, measures should be taken, in accordance with rules of the South Florida Water Management District, to protect the aquifer and overlying soils and vegetation from negative consequences of drawdown.~~

~~The Town has reduced density in some residential districts over primary recharge areas, and will continue as Town policy to reduce redevelopment densities in the Town as a whole. Existing land uses in primary recharge areas will be maintained, and beaches and dunes will be protected, as described in the "Protection and Restoration of Beaches and Dunes" section of the Coastal Zone Management/Conservation Element of this Plan. The Town will also continue to prohibit industry and hazardous waste storage within its limits.~~

~~The Town further improves aquifer recharge by requiring new development and redevelopment in primary aquifer recharge areas to run storm water through vegetated areas prior to discharge into the Town's drainage system. No further programs or regulations are deemed necessary, unless future use of the aquifer necessitates further measures.~~

## **POTABLE WATER SUB-ELEMENT**

### **State of Florida Potable Water Supply Plan**

From 2002 to 2016, the Florida Legislature enacted legislation to address the state's water supply needs. In particular, Senate Bills 360 and 444, adopted during the 2005 legislative session, significantly amended Chapter 163 and 373, F.S. The legislation resulted in strengthening the statutory links between the regional water supply plans prepared by the Water Management Districts and the comprehensive plans prepared by local governments. In addition, these bills established the basis for improving coordination between the local land use planning and water supply planning.<sup>9</sup>

The statutory requirements mandate that each local government comply with the following requirements, which have been summarized:

1. Coordinate appropriate aspects of its comprehensive plan with the appropriate Water Management District's regional water supply plan.
2. Ensure that its future land use plan is based upon availability of adequate water supplies and public facilities and services.
3. Ensure that adequate water supplies and facilities are available to serve new development no later than the date on which the local government anticipates issuing a certificate of occupancy.
4. For local governments subject to a regional water supply plan, revise the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge

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<sup>9</sup> Town of Palm Beach 10-year Water Supply Facility Work Plan 2020

Element (the “Infrastructure Element”), within 18 months after the Water Management District approves an updated regional water supply plan.

5. Revise the Five-Year Schedule of Capital Improvements to include any water supply, reuse, and conservation projects and programs to be implemented during the five-year period.
6. Where applicable, revise the Conservation Element to assess projected water needs and sources for at least a 10-year planning period, considering the appropriate regional water supply plan, the applicable District Water Management Plan, as well as applicable consumptive use permit(s).
7. To maintain internal consistency, revise the Intergovernmental Coordination Element to ensure coordination of the comprehensive plan with applicable regional water supply plans and regional water supply authorities’ plans.
8. Address in the Evaluation and Appraisal Review (EAR) of the Comprehensive Plan (if necessary), the extent to which the local government has implemented the 10-year water supply facilities work plan.

### **The Town of Palm Beach Water Supply Planning**

The Town of Palm Beach receives its drinking water (potable) from the City of West Palm Beach through a water system that was once owned and operated by Henry Flagler. A portion of the water comes from rainfall captured and stored in a part of the Everglades Ecosystem known as the Grassy Waters Preserve.



Grassy Waters Preserve

Grassy Waters Preserve is a 23-square-mile wetlands ecosystem that serves as a portion of the freshwater supply for the City of West Palm Beach, the Town of Palm Beach, and South Palm Beach. Historically, Grassy Waters was both a key component of the Greater Everglades watershed and the headwaters of the Northwest Fork of the Loxahatchee River. Although human needs have led to severe alterations to the flow of water through South Florida, Grassy Waters Preserve remains a pristine remnant of the once great Everglades system.<sup>10</sup>

<sup>10</sup> <https://www.wpb.org/government/public-utilities/grassy-waters-preserve/about-grassy-waters>

Henry Flagler's foresight in the early 1890s led him to purchase Grassy Waters preserve property when the land was under private ownership and utilized the water that flowed from Grassy Waters to contribute further to the supply of water in Clear Lake, also under Flagler's ownership.

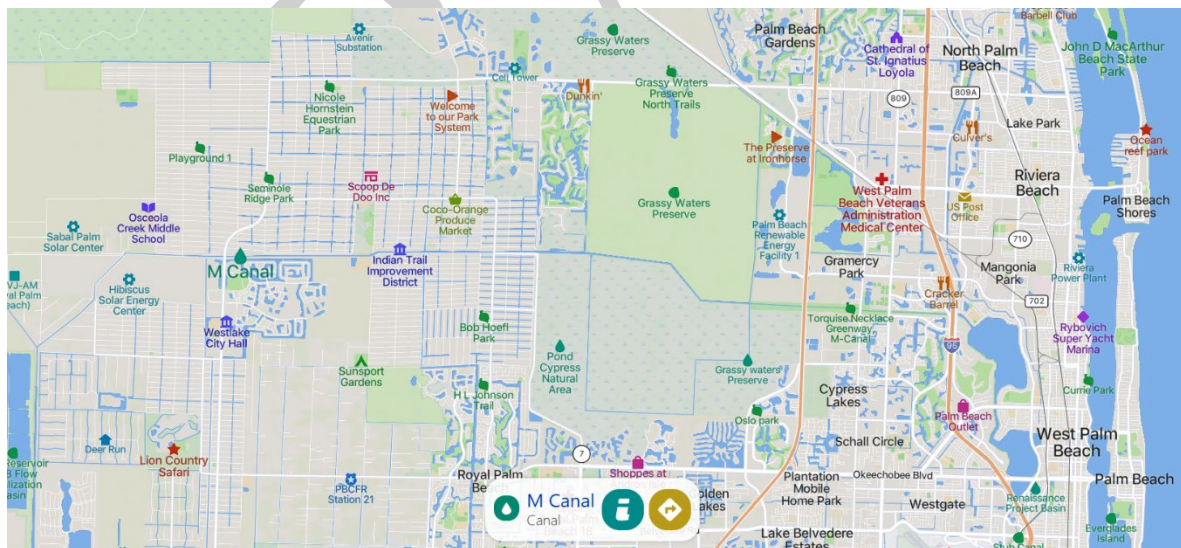
In 1901, the City of West Palm Beach approved a 30-year franchise for water service when Henry Flagler's East Coast Hotel Company built and began operating a water plant at the northeast corner of Australian Avenue and Banyan Boulevard, adjacent to Clear Lake. When the population of West Palm Beach grew so did the demand for more and higher purity water. As a result, a new filtration plant was constructed in 1927 and nearly tripled the capacity of the plant.<sup>11</sup>



Image of Clear Lake, West Palm Beach

The City of West Palm Beach purchased the Grassy Waters property, along with the Water Treatment Plant in 1955 and later in 1964, the Grassy Waters was given special protection by the state legislation to limit the use of Grassy Waters to water consumption. The water system feeds and sustains Lake Mangonia, in addition to Clear Lake via the M-Canal, displayed below, which was constructed in 1930 and runs through the heart of Grassy Waters. These two (2) lakes cover a 1,000-acre area.<sup>12</sup>

A 30-year renewable contract between the Town and the City of West Palm Beach was signed in 1965 and expired in January 1995. The Town subsequently renegotiated the contract with the City, and a new franchise agreement was signed in 1999 and is effective until 2029.



Grassy Waters Watershed - M-Canal

<sup>11</sup> 2022 City of West Palm Beach Water Quality Report

<sup>12</sup> Ibid



## **Town of Palm Beach 10-Year Water Supply Facility Work Plan**

The purpose of the Town of Palm Beach Water Supply Facility Work Plan (Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within the Town's jurisdiction. Chapter 163, Part II, F.S., requires the Town to prepare and adopt a Work Plan into its comprehensive plan within 18 months after the water management district approves a regional water supply plan or its update. The 2018 Lower East Coast Water Supply Plan Update was approved by the SFWMD in November of 2018. Completion of the Town's plan was dependent upon the of the City of West Palm Beach's Work Plan as the Town's water supplier. The Town's 10-Year Water Supply Facility Work Plan was approved in August 2020.

According to state guidelines, the Work Plan and the comprehensive plan amendment must address the development of traditional and alternative water supplies, bulk sales agreements, conservation, and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. Due to the Town's relationship with the City of West Palm Beach, the Town's Work Plan has the same planning time schedule as the City of West Palm Beach's 10-year Work Plan.

The Town of Palm Beach Water Supply Facility Work Plan (Work Plan) references the initiatives already identified in City of West Palm Beach's 10-year Work Plan since the Town is a retail buyer. According to state guidelines, the Work Plan and the comprehensive plan amendment must address the development of traditional and alternative water supplies, bulk sales agreements, conservation, and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. Because of the Town's relationship with the City of West Palm Beach, the Town's Work Plan has the same planning time schedule as the City of West Palm Beach's 10-year Work Plan.

The Town's population figures have been included in the City of West Palm Beach's 10-Year Water Supply Facility Work Plan, which also includes the population figures for the Town of South Palm Beach in addition to the City of West Palm Beach. The combined population statistics have been used to project future water demand in the Utility Service Area for the City of West Palm Beach and are included in the City's 10-Year Water Supply Facility Work Plan in the City's Comprehensive Plan.

According to the 2022 Water Quality Report, the City of West Palm Beach routinely monitors for contaminants according to Federal and State laws, rules, and regulations (Exhibit 5-3). More specifically, the Environmental Protection Agency requires monitoring of over 80 contaminants with annual reporting. The annual water quality report, referred to as the Consumer Confidence Report (CCR), and includes information on source water, treatment processes, detected contaminants, and their meaning. Stated in the 2022 Water Quality Report, the City of West Palm Beach has maintained compliance with all Federal and State requirements and has had no violations.

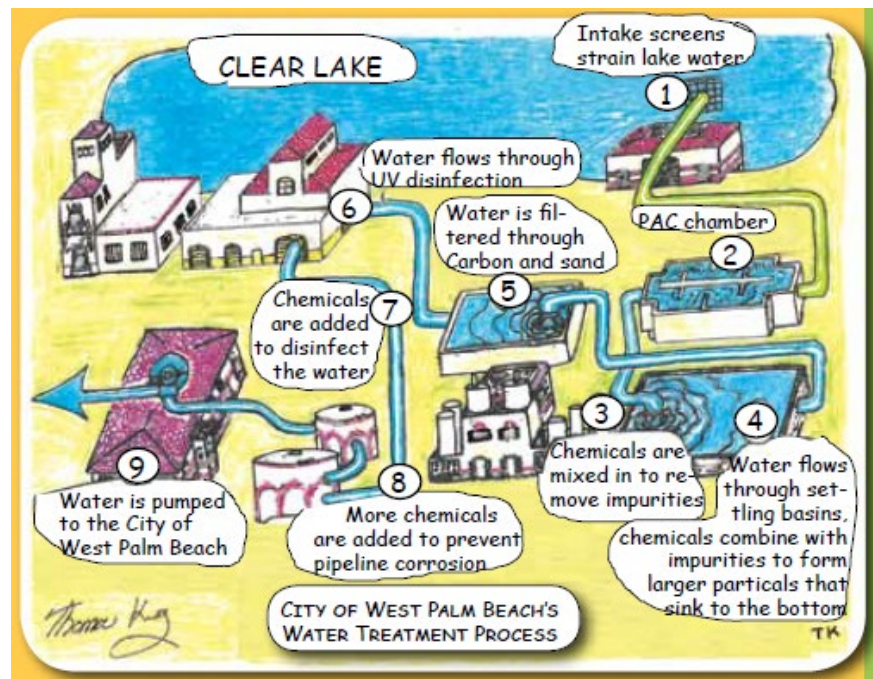


Exhibit 5-3 Clear Lake Plant Treatment Process

In 2019, the Water Treatment Plant started up the new Ultra-Violet (UV) treatment system that established an additional barrier to ensure the production of safe drinking water. The UV System is designed to control bacteriological contaminants typically found in surface and ground water supplies. Housed within massive pipes inside the water treatment plant, the UV system is the largest in Florida. In 2021, the City of West Palm Beach then completed the installation of a Powdered Activated Carbon (PAC) Treatment Unit and began using it to further remove harmful contaminants, such as algal toxins.<sup>13</sup>

<sup>13</sup> Ibid

## Aquifer Recharge

As demonstrated in Exhibit 5-4, the Town of Palm Beach is underlain by two (2) aquifer systems; the Biscayne Aquifer, which is a surficial aquifer and the more deeply located Floridan Aquifer. As displayed in the image below, these two (2) aquifers are separated from each other by the Hawthorn Formation which prevents any recharge from reaching the Floridan aquifer. Neither aquifer is used as a source of potable water by the Town. Development in the Town, including the placement of poorly drained urban fill, has affected the quantity of recharge to the Biscayne Aquifer. Pomello fine sand and, to a lesser extent, Palm Beach Urban Complex, are probably the most active recharge soils. According to the Palm Beach County Soil Survey, most native sandy soils are located along the beach ridge, and in the north end of Town, directly behind the beach ridge. The surficial aquifer is not considered a suitable source of potable water, nor as a major source for irrigation because of its high chloride (salt) content.

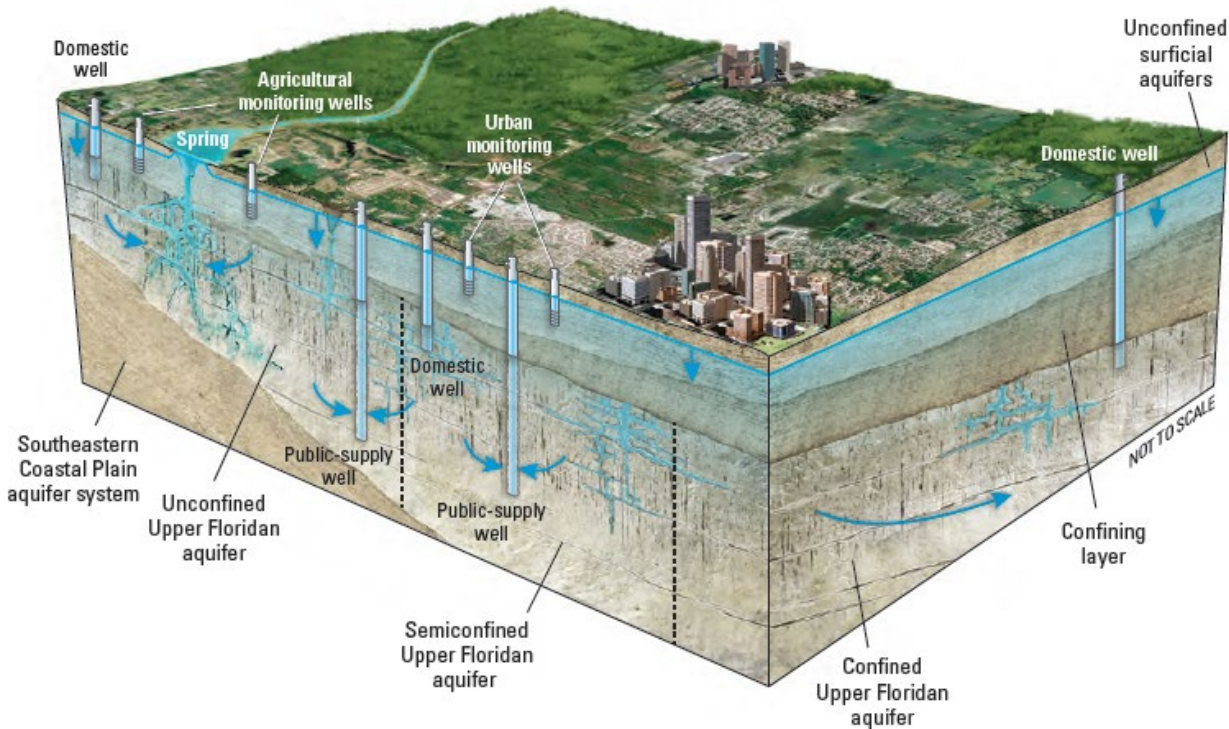


Exhibit 5-4 Groundwater Modeling

The Town protects recharge through its stormwater retention requirements and its minimum landscaped area requirements, which ensure pervious areas for water percolation to the aquifer. In addition, all septic tanks in the Town have been abandoned. Additionally, there are no existing or potential identified problems with hazardous waste contamination and no known sources of aquifer contamination or depletion. In the event that the Town chooses to utilize the surficial aquifer as a non-potable water source for irrigation, measures should be taken, in accordance with rules of the South Florida Water Management District, to protect the aquifer and overlying soils and vegetation from negative consequences of drawdown.

## **SUMMARY**

As previously noted, the Town's present contract for potable water supply with the City of West Palm Beach expires in 2029. The Town is presently investigating potential potable water supply sources as a commitment to the Town residents to perform due diligence to ensure the Town receives high quality water in a cost-effective manner. The town began this process in 2021 to ensure enough time was available to implement whichever alternative is selected by 2029, the time of the existing contract expiration.

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## **SANITARY SEWER SERVICES**

Sewage is collected by typical gravity sanitary sewers. Many small pumping and relay stations are required because of flat terrain and the 12-mile length of the Town. Sewage leaves the Town by means of three force mains, one each in the northern, central and southern parts of Town to treatment facilities at the East Central Regional Wastewater Reclamation Facility (ECRWRF) on the mainland.

The northern force main, a 30-inch subaqueous line with a capacity of five million gallons per day (MGD), runs along Tangier Avenue and then under Lake Worth to connect to the regional plant. This force main was the primary effluent route until the new central force main was constructed which is a 24-inch subaqueous line from the Town's master pump station, that transitions to a 24-inch line along Flagler Drive that ties into the existing joint transmission force main there in West Palm Beach. The new central force main system was placed in operation in 2014. The southern main is a 16-inch subaqueous line with a capacity of 0.94 MGD connecting to the City of Lake Worth transmission system, which then connects to the regional plant. As of 2013, that southern force main is no longer used on a daily basis but is only used for emergencies or when it is necessary to bypass flow from the City of West Palm Beach system. When those situations arise, the Town has a short-term capability to send 1.7 MGD (1300 gpm) through the City of Lake Worth system. A new bulk user agreement was signed with the City of Lake Worth for those occasions when it is necessary to send flow through their subregional system.

The East Central Regional Wastewater Reclamation Facility uses secondary treatment involving a complete mix-activated sludge system. Effluent is disposed through deep well injection, and sludge is transported for disposal at the Palm Beach County Solid Waste Authority compost facility. The plant, which is owned in common by the cities of Lake Worth, Riviera Beach, West Palm Beach, Palm Beach County and the Town of Palm Beach, is operated and maintained by the City of West Palm Beach. The Town, and the four other owners of the plant, have "Large User Agreements" for treatment capacity. The Town's agreement calls for a 5 MGD allocation of plant capacity. The Town's capacity share increased to 6 MGD, based on the reallocation due to flows no longer passing through the City of Lake Worth system.

The plant underwent an expansion which raised capacity from 55 MGD to 64 MGD. The current rated capacity is now 70 MGD. There are no deficiencies in the sanitary sewer treatment plant facilities now serving the Town.

Analysis of Town per capita wastewater flows between 2000 and 2007 indicated that total wastewater flows have decreased due primarily to rehabilitation of the gravity sewer line. With this reduction, the Town will continue to be within its 6 MGD allocation and contract.

Discussions with the Town Public Works Department and representatives of the ECRWRF indicate that at the projected peak seasonal population, the Town will remain within the levels of service for these force mains, and the ECRWRF has the capacity to provide service at the Town's adopted LOS throughout the planning period.

In September of each year the Town obtains a letter from the City of West Palm Beach certifying

~~that the East Central Regional Wastewater Reclamation Facility has the capacity to treat the volume of wastewater projected to be generated in the Town during the peak season at the Town's adopted level of service.~~

~~The developer for each individual project is responsible for providing the Town with an estimate of the population for the project and the Town engineer determines the adequacy of available capacity of the force mains to handle the flow generated by the project.~~

## **SANITARY SEWER SUB-ELEMENT**

A sanitary sewer is an underground pipe system for transporting sewage from residential and commercial buildings to a sewage treatment plant for disposal. Sanitary sewer systems include gravity sewer pipes, force mains and lift (pump) stations. In the Town of Palm Beach, many pumping and relay stations are required due the flat terrain and the 12-mile length of the Town.

The Town's wastewater system includes pump stations (including dry well/wetwell, wetwell, and air ejector types), forcemains, gravity mains and manholes. The Town can pump its wastewater to either West Palm Beach or Lake Worth for ultimate pumping to, and treatment and disposal at, the East Central Regional Wastewater Treatment Plant, located at Jog Road/Haverhill Road.

The Town's wastewater system includes:

- Ejector (air) Pump Stations
- "S" Pump Station - Primary inline booster pump station
- "A" Pump Stations - Drywell/wetwell pump stations
- "E" Pump Stations - Electric submersible wetwell type pump stations
- "G" Pump Stations - Very small electric submersible wetwell type pump stations
- Estimated 70 miles of collection system
- \* A-7 Wastewater Pump Station - Combination of an Inline booster and drywell/wetwell

Sewage contains all the components of wastewater. It is actually a subset of wastewater. The only difference is that wastewater can come from anywhere, while source of sewage is specific. In the Town of Palm Beach, wastewater leaves the Town by means of three (3) force mains, one (1) within each of the three (3) sections of Town, north, central, and south. Sewage then flows to the East Central Regional Wastewater Reclamation Facility (ECRWRF) located on the mainland and managed by the City of West Palm Beach. The ECRWRF provides the overall wastewater treatment, which includes sewerage for the following jurisdictions.

- The City of West Palm Beach
- The City of Lake Worth Beach
- The City of Riviera Beach
- The Town of Palm Beach
- Portions of Palm Beach County

The ECRWRF is funded and governed by a board comprised of a representative member from each of the entities it serves. The ECRWRF is licensed to function under specific guidelines by



the State of Florida and the U.S. Environmental Protection Agency. The plant is operated by Florida licensed Wastewater Plant Operators.<sup>14</sup>

The ECRWRF, which is permitted to process 70 million gallons of wastewater per day, removes contaminants from the wastewater using a series of aerobic digestion basins. The wastewater treatment process produces two (2) by-products. Those by-products include effluent, a chemically and micro-biologically treated water, and bio-solids, which are nutrient rich organic materials left over from the treatment process. A portion of the plant's effluent is further treated to provide reclaim water services. The remainder of the effluent is disposed of through deep well injection.<sup>15</sup>

The Town's Public Works Department is presently lining gravity sewer lines throughout the Town in order to reduce the inflow and infiltration of ground water or rainfall into the sewer system. In 2023, a lift station condition assessment was initiated that will provide the Town with a prioritized 10-year capital plan associated with lift stations. In conjunction, a Lucity program has also been implemented for sanitary sewer to include tracking capital improvements and life cycle costs.

## **SUMMARY**

Discussions with the Town Public Works Department and representatives of the ECRWRF indicate that at the projected peak seasonal population, the Town will remain within the levels of service for these force mains, and the ECRWRF has the capacity to provide service at the Town's adopted LOS throughout the planning period.

In September of each year the Town obtains a letter from the City of West Palm Beach certifying that the ECRWRF has the capacity to treat the volume of wastewater projected to be generated in the Town during the peak season at the Town's adopted level of service.

Over the next 20 years Public Works will perform capital improvement work on all Town lift stations. As displayed below, a five (5)-year Capital budget for sewer system demonstrates continued upgrades that will maintain the level of service standard over the 20-year planning horizon.

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<sup>14</sup> <https://www.wpb.org/government/public-utilities/our-divisions>

<sup>15</sup> Ibid

**TABLE 5-3 Pay-as-you-go Capital Improvement Plan FY2024**  
**Sanitary Sewer System**

<u>Location</u>	<u>Accumulated Project Budget through FY23</u>	<u>FY2023 Available Balance as of 6/16/23</u>	<u>FY2024 Estimated</u>	<u>FY2025 Estimated</u>	<u>FY2026 Estimated</u>	<u>FY2027 Estimated</u>	<u>FY2028 Estimated</u>	<u>FY2024-2028 Total</u>
<b><u>Sanitary Sewer System</u></b>	<b><u>\$10,911,136</u></b>	<b><u>\$4,233,363</u></b>	<b><u>\$1,235,000</u></b>	<b><u>\$2,795,000</u></b>	<b><u>\$905,000</u></b>	<b><u>\$235,000</u></b>	<b><u>\$235,000</u></b>	<b><u>\$5,405,000</u></b>
<b><u>A-4 The Breakers</u></b>	<u>\$912,000</u>	<u>\$158,600</u>	=	=	=	=	=	<u>\$-</u>
<b><u>A-5 Royal Poinciana Way (S of S-2)</u></b>	=	=	=	<u>\$2,000,000</u>	=	=	=	<u>\$2,000,000</u>
<b><u>A-6 Royal Palm Way/Intercoastal</u></b>	=	=	=	=	=	=	=	<u>\$-</u>
<b><u>A-7 Island Road/County Road</u></b>	<u>\$484,576</u>	<u>\$10,447</u>	=	=	=	=	=	<u>\$-</u>
<b><u>A-39 Phipps Park</u></b>	<u>\$847,112</u>	<u>\$34,850</u>	<u>\$1,100,000</u>	=	=	=	=	<u>\$1,100,000</u>
<b><u>A-41 Palm Beach Par 3 Golf Course</u></b>	=	=	=	=	=	=	=	<u>\$-</u>
<b><u>A-42 Bellaria Condominium</u></b>	<u>\$80,000</u>	<u>\$80,000</u>	=	<u>\$560,000</u>	=	=	=	<u>\$560,000</u>
<b><u>A-43 Atriums of Palm Beach</u></b>	<u>\$90,000</u>	<u>\$90,000</u>	=	=	<u>\$550,000</u>	=	=	<u>\$550,000</u>
<b><u>E-1 Mediterranean Road</u></b>	=	=	=	=	=	=	=	<u>\$-</u>
<b><u>E-2 Mockingbird Trail</u></b>	=	=	=	=	=	=	=	<u>\$-</u>

<b><u>E-3 Garden Road (trail)</u></b>	=	=	=	=	=	=	=	<b><u>\$-</u></b>
<b><u>E-5 Country Club Drive</u></b>	<u>\$1,400,715</u>	<u>\$375,111</u>	=	=	=	=	=	<b><u>\$-</u></b>
<b><u>E-6 Tangier Avenue</u></b>	<u>\$2,277,063</u>	<u>\$945,996</u>	=	=	=	=	=	<b><u>\$-</u></b>
<b><u>E-11 El Vedado Way</u></b>	=	=	=	=	<u>\$120,000</u>	=	=	<b><u>\$120,000</u></b>
<b><u>S-2 royal Poinciana Way (N of A-5)</u></b>	<u>\$50,000</u>	<u>\$16,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<b><u>\$250,000</u></b>
<b><u>Ejector Stations – 21 in Total</u></b>	=	=	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<u>\$50,000</u>	<b><u>\$250,000</u></b>
<b><u>I and I Implementation</u></b>	<u>\$4,505,508</u>	<u>\$2,258,198</u>	=	=	=	=	=	<b><u>\$-</u></b>
<b><u>Wastewater Pumpstation Condition Assessment</u></b>	<u>\$180,000</u>	<u>\$180,000</u>	=	=	=	=	=	<b><u>\$-</u></b>
<b><u>Resiliency Implementation</u></b>	=	=	=	<u>\$100,000</u>	<u>\$100,000</u>	<u>\$100,000</u>	<u>\$100,000</u>	<b><u>\$400,000</u></b>
<b><u>Wastewater Pump/R&amp;R</u></b>	=	=	<u>\$25,000</u>	<u>\$25,000</u>	<u>\$25,000</u>	<u>\$25,000</u>	<u>\$25,000</u>	<b><u>\$125,000</u></b>
<b><u>Sanitary Sewer Air Release Valve R&amp;R</u></b>	<u>\$84,162</u>	<u>\$84,162</u>	<u>\$10,000</u>	<u>\$10,000</u>	<u>\$10,000</u>	<u>\$10,000</u>	<u>\$10,000</u>	<b><u>\$50,000</u></b>

## **SOLID WASTE**

Solid waste pick-up and disposal service, including garbage, trash and vegetative yard trash, is provided by the Town to both residential and commercial areas.

## **GARBAGE**

The Town provides garbage pick-up Monday through Friday. Weekend pick-up is provided to commercial establishments, such as restaurants, upon arrangement with the Town.

Commercial garbage is collected in 20 cubic yard packers, while six cubic yard packers are used for collecting residential garbage. These wastes are then transferred to 65 cubic yard tractor trailer packers at the Pinewalk Transfer Station. This transfer station is leased to the Town on a year-to-year basis to the year 2050 by Flagler Systems, the developer of the Breaker's PUD. If the Pinewalk area is developed and no longer available, the Town will be faced with the decision of whether to purchase or lease a transfer station on the Island or mainland, or eliminate the need for a transfer station by increasing the packer fleet. However, it is probable that the Pinewalk Station will remain as is, well past the 10-year planning period.

Waste material is taken from the station in tractor trailers to the County's North County Regional Resource Recovery facility (or SWA directed facility), operated by the Palm Beach County Solid Waste Authority (SWA) under a County wide solid waste plan.

The SWA's North County Regional Resource Recovery Facility (NCRRRF), located on Jog Road, replaced the Dyer Boulevard Landfill in 1989 and handles both sludge, from the East Central Wastewater Treatment Facility, and garbage for separation, recycling and incineration. Aluminum and ferrous materials are separated at the plant. The remaining organic materials are used as fuel for an electricity producing turbine generator. The plant serves the entire County at a capacity of 3,000 tons per day, six days per week, for an annual capacity of 936,000 tons per year. In 2015, SWA opened a second unit, also at a capacity of 3,000 tons per day. Since the NCRRRF serves the entire County, predominant land uses served include residential, commercial, industrial, recreational, agricultural and public uses. The current inter local agreement between the Town and SWA for solid waste and recycling has been in effect since 2009.

The Palm Beach Solid Waste Authority, which operates the NCRRRF, does not allocate any particular share of its capacity to individual users or municipalities. However, in 2006, the Town's contribution of garbage to the Jog Road landfill comprised less than 1% of the total garbage generated countywide, and will certainly not exceed this proportion during the planning period.

The NCRRRF site also contains a 350-acre landfill which is estimated to have an expected life to the year 2043 due to the opening of REF#2 in 2015. The Solid Waste Authority performs an annual review and analysis of the remaining capacity of the landfill based on the University of Florida Bureau of Economic and Business Research population projections, current waste generation rates, and the volume of landfill capacity available.

According to the County's Plan, the current Level of Service (LOS) averaged 4.28 pounds per day/capita for garbage, 2.26 for trash, and .59 pounds of recyclables for a total of 7.13 pounds per day per capita in 2006. The 2006 plan is still in place.

Florida Power and Light Company has agreed to purchase electricity produced by the plant, and the remaining ash residue will be placed in an adjacent landfill. The Town, as part of the North County Service Area, transports its garbage directly to the resource recovery plant. The Town's collection and disposal equipment are compatible with the requirements of the plant.

The SWA has implemented a public education program designed to encourage the public to separate garbage prior to pick-up. The Town implemented a separation and recycle program in 1990. Curbside collection may not be possible due to the Town's tradition of backyard pick-up.

The Town of Palm Beach's total projected volumes of garbage for an average day, and the average day during the peak month using the 1990-1994 average figures of 2.09 and 2.89 pounds per day per capita, indicate the Town should have no trouble meeting capacity demands for the duration of the planning period, and remain within its adopted level of service of 2.55 pounds per day per capita.

Discussion with the Town Public Works Department and representatives of the NCRRRF indicates that at the projected peak seasonal population, the NCRRRF will have adequate capacity to provide service at the Town's adopted level of service throughout the planning period.

In September of each year the Town obtains a letter from the Palm Beach County Solid Waste Authority certifying that the North County Regional Resource Recovery Facility has the capacity to treat the amount of garbage projected to be generated in the Town during the peak season at the Town's adopted level of service.

Also during September, the Town Public Works Department certifies that the Town maintains adequate capacity to dispose of the amount of vegetative trash associated with the projected population. Unless annual determinations identify unexpected capacity problems, it is assumed there is adequate capacity to accommodate vegetative trash disposal associated with new development.

## **VEGETATIVE YARD TRASH**

Vegetative yard trash is collected by the Town using twelve 30-cubic yard scow body trash trucks and three cranes. Trash is hauled directly to the Skees Road or the Okeechobee Boulevard sites in West Palm Beach, and is decomposed naturally. The Town owns and operates both sites, and neither serve any other local government jurisdictions. Predominant types of land uses served by these facilities are the residential, commercial, recreational, public and private group uses located in the Town. Pick-up service is provided once per week on a regular schedule. The Town restricts collection to vegetative matter only. Size and placement of trash on right of ways are also regulated. The Skees Road site encompasses about 28 acres and is the main site for disposal of the Town's vegetative refuse. It operates under permit from the Florida Department of Environmental Protection (FDEP). The permit is renewed each December.

The Okeechobee Boulevard site encompasses about 28 acres, but only about nine (9) acres are occasionally used by the Town for the vegetative landfill purpose. This site also operates under an annual permit issued by the FDEP. Because of the rate of decomposition of the organic matter, both sites are expected to have a useful life of between 16 and 25 years. While the Town has not estimated a capacity for each remaining individual site, at the volumes of vegetative trash expected to be generated during the planning period, this would indicate that these two sites have a combined capacity of at least 475,000 cubic yards of vegetative trash. A preliminary study is underway to evaluate the options for volume reduction of existing vegetative debris cells at these landfills to determine if material can be segregated and disposed of off-site (top soil, mulch, etc.) to increase the long term capacity and life span of the landfills.

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Seasonal growth conditions, storm events, and development site clearing are the primary factors affecting vegetative trash production. Site clearing has only a minimal influence as very little undeveloped land remains. Seasonal growth patterns are fairly predictable, coinciding with the warm weather rainy season between May and October. Storm events can occur at any time. Tropical storms and hurricanes usually form between June and November, while northeasters are the product of winter cold fronts.

The current level of vegetative trash generation is 152,000 cubic yards per year, representing a LOS of 0.0416 cubic yards per person per day, or 0.021 cubic yards per peak season person per day. There is a clearly defined upward trend in vegetative trash generation in the Town. July typically represents the peak month during which the total volume generated approximates 1.52 times that of the average month.

There appears to be no relationship between population and the volume of vegetative trash generated in the Town. However, because of the clear 1988 to 1994 trend of increasing vegetative trash generation, a least squares methodology has been used to project future volumes for the planning period, indicating a LOS of .025 cubic yards per peak season person per day generation of vegetative trash at the end of the 10 year planning period. Town collection equipment and crews are capable of meeting the projected demands.

## **SPECIAL SOLID WASTE**

The Town provides pick-up of appliances, discarded furniture, large packing boxes, and similar household goods for a minimum charge.

Special collection services must be scheduled with the Town in advance. These wastes will continue to be taken to the Resource Recovery Plant/Landfill at Jog Road. This service is available Tuesdays and Thursdays all year long.

A truck, with a crew of two, is provided by the Town's Streets Division. The truck's maximum carrying capacity is three tons. During peak demand periods, the truck can carry up to six loads per day, resulting in a maximum capacity of 18 tons/day, 144 tons/month and 1,872 tons/year.

The total yearly capacity of the Special pick-up service has exceeded actual demand for the last five years, although peak monthly demands have historically exceeded capacity. Peak demand generally occurs in the winter.



A review of annual demand for collection of Special Solid Wastes reveals a steady increase since 1990. Population has increased modestly during the same time period, indicating that demand is not directly related to population levels. Although future demand cannot be accurately projected, the Town has the capacity to meet a maximum yearly demand of 1,872 tons, which has proven adequate since 1983. This capability provides the required level of service through the 10-year planning period.

## **RECYCLING**

The Town began its solid waste recycle program in July, 1990 with pickup at single family residences. In 1992, the program was expanded to multi family residential pickup, in 1993 to commercial locations, and in 1995 to office locations for paper pickup. Recycling collection is set up to provide pick-up on a weekly basis.

Residential collection encompasses five routes that cover the entire Town from the inlet to 2300 South Ocean Blvd. There are no residential homes south of 2300 South Ocean Boulevard.

Multi family collection is also set up to provide collection on a weekly basis, with additional pick-ups conducted on an as-needed basis. Multi family units are serviced on Wednesday, Thursday and Friday. Service days are determined by location of condos or apartments.

Commercial collection and additional multi family pick-ups are done on Tuesdays. The collection options available for residential, commercial and multi family units are the same. Material collected is co-mingled glass, aluminum and grades 1 and 2 plastic. Newsprint is also collected but separated.

Participation rate fluctuates because the majority of residents are seasonal, however, heaviest participation occurs between December and May. Process costs and labor factors dictate the method of collection.

The latest three-year average for recycling tonnage totaled 1,650 tons/year using 2014 figures. Public education efforts help to increase awareness of meeting future goals.

## **SOLID WASTE SUB-ELEMENT**

In the Town of Palm Beach, solid waste collection and disposal service includes garbage, trash and vegetative yard trash, recycling, and special solid waste that the Town provides to both residential and commercial establishments. The main objective is to maintain the highest level of service to meet the expectations of the residents and commercial businesses, doing so in the most efficient methods possible. The Town provides garbage pick-up Monday through Friday. For residential pickup, six (6)-cubic yard packers are used for garbage collection. In contrast, commercial garbage is collected in 20-cubic yard packers.

With regard to commercial pickup, weekend service is provided to such users, as hotels and restaurants, upon arrangement with the Town. These wastes are then transferred to 65-cubic yard

tractor trailer packers at the Pinewalk Transfer Station. This transfer station is leased to the Town on a year-to-year basis to the year 2050 by Flagler Systems, the developer of the Breaker's Planned Unit Development (PUD). Should the Pinewalk area be developed and no longer available, the Town will be faced with the decision of whether to purchase or lease a transfer station on the Island or mainland or eliminate the need for a transfer station by increasing the packer fleet. However, it is probable that the Pinewalk Station will remain as is, well past the 20-year planning period.

Waste material is taken from the station in tractor trailers to the Palm Beach County's North County Regional Resource Recovery facility (NCRRRF), through an agreement with the Palm Beach Solid Waste Authority (SWA) that is located on Jog Road. The NCRRRF replaced the Dyer Boulevard Landfill in 1989 and handles both sludge from ECRWRF, and garbage for separation, recycling and incineration. Aluminum and ferrous materials are separated at the plant. The remaining organic materials are used as fuel for an electricity-producing turbine generator. The plant serves the entire County at a capacity of 3,000 tons per day, six days per week, for an annual capacity of 936,000 tons per year.

Since opening the second unit in 2015, SWA now has a capacity of 3,000 tons per day. As the NCRRRF serves the entire County, predominant land uses served include residential, commercial, industrial, recreational, agricultural, and public uses. The current inter-local agreement between the Town and SWA for solid waste and recycling has been in effect since 2009. The expected life of the landfill is year 2043.

The Palm Beach SWA, which operates the NCRRRF, does not allocate any particular share of its capacity to individual users or municipalities. However, since 2006, the Town's contribution of garbage to the Jog Road landfill comprised, on average, less than 1% of the total garbage generated countywide, and will certainly not exceed this proportion during the planning period.

NCRRRF indicates that at the projected peak seasonal population, the NCRRRF will have adequate capacity to provide service at the Town's adopted level of service throughout the planning period. Additionally, every September of each year the Town obtains a letter from the Palm Beach County SWA certifying that the NCRRRF has the capacity to treat the amount of garbage projected to be generated in the Town during the peak season at the Town's adopted level of service.

Below is the adopted level-of-service standard or solid waste collection in the Town of Palm Beach.

#### **Wastewater Collection**

<b><u>Development Type</u></b>	<b><u>Avg. Daily Water Flow</u></b>
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Single Family	350 gpd/DU
Multifamily	250 gpd/DU
Commercial	0.20 gpd/SF
Industrial	0.15 gpd/Sf
Hotel	100 gpd/room

DU=dwelling unit	gpd=gallons per day
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SF=Square feet \_\_\_\_\_

**Pumping Station**

<b><u>Peaking Factor</u></b>	<b><u>Avg. Daily Flow (MGD)</u></b>
3.5	0.01 to 0.05
3.0	0.05 to 0.25
2.5	0.25 to 2.0
2.0	>2.0

Peaking factors for other facilities shall be determined using historical flow records.

**Special Solid Waste**

The Town additionally provides a scheduled pick-up for appliances, discarded furniture, large packing boxes, and similar household goods for a minimum charge. The level of service standard is to maintain resources to provide the desired level of service and capacity for the duration of the planning period.

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## SUMMARY

Below is a summary of the operation for solid waste collection and the Public Works mission to ensure compliance with providing this service in the Town of Palm Beach.

### Garbage

- Maintain daily scheduled collection and disposal operations of residential and commercial garbage.
- Maintain compliant operations of the transfer station as outlined in the Operating Permit.
- Increase collection fleet units to balance route workloads and maintain per industry standards.
- Maintain inter-local agreement with Solid Waste Authority as part of the Solid Waste Master Plan.
- Look for ways to reduce solid waste tonnage and tip fees through waste diversion methods.
- Evaluate commercial establishments generation rates to determine if collection and disposal methods could utilize the compactor method.

### Recycling

- Increase recycling tonnage through public education, increased manpower and collection equipment.
- Maintain inter-local agreement with the Solid Waste Authority for the processing of collected materials and profit sharing of commodities sold.

### Vegetative Yard Trash

- Maintain daily scheduled collection and disposal operations of residential and commercial yard waste.
- Maintain compliant landfill operations as outlined in the Operating Permit.
- Continue with the annual Capacity Analysis to monitor available capacity.
- Implement volume reduction process of new and existing vegetative debris cells at Skees Road Landfill off of the Florida Turnpike in the City of West Peach to segregate and dispose of off-site (topsoil, mulch, etc.) to increase the long-term capacity and life span of the landfill.

Over the next 20 years Public Works will continue to contract with the Solid Waste Authority to provide solid waste disposal. As displayed below, a five (5)-year Capital budget for solid waste disposal demonstrates continued upgrades that will maintain the level of service standard over the 20-year planning horizon.

<u>Table 5-4</u> <u>Pay-as-you-go Capital Improvement Plan FY2024</u> <u>Solid Waste/Vegetation Disposal</u>								
<u>Location</u>	<u>Accumul</u> <u>ated</u> <u>Project</u> <u>Budget</u> <u>through</u>	<u>FY202</u> <u>3</u> <u>Availa</u> <u>ble</u> <u>Balan</u>	<u>FY202</u> <u>4</u> <u>Estima</u> <u>ted</u>	<u>FY202</u> <u>5</u> <u>Estima</u> <u>ted</u>	<u>FY202</u> <u>6</u> <u>Estima</u> <u>ted</u>	<u>FY202</u> <u>7</u> <u>Estima</u> <u>ted</u>	<u>FY202</u> <u>8</u> <u>Estima</u> <u>ted</u>	<u>FY20</u> <u>24-</u> <u>2028</u> <u>Total</u>

	<u>FY23</u>	<u>ce as</u> <u>of</u> <u>6/16/2</u> <u>3</u>						
<u>Solid</u> <u>Waste/Veget</u> <u>ation</u> <u>Disposal</u>	<u>\$30,000</u>	<u>\$30,00</u> <u>0</u>	<u>\$-</u>	<u>\$200,0</u> <u>00</u>	<u>\$-</u>	<u>\$-</u>	<u>\$-</u>	<u>\$200,</u> <u>000</u>
<u>Skees /</u> <u>Okeechobee</u> <u>Landfill</u>	<u>\$30,000</u>	<u>\$30,00</u> <u>0</u>	=	<u>\$200,0</u> <u>00</u>	=	=	=	<u>\$200,</u> <u>000</u>

## **UNDERGROUND UTILITIES**

The conversion of the overhead utilities to underground locations will be one of the most ambitious infrastructure projects ever undertaken by the Town of Palm Beach. The undergrounding will preserve the historic character of the Town and enhance the aesthetics of the landscape and scenic vistas. The conversion will significantly improve the level of service and reliability of the electric, telephone, and cable communications to the Town.

### **Impacts of the Issue**

The impacts of the Town-wide underground utilities conversion project include installing underground utilities for all areas of the Town that presently has overhead utilities. There are some areas within the Town that have already converted their utilities to underground. Those areas include: Everglades Island; Via Fontana; Lake Towers; 300 block of Dunbar Road (summer of 2016); and Nightingale and LaPuerta (started summer of 2016). The conversion will include locating most of the utilities in the Town's road right of ways wherever possible. The utilities will be located in alley ways in those neighborhoods which have rear access alleys wide enough for truck access.

The construction is anticipated to take 6 to 10 years. The most disruptive construction will take place during the summer months with the actual utility connections to take place during the winter months. The last step of removing poles and equipment primarily from rear yards will take place the following spring. The undergrounding conversion construction will be coordinated with other Capital Improvement Projects as identified in the Capital Improvements Section of the Comprehensive Plan.

### **Resulting Problems or Opportunities**

Problems associated with the underground utilities project include:

- Easements will be required for transformers and other above ground equipment. There is a potential that eminent domain will be required for some easements.
- Disruption to the community, including noise and traffic congestion is anticipated.



- ~~Project cost may exceed the approved referendum amount.~~
- ~~Removal of equipment from poles has been a challenge in similar communities.~~

Opportunities include:

- ~~Increased reliability for all utilities.~~
- ~~Improved aesthetics for the entire community due to removal of wood and concrete poles.~~
- ~~Potential for improved broadband and wireless services.~~

### **Needed Actions to Address the Issue**

- ~~Complete Master Plan which includes construction sequencing and project estimate of cost.~~  
*Timeframe: Master Plan for first assessment phase of the Town will be completed in 2017.*

### **Underground Utilities (Powered Communications)**

In 2006, the Town of Palm Beach commissioned a study titled “Conversion of Aerial to Underground Utilities Analysis” by “R.W. Beck, Inc.” to perform a high-level review to analyze the cost of the conversion. At that time, the estimated cost for the undergrounding effort was roughly \$60.3 million.

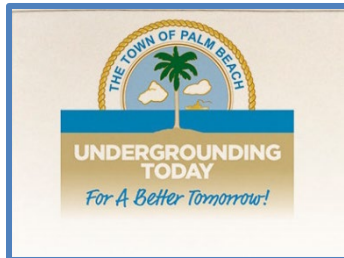
The study did not trigger a Town-wide conversion process. In the following few years, the decision was made to perform undergrounding projects on an “as requested” basis by each neighborhood. While the pace of this effort varied from year to year, it had yielded a handful of completed projects. From that point, if two thirds of the residents within that boundary voted to go forward, the Town would proceed with the planning/design and construction process. The cost of the design and construction would then be assessed to all the residents of that particular street. While these projects were successful, they were on such a small scale that little effect was made on the overall appearance and utility reliability of the Town as a whole.

Increasing motivation by the residents of the Town expanded the undergrounding program to cover larger areas. At the October 14, 2014, Town Council meeting FPL presented the need to improve or “harden” large portions of the Town’s existing overhead utilities. That hardening effort, triggered by FPL’s recognition of their facilities’ conditions, would include replacement of many of the existing wood power poles with larger and taller concrete power poles.



Workers Installing Underground Utilities

Within the context of previous and ongoing conversations between the residents, Council members, staff, and consultant(s) regarding a more “regionalized rather than local” approach to undergrounding of FPL power lines, the hardening proposal by FPL became an added impetus to view the large-scale undergrounding of utilities located on these poles an alternative whose time had perhaps come.



After in depth deliberations, Town Council unanimously decided to pursue Town-wide undergrounding of all FPL, ATT, and Comcast utilities. A ballot question regarding the financing of the Town-wide project was approved in March 2016. Construction for undergrounding of overhead utilities was initiated in 2017.

The impacts of the Town-wide underground utilities conversion project include installing underground utilities for all areas of the Town that have overhead utilities. The conversion includes locating most of the utilities in the Town's street rights-of-way, wherever possible.

The Undergrounding Project Team assembled to complete the project work is led by the consulting firm Kimley-Horn and Associates, under the direction of the Town Engineer, Public Works Department, and the Town Manager's Office, with representatives of Florida Power & Light, Comcast and AT&T. As displayed in Exhibit 5-4, there are 15 phases which include north and south phases for Phases 1 through 7, with Phase 8 being the last. At present, the undergrounding project is nearing completion. As displayed in the illustration below, the status of the phases are provided below.

- ✓ Phases 1 north and south are complete.
- ✓ Phases 2 north and south are complete.
- ✓ Phase 3 north is complete.
- ✓ Phase 4 north is complete.
- ✓ Phase 3 south is under construction to be completed in 2023.
- ✓ Phase 4 south is under construction to be completed in 2024.
- ✓ Phases 5 north and south are under construction to be completed in 2023.
- ✓ Phases 6 north and south are under construction to be completed in 2025.
- ✓ Phases 7 north and south will begin construction in 2023 and be completed in 2025.
- ✓ Phase 8 will begin construction in 2024 and be completed in 2027.

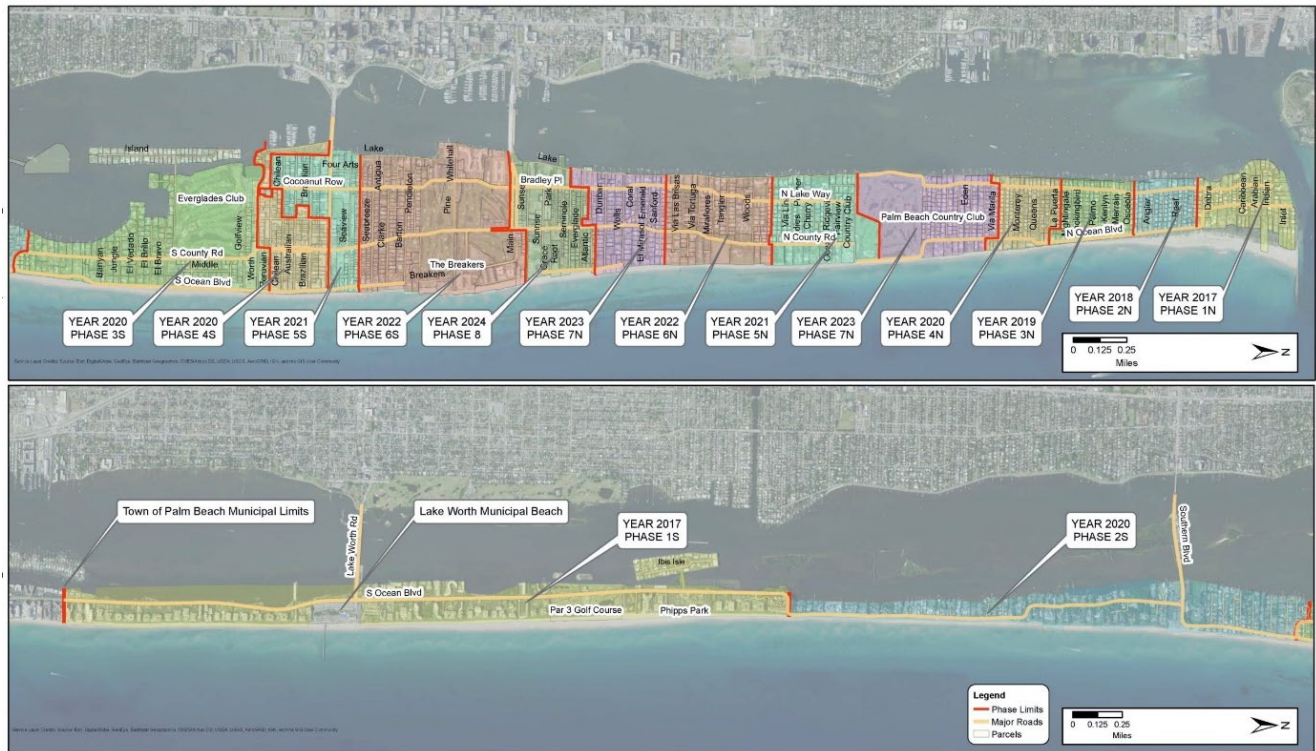


Exhibit 5-5 Sequence of Phases for Undergrounding

## SUMMARY

The conversion of the overhead utilities to underground locations is one of the most ambitious infrastructure projects ever undertaken by the Town of Palm Beach. The current estimate for this undertaking is estimated at over \$100 million. The undergrounding will preserve the historic character of the Town and enhance the aesthetics of the landscape and scenic vistas. The conversion will significantly improve the level of service and reliability of the power, telephone, and internet communications to the Town. Once complete, the utility companies will be responsible for the maintenance and response to customers.