COMPREHENSIVE PLAN
UTILITIES ELEMENT

POTABLE WATER SUBELEMENT
GOALS, OBJECTIVES AND POLICIES

GOAL 1: PROVIDE CITY RESIDENTS AND OTHER LOCAL GOVERNMENTS THAT RECEIVE POTABLE WATER WITH RELIABLE SERVICE.

Objective 1.1: New development within the City's Potable Water Service Area shall be approved only when adequate water supply, treatment and distribution capacity is available to provide, or provisions are included (as identified in Capital Improvement Element Policies), for the needed potable water or when the developer obligates funds to provide that development's share of capital improvements to any of these systems, as well as the distribution systems within the development.

Policy 1.1.1: The City shall coordinate closely with local governments that receive potable water from the City to ensure they provide the City with an annual report including 5-year, 10-year and 20-year projections of population, land use and water usage information.

Policy 1.1.2: Applicants seeking development approvals shall obtain a written water availability statement from the City indicating an adequate water supply consistent with the established level of service (LOS) standards available to serve the development. At a minimum, the water availability statement shall indicate an adequate water supply will be available and all required delivery infrastructure shall be fully constructed and operable prior to the issuance of the Certificate of Occupancy.

Policy 1.1.3: The level of service standard for determining the demand and future capacity needs to be generated by a development shall be based on 272 gallons per day per capita factor as identified in Capital Improvement Element of the City's Comprehensive Plan.

Objective 1.2: The City shall continue to annually evaluate programs and construction projects to identify necessary repairs and add to the potable water delivery system to correct existing facilities and distribution deficiencies.

Policy 1.2.1: The City shall continue to implement an on-going program of inspection and replacement of water lines which are determined to be in a deteriorated condition. Priorities for this work shall be established within the planned capital projects. Additionally, the Utilities Department shall continue to identify and implement appropriate measures to safeguard the quality of the City's potable water.

Policy 1.2.2: The City shall continue with programs such as water quality monitoring nodes, automatic flushing units, free chlorination, reviewing the system to provide looped service among other programs to continuously monitor and improve water quality in the distribution system.

Objective 1.3: Pursuant to the South Florida Water Management District 20-year Consumptive Use Permit (2013), per capita use of potable water within the West Palm Beach Service Area shall not exceed 272 gallons per capita per day.

Policy 1.3.1: The City shall continue to educate water users of the importance of water conservation and coordinate with the South Florida Water Management District in the implementation of water conservation programs such as but not limited to:

a) Encourage the use of water saving plumbing devices in new and existing structures.

b) Reduce water line loss through leak detection, valve exercises and regular repair and replacement.

c) Pursue the use of wastewater reuse for landscaping within rights-of-way, golf courses and parks.

d) Promote native and Florida friendly plants and efficient irrigation when considering all proposals for development and/or redevelopment.

Policy 1.3.2: The City shall continue to implement a water conservation program aimed at the consumer and monitor water usage to study the results of the program.

Policy 1.3.3: The City shall continue to employ structured water rates as an incentive that supports this objective of potable water conservation.

Objective 1.4: In order to discourage urban sprawl, the City shall concentrate new development around existing or planned infrastructure, including potable water facilities.

Policy 1.4.1: The City shall discourage urban sprawl by adhering to the concurrency requirements and level of service standards outlined within this comprehensive plan, including those for potable water facilities.

Policy 1.4.2: The City shall investigate, and, when technically and economically feasible, construct additional infrastructure and/or facilities for potable water delivery as it deems necessary to accommodate projected needs.

Objective 1.5: The City has planned for future water supplies to assure future water demands are met through the implementation and updates of the 10 Year Water Supply Facility Work Plan (incorporated into this Element as the 10 Year Water Supply Facility Work Plan SubElement) and incorporated alternative water supply projects identified in the South Florida Water Management District's regional water supply plan pursuant to s. 373.036(2)(a).

Policy 1.5.1: The City shall continue to coordinate with the South Florida Water Management District regarding water supply efforts and shall incorporate into the 10 Year Water Supply Facility Work Plan, as appropriate, any updates to the South Florida Water Management District Lower East Coast Regional Water Supply Plan.

Policy 1.5.2: The City shall continue to coordinate population projections and future annexation areas with local governments within the City's potable water service area through the following actions:

- An ongoing review, through the Intergovernmental Plan Amendment Review Committee (IPARC) notification system, of all future land use amendments to properties located within the City's potable water service area.

- Use of the Palm Beach County Planning, Zoning and Building Division's Population Allocation Model for future population projections by jurisdiction; and

- Once-a-year notification, requiring local governments within the City's potable water service area to provide the City with (i) major development plans affecting the service/future annexation area; and (ii) population projections, if different from those provided by Palm Beach County; and.

Policy 1.5.3: The City shall coordinate its level of service (LOS) standards for potable water with local governments within the City's service area, through the following actions:

- The City shall contact local governments within the City's potable water service area to provide them with information on any changes regarding current LOS standards or any changes of future LOS standards to be included in the Comprehensive Plan and the renewal of local service agreements; and

- The City shall provide local governments within the City's potable water service area with its potable water conservation measures, including reuse.

Policy 1.5.4: The City shall provide local governments within the City's potable water service area with a copy of its annual update of the Capital Improvements Schedule (CIS) for all capacity-related water supply facility projects to be included in the respective updates of their CIS.

SANITARY SEWER SUBELEMENT
GOALS, OBJECTIVES AND POLICIES

GOAL 1: THE CITY SHALL CONTINUE TO MEET ITS SANITARY SEWER NEEDS AND, AS EAST CENTRAL REGIONAL WATER RECLAMATION FACITY OPERATOR, SHALL COORDINATE WITH LOCAL GOVERNMENTS THAT IT SERVES IN ORDER TO MEET THEIR FUTURE PLANNING NEEDS.

Objective 1.1: The City shall continually ensure that future demands for sanitary sewer can be met for at least a 20-year planning horizon.

Policy 1.1.1: The City shall coordinate closely with local governments that receive treatment service to ensure they provide the City with 5-year, 10-year and 20-year projections of future wastewater needs and flows based on population projections, development activity, and wastewater generation estimates.

Policy 1.1.2: The City shall treat wastewater from the service area to meet current and future State and Federal standards.

Policy 1.1.3: The City shall coordinate with the communities holding large user agreements to ensure their comprehensive plans and development permit procedures are compatible with the City of West Palm Beach policies with regard to waste water generation, collection, transport, treatment and disposal.

Objective 1.2: In order to discourage urban sprawl, the City shall maximize the use of existing facilities by concentrating new development activity around existing or planned infrastructure, including sanitary sewer facilities.

Policy 1.2.1: The City shall discourage urban sprawl by adhering to the concurrency requirements and level of service standards for sanitary sewer.

Policy 1.2.2: The City shall construct additional infrastructure and/or facilities for sanitary sewer delivery as it deems necessary to accommodate projected needs.

Objective 1.3: The City shall ensure that development permits are issued only if adequate capacity is available concurrent with the impacts of development.

Policy 1.3.1: The City shall continue to prepare annual summaries of built and approved development within its service area.

Policy 1.3.2: The following level of service standards shall serve as the basis for determining current or future capacity requirements:

WASTE WATER COLLECTION

DEVELOPMENT TYPE	AVG. DAILY WASTE WATER FLOW	
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
SF = square feet

PUMP STATION PEAKING FACTORS

PEAKING FACTOR	AVG DAILY FLOW (MGD)
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.

Policy 1.3.3: All improvements shall be consistent with federal, state and local standards, where applicable.

Policy 1.3.4: Permits for future development shall not be issued if flow from the development will cause overloaded conditions within the sewage treatment facilities until improvements can be completed to bring treatment/transmission systems up to capacity and up to adopted standards.

Policy 1.3.5: Sanitary sewer lines shall be installed, either by the City, or through City-approved agreements to meet sanitary sewer level of service requirements.

Policy 1.3.6: The City shall prepare a capacity analysis for the wastewater treatment plant in accordance with State and Federal regulations. The analysis shall be updated annually when a capacity increase is necessary within the next 10 years. Design for additional capacity in the City service area shall begin before a facility is 3 years away from the need for on-line capacity expansion determined by the capacity analysis.

Objective 2.1: The City shall develop a list of capital improvement projects, to be updated annually, identifying needs in 5-year planning increments.

Policy 2.1.1: The capital improvement projects list shall be comprehensive and include projects from all departments of the City government.

Policy 2.1.2: The City shall evaluate and rank the list of capital improvement projects in order to logically distribute funding for the various projects.

Policy 2.1.3: Projects which correct existing deficiencies to an adopted level of service, shall be ranked ahead of those required for projected shortfalls.

Objective 2.2: The City shall ensure the maximum use of existing facilities and discourage urban sprawl while expanding the City tax base sufficiently to provide adequate services to all within its service area.

Policy 2.2.1: New capital projects shall be constructed preferably in a compact loop design around the existing collections and treatment facilities in order to maximize the use of new facilities and minimize the cost to the City.

SOLID WASTE SUBELEMENT
GOALS, OBJECTIVES AND POLICIES

GOAL 1: THE CITY SHALL CONTINUE TO PROVIDE COLLECTION AND TRANSPORT OF GARBAGE, VEGETATIVE WASTE, BULK TRASH AND RECYCLABLES TO MEET THE CITY'S EXISTING AND 10-YEAR PROJECTED DEMANDS.

Objective 1.1: The City shall continue to implement procedures to discourage urban sprawl and ensure that at the time a development permit is issued, adequate solid waste disposal capacity is available or will be available when needed to serve the development.

Policy 1.1.1: The following collection and disposal level-of-service standards are hereby adopted for determining the availability of facility capacity and the demand generated by development:

Collection – The City shall adhere to the Franchise Agreement of the Solid Waste Authority by providing a minimum level of service for residential garbage collection of twice per week, bulk trash collection of once per week, vegetation collection of once per week, and recyclable collection of once per week.

Disposal – The City shall ensure delivery of solid waste material collected to the Solid Waste Authority (SWA) North County Landfill and shall continue to seek annual certification from the SWA that it has sufficient disposal capacity to accommodate the solid waste generated for both the five (5) year and ten (10) year planning periods. The

SWA certification letter shall constitute compliance with the City's Solid Waste LOS standard.

Objective 1.2: The City shall continue to coordinate with the Palm Beach County Solid Waste Authority regarding the management of existing landfill sites, the selection of future landfill sites, and in developing alternative methods of disposing of solid and hazardous wastes.

Policy 1.2.1: The City shall continue operating its recycling program on a Citywide basis in order to increase the amount of recyclable material, to reduce solid waste going to landfills by 30 percent between 2008-2018, and to conserve valuable natural resources through reuse of materials.

Policy 1.2.2: The City of West Palm Beach shall coordinate with Palm Beach County to ensure that the City is assisting the County with a countywide solid waste collection system to discourage littering and the illegal dumping of solid waste.

Policy 1.2.3: The City shall ensure proper notification to its residents and businesses of its collection schedule before and after a major storm event in order to provide appropriate and safe disposal practices.

Policy 1.2.4: The City shall control urban sprawl by adhering to the concurrency requirements and level of service standards outlined within this comprehensive plan, including those for solid waste facilities.

Policy 1.2.5: The City shall provide additional infrastructure and/or facilities for solid waste collection and transport as it deems necessary to accommodate projected needs.

Objective 1.3: The City shall continue to coordinate with local businesses contracted to haul Fats, Oils, and Grease (FOG) from restaurants and food service establishments and septage according to State Regulations for disposal at the East Central Regional Water Reclamation Facility (ECRWRF).

Policy 1.3.1: FOG and Septage transporters, when required, shall obtain an annual written permit from the Florida Department of Health.

Policy 1.3.2: All septage transporters shall comply at all times with Florida Administrative Code (F.A.C) 64E-6, City of West Palm Beach City Ordinance 4414-12, City of West Palm Beach Sewer Use Ordinance 90-126 and 90-128, and ECRWRF Septage Receiving Policy accordingly.

Policy 1.3.3: All FOG transporters shall comply at all times with Florida Administrative Code (F.A.C) 64E-6, City of West Palm Beach City Ordinance 4414-12, and ECRWRF Septage Receiving Policy accordingly.

Policy 1.3.4: The City shall continue to maintain an Industrial Pretreatment Program (IPP) according to EPA local limits, F.A.C. 62-625, City of WPB Resolution No. 52-12, and City of West Palm Beach Industrial Pretreatment Program Enforcement Response Plan to ensure compliance by local businesses that produce waste.

STORMWATER MANAGEMENT SUBELEMENT
GOALS, OBJECTIVES AND POLICIES

GOAL 1: THE CITY SHALL PROVIDE ADEQUATE STORMWATER MANAGEMENT FOR PROTECTION AGAINST FLOODING AND TO PREVENT DEGRADATION OF THE QUALITY OF RECEIVING WATERS.

Objective 1.1: The City shall continue to implement adopted stormwater management regulations which will help to discourage urban sprawl and provide guidelines to prevent the degradation of the water quality of receiving waters. The City shall ensure that future development meets level of service standards and utilizes stormwater management systems compatible with the City's current Stormwater Management Plan.

Policy 1.1.1: The City shall continue to fully implement the stormwater requirements set forth in the Zoning and Land Development Regulations and as specified by the South Florida Water Management District. The City shall continue to implement these regulations in order to meet the following:

a. Maintain and expand the storm management system as needed to maintain level of service design standards of a 3-year, 1-hour storm for the storm-sewer system and a 25-year, 24-hour storm for the canal system.

b. Require erosion and sedimentation controls during construction to avoid contamination of receiving waters.

c. Utilize retention/detention facilities where practical to provide water-quality treatment of stormwater runoff.

d. Install sedimentation basins and/or baffle systems to prevent pollutants from entering receiving water bodies.

e. Maintain the land around Clear Lake and Lake Mangonia in order to prevent stormwater runoff from entering this potable water source.

f. Require future development to limit post-development runoff rates to pre-development discharge rates.

g. Provide routine maintenance to the stormwater management facilities to ensure they are functioning properly and to prolong their service life.

h. Continue the City's vigorous street sweeping program that includes the daily sweeping of downtown streets and twice weekly sweeping of all streets outside of the downtown.

GOAL 2: THE CITY SHALL ENCOURAGE COMPACT GROWTH IN THE WESTERN AREAS OF THE CITY AND PROVIDE ADEQUATE STORMWATER MANAGEMENT SYSTEMS WITHOUT DEPLETING THE SOURCE OF IRRIGATION AND RECHARGE WATER.

Objective 2.1: The City shall continue to coordinate with the South Florida Water Management District and the local improvement districts to design and implement future stormwater management systems, to conserve wetlands acreage, to foster protection of natural wildlife habitats, to protect natural resources, and to protect water quality.

Policy 2.1.1: The City shall maintain the water levels in the City's discharge canals at beneficial elevations during dry periods to conserve valuable water resources.

Objective 3.1: The City shall implement recommendations from the 2016 Stormwater Master Plan, which addresses correcting existing deficiencies and the increasing of capacity to meet future needs.

Policy 3.1.1: The City shall address deficiencies and future demand through the Implementation of the 2016 Stormwater Master Plan recommendations and by the implementation of the 1993 Stormwater Utility Ordinance and the Utility Fee to fund designated projects on an ongoing basis.

NATURAL GROUNDWATER AQUIFER RECHARGE SUBELEMENT GOALS, OBJECTIVES AND POLICIES

GOAL 1: PRESERVATION AND ENHANCEMENT OF THE AQUIFER IN THE CITY'S WATER CATCHMENT AREA.

Objective 1.1: The City shall maintain Comprehensive Plan policies and land development regulations that restrict the encroachment of incompatible land uses upon the water catchment area.

Policy 1.1.1: Written objections will be submitted to the City regarding restrictions upon encroachment of potentially-detrimental land uses near the water catchment area. The Water Advisory Committee will analyze and report concerns directly to the City Commission.

Policy 1.1.2: Continue monitoring water quality in an effort to identify possible deterioration in water supply quality. Cooperate and participate with other agencies to develop water quality models to more accurately assess the impacts of proposed land use activities.

Objective 1.2: The City shall actively pursue acquisition of lands adjacent to the Water Catchment Area and the voluntary dedication of preserves areas in adjacent developed land to maximize natural buffer areas around the perimeter of the Water Catchment Area.

Policy 1.2.1: The City shall protect this vital groundwater recharge area and closely regulate development surrounding the Water Catchment Area by allowing only those land uses, site designs, and on-site stormwater drainage systems that are of a benign or beneficial influence to the recharge area.

Objective 1.3: The City shall continue to implement a program of public education and information to promote understanding of the Water Catchment Area and the importance of environmental preservation to the quality of the City's water supply.

Policy 1.3.1: The City shall continue to develop and utilize the Nature Center facilities and relationships with environmental groups and educational centers to provide an educational program that allows acceptable, passive recreational use of the Water Catchment Area to promote an appreciation of the fragile and unique environment that is the source of the City's water.

Objective 1.4: The City shall continue to implement existing and identify additional programs to augment and enhance groundwater recharge.

Policy 1.4.1: The City shall continue to divert excess rainwater from the catchment area to Clear Lake and Lake Mangonia to enhance groundwater recharge.

Policy 1.4.2: The City shall continue to operate the Renaissance Stormwater Treatment System to capture and store water in South Clear Lake to enhance groundwater recharge.

Policy 1.4.3: The City shall continue to operate the C-17 Tidal Capture System to capture and store water in Clear Lake to enhance groundwater recharge.

20 YEAR WATER SUPPLY FACILITY WORK PLAN SUBELEMENT

1.0 INTRODUCTION

1.1 Purpose and Objectives

The purpose of the City of West Palm Beach Water Supply Facility Work Plan (hereinafter the Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within the local government's jurisdiction.

The work plan reflects the assessments completed as part of the City's 2020 Capacity Analysis Report update that is submitted to the Florida Department of Health in Palm Beach County. The development and submittal requirements for both are based on the following:

- Chapter 403, Part VI, F.S., requiring public water systems to provide for the timely planning, design, permitting, and construction of necessary public water system source, treatment, or storage facilities. Under Chapter 62-555.348, F.A.C., the City is required to prepare and submit an updated Capacity Analysis Report every five years. The 2020 Capacity Analysis Report Update was submitted to the Florida Department of Health in January 2020.

- Chapter 163[1], Part II, F.S., requires local governments to prepare and adopt Work Plans into their comprehensive plans 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 (LECWSP) Update was approved by the South Florida Water Management District in November 2018.

Residents of the City, Town of Palm Beach and Town of South Palm Beach, buy their water directly from the City of West Palm Beach Public Utilities Department (PUD). Under this arrangement, the City's PUD ensures that sufficient capacity is available for existing and future customers and that supporting infrastructure, such as the water lines, are adequately maintained.

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 and conservation and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period.

The City's Work Plan is divided into the following four sections:

Section 1 – Introduction

[1] Section 163.3177 (1)e), F.S., When a federal, state, or regional agency has implemented a regulatory program, a local government is not required to duplicate or exceed that regulatory program in its local comprehensive plan.

Section 2 – Background Information
Section 3 – Data and Analysis
Section 4 – Work Plan Projects/Capital Improvement Element/Schedule

1.2 Statutory History

The Florida Legislature has enacted bills in the 2002, 2004, 2005, 2011, 2012, 2015 and 2016 sessions to address the state's water supply needs. These bills, especially Senate Bills 360 and 444 (2005 legislative session), significantly changed Chapter 163 and 373 Florida Statutes (F.S.) by 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.

1.3 Statutory Requirements

The following highlights the statutory requirements:

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. Data and analysis demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany all proposed Future Land Use Map amendments submitted to the Planning Division for review. The submitted package must also include an amendment to the Capital Improvements Element, if necessary, to demonstrate that adequate public facilities will be available to serve the proposed Future Land Use Map modification.

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 and consult with the applicable water supplier prior to approving building permit, to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy. This "water supply concurrency" is now in effect, and local governments should be complying with the requirement for all new development proposals. In addition, local governments should update their comprehensive plans and land development regulations as soon as possible to address these statutory requirements. The latest point at which the comprehensive plan must be revised to reflect the concurrency requirements is at the time the local government adopts plan amendments to implement the recommendations of the Evaluation and Appraisal Report (EAR).

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

Element (the "Infrastructure Element"), within 18 months after the water management district approves an updated regional water supply plan, to:

a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the updated regional water supply plan, or the alternative project proposed by the local government under s. 373.709(8)(b) and 373.709(2) (a) F.S.;

b. Identify the traditional and alternative water supply projects, bulk sales agreements, and the conservation and reuse programs necessary to meet current and future water use demands within the local government's jurisdiction; and

c. Include a water supply facility work plan for at least a 20-year planning period for constructing the public, private, and regional water supply facility identified in the Element as necessary to serve existing and new development. Amendments to incorporate the water supply facility work plan into the comprehensive plan are exempt from the twice-a-year amendment limitation.

5. Revise the Schedule of Capital Improvements to include any water supply, reuse, and conservation projects and programs to be implemented during the planning period.

6. To the extent necessary to maintain internal consistency after making changes described in Paragraph 1 through 5 above, revise the Conservation Element to assess projected water needs and sources for at least a 20-year planning period, considering the appropriate regional water supply plan, the applicable District Water Management Plan, as well as applicable consumptive use permit(s).

   If the established planning period of a comprehensive plan is greater than ten years, the plan must address the water supply sources necessary to meet and achieve the existing and projected water use demand for established planning period, considering the appropriate regional water supply plan.

7. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 5 above, 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 EAR, the extent to which the local government has implemented the 10-year water supply facility work plan, including the development of alternative water supplies, and determine whether the identified alternative water supply projects, traditional water supply projects, bulk sales agreements, and conservation and reuse programs are meeting local water use demands.

2.0 BACKGROUND INFORMATION

2.1 Overview of the City of West Palm Beach

The City, established in 1894, is the largest municipality within Palm Beach County and serves as the County seat. The City boundaries encompass approximately fifty-eight (58) square miles and are bounded by the Intracoastal Waterway to the east, the South Florida Water Management District C-51 canal to the south, the City's 19.3 square mile Water Catchment Area (WCA) to the west, and the Beeline Highway and 59th Street to the north. Located adjacent to the City are several municipalities including, the Town of Palm Beach, City of Lake Worth, Town of Mangonia Park, and City of Riviera Beach.

Although the City is substantially built-out, approximately 98%, the City population has grown from 106,893 in 2015 to 117,415 in 2020, an increase of less than ten percent. This population growth is reflective of the fact that the City continues to experience infill and redevelopment within its limits. For future planning purposes, 2020 has been set as the base year with 5-year planning increments through 2045.

In 2007, an evaluation of existing gross acreage by land uses revealed that 28.2% of the total gross acreage in the City is dedicated to residential use. The remaining gross acreages are allocated to non-residential such as recreation/open space (50%); commercial (5.4%); industrial (2.9%); and undeveloped (2%). The City does not anticipate substantial increases in land area in the near future, however population projections indicate ~~a~~ continued growth for the City of nearly 21% between 2020 and 2045.

2.2 Relevant Regional Issues

As the state agency responsible for water supply in the Lower East Coast planning area, the South Florida Water Management District (SFWMD) plays a pivotal role in resource protection, through criteria used for Consumptive Use Permitting. As pressure increased on the Everglades ecosystem resource, the Governing Board initiated rulemaking to limit increased allocations dependent on the Everglades system. As a result, the Regional Water Availability Rule was adopted by the Governing Board on February 15, 2007 as part of the SFWMD's Consumptive Use Permit Program. This reduced reliance on the regional system for future water supply needs, mandates the development of alternative water supplies, and increasing conservation and reuse.

1. The existing alternative water supplies developed by the City include:

    a. Construction of an Aquifer Storage and Recovery (ASR) well system at the water treatment plant to capture and store excess water from Clear Lake during the wet season and recover the stored water during the dry season.

    b. Construction of the C-17 Pump Station to capture excess stormwater within the C-17 Canal prior to discharge to tide.

c. Construction of the Renaissance Project that captures and treats stormwater drainage from the Stub Canal to reduce discharges to tide.

d. Construction of the Boyd Street gate system that allows the capture of excess water from the C-51 Canal prior to discharge to tide.

2. Future water supplies and treatment strategies to be evaluated include:

    a. Alternative Water Supply: The City will investigate and develop strategies for use of alternative water supplies including:

        i. Brackish Water Supply: The City seek to secure an allocation of brackish water from the Floridan Aquifer from the South Florida Water Management District (SFWMD) to meet future demands.

        ii. Brackish Water Production Wells: The City will develop the necessary Floridan Aquifer production wells and associated infrastructure to transport brackish water for treatment to meet future demands.

    b. Treatment Strategies: The City will investigate and implement strategies to improve the water treatment plant efficiencies including:

        i. Surface Water Treatment: The City will investigate and develop treatment strategies that improve the efficiencies for raw water treatment, chemical use, and waste production.

        ii. Brackish Water Treatment: The City will investigate and develop treatment strategies to process brackish water to meet future demands.

    c. Zero-Liquid Discharge -

3. The City's, East Central Regional Water Reclamation Facility and Palm Beach County have an interlocal agreement for the operation and maintenance of the reclaimed water facility located on the ECRWRF property. Through interlocal agreement Palm Beach County provides reclaimed water to the Fit Team Ball Park of the Palm Beaches for the sole purpose of providing irrigation for the property which is located in the City of West Palm Beach service area.

The intent of the City's Water Supply Facilities Work Plan is to meet the statutory requirements mentioned in subsection 1.2 of this plan and to coordinate the City's water supply initiatives with

the Lower East Coast Water Supply Plan (LECWSP) prepared by the South Florida Water Management District.

This Water Supply Facilities Work Plan details the facilities and proposed alternative water supply (AWS) projects that are being evaluated, planned or completed recently and included in the LECWSP in order to assist the City in meeting the service area water demands through 2045. These projects are expected to be completed in increments consistent with the projected growth set forth in the Plan. The AWS projects will be included within the City's Capital Improvement Element, as needed.

The City's watershed, Grassy Waters Preserve, provides flows to Loxahatchee River (one of the two Florida rivers designated as a National Wild and Scenic river) to meet its Minimum Flows and Minimum Water Levels through G161 structure.

3.0 DATA AND ANALYSIS

3.1 Service Area - Population Information

The City of West Palm Beach Potable Water Supply Service Area (Utility Service Area) includes the City of West Palm Beach, Town of Palm Beach and Town of South Palm Beach. The existing and future population figures for the Utility Service Area were developed based on the information obtained from the Palm Beach County PZB Divisions Population Allocation Model.

Between 2015 (116,897) and 2020 (128,140) the City experienced a population growth rate of nearly nine percent in the City's service area. The City does not anticipate substantial increases in land area in the near future, however population projections indicate a continued population growth for the City's service area of nearly 22 percent for the next 20 years to a projected population of 163,918 in the year 2045.

The City has two bulk service agreements that account for a demand of up to 0.50 mgd and include the Solid Waste Authority and Bayhill Estates. The City anticipates that the agreement with the Solid Waste Authority will remain in place during the planning horizon, with the agreement with Bayhill Estates, currently being served by Palm Beach County, expiring in 2030.

3.2 Service Area Map

The City Utility Service Area includes the City of West Palm Beach, Town of Palm Beach and Town of South Palm Beach. A copy of the City's Potable Water Supply Service Area map is provided in the Comprehensive Plan Map Series.

A trailer park on Community Drive located in Palm Beach County, but within the City's service area gets water from wells, and currently there is no plan to provide water to this area.

3.3 Population and Potable Water Supply Demand Projections

This section provides historical population data from 2018 to 2022 and projected population projections from 2025 to 2045 for the City Utility Service Area.

The total population estimates for the City, Town of Palm Beach and Town of South Palm Beach were based on the information obtained from the sources noted in Section 3.1 of the Work Plan.

3.3.1 Historical Population Projections for the Service Area

Historical populations for the City Utility Service Area are as shown below in Table 1. These figures are based on the U.S. Census data with the exception of the 2019 values which corresponds to the BEBR data.

Table 1 – Historical Population for City of West Palm Beach Water Utility Service Area

Year	2018	2019	2020	2021	2022
City of West Palm Beach Population	111,398	115,176	117,415	119,255	119,814
Town of Palm Beach Population	8,802	8,321	9,254	9,253	9,394
Town of South Palm Beach Population	1,471	1,448	1,471	1,472	1,547
Total Service Area Population	**121,671**	**124,945**	**128,140**	**129,980**	**130,755**

3.3.2 Future Population Projections for the Service Area

Future population projections for the City Water Utility Service Area are as shown below in Table 2 and based on the data provided by the SFWMD as part of the Lower East Coast Water Supply Plan.

Table 2 – Future Population Projections for City of West Palm Beach Water Utility Service Area

Year	2025	2030	2035	2040	2045
City of West Palm Beach Population	123,429	133,370	142,259	148,117	152,538
Town of Palm Beach Population	9,464	9,569	9,627	9,642	9,818

Year	2025	2030	2035	2040	2045
Town of South Palm Beach Population	1,549	1,552	1,557	1,557	1,562
Total Service Area Population	**134,442**	**144,491**	**153,443**	**159,316**	**163,918**

3.3.3 Historical Water Use

The City's Water Treatment Plant historic water production figures are provided in Table 3 for years 2018 through 2022.

Table 3 – Service Area Historic Water Production and Demand

Year	Annual Finished Water Produced at WPB WTP (MGY)	Daily Finished Water Produced at WPB WTP (MGD)	Service Area Population	Per Capita Demand (GPCPD)
2018	10,692	29.29	121,671	240.8
2019	10,586	29.00	124,945	232.1
2020	10,364	28.39	128,140	221.6
2021	10,662	29.21	129,980	224.7
2022	10,894	29.85	130,755	228.3

3.3.4 Future Water Demand Projections

Future water demand projections are estimated using the City's service area population projections multiplied by the per capita factor of 229.5 gallons per capita per day (gpcpd). The per capita factor selected was based on the average rate over the past five years. Historically, a baseline per capita factor of 272 gpcpd was used based on the City's Consumptive Use Permit (CUP). Table 4 below provides the projected finished water demand for the years 2025 through 2045.

Table 4 – Utility Service Area Water Demand Projections

Year	Projected Population	Per Capita Demand (GPCPD)	Projected Annual Finished Water Demand (MGY)
2025	134,442	229.50	11,262
2030	144,491	229.50	12,104
2035	153,443	229.50	12,854
2040	159,316	229.50	13,346
2045	163,918	229.50	13,731

Table 5 below summarizes the City's Bulk Service Agreements with the Palm Beach County Solid Waste Authority (expires September 2029) and Palm Beach County Water Utilities Department for Bayhill Estates (expires October 2030). The City anticipates the agreement for Bayhill Estates will not be renewed. The City has additional interconnect agreements with Palm Beach County and the adjacent municipalities, which are not included as a capacity reservation as these are, by definition, for emergency use, and subject to system capacity capability at the time of request.

Table 5 – Bulk Service Agreements Capacity Reservation

Utility/Agency Served	Quantity of Water (mgd)				
	2025	2030	2035	2040	2045
Solid Waste Authority	0.40	0.40	0.40	0.40	0.40
Palm Beach County-Bayhill Estates	0.15	0.15	-	-	-
Total	0.55	0.55	0.40	0.40	0.40

The total quantity of water allocated through the bulk service agreements is combined with the City's projected annual demand and compared to the City's permitted annual allocation from Clear Lake in Table 6 based on a treatment process loss factor of 5 percent.

Table 6 – Total Service Area and Bulk Service Agreement Demand Projection

Year	Bulk Service Agreements (MGY)	Projected Service Area Finished Water Annual Demand (MGY)	Total Service Area Finished Water Demand with Bulk Service (MGY)	Total Raw Water Demand* with Bulk Service (MGY)	Permitted Maximum Allocation of Raw Water (MGY)	Surplus or (Deficit) of Permitted Allocation (MGY)
2025	201	11,262	11,463	12,066	15,038	2,972
2030	201	12,104	12,305	12,952	15,038	2,086
2035	146	12,854	13,000	13,684	15,038	1,354
2040	146	13,346	13,492	14,202	15,038	836
2045	146	13,731	13,877	14,607	15,038	431

*Raw water demand is based on a 5% loss factor during the treatment process and is calculated by taking 5% of finished water demand and adding it to finished water demand to get the raw water demand. The City has not yet obtained an allocation for the Floridan Aquifer, but expects to receive one in the near future.

Table 7 below identifies Alternative Water Supply Sources (AWS) that can be utilized to meet the City's projected annual service area demand and bulk service agreement reservation. Permitted maximum allocation of 15,038 MGY is based on City's permitted allocation for withdrawal from Clear Lake. For the AWS, C51 canal tidal capture (54 MGD), C17 canal tidal capture (72 MGD) and ASR (2 MGD) each source is assumed to provide water for 20 days based on availability and

meeting the water use permit specified canal levels and the requirement of water being discharged to tide. The AWS are not part of the Consumptive Use Permit allocation.

Table 7–Service Area Raw Water Demand Projections and Alternative Water Supply Sources

	WUP	Alternative Water Supplies				Projection	Surplus
Year	Clear Lake Allocation (MGY)	Renaissance Project (MGY)	C-51 Tidal Capture (MGY)	C-17 Tidal Capture (MGY)	ASR Well Recovery* (MGY)	Raw Water Demand** (MGY)	WUP + AWS – Projection (MGY)
2025	15,038.00	637	1,080	1,440	180	12,066	6,309
2030	15,038.00	637	1,080	1,440	180	12,952	5,423
2035	15,038.00	637	1,080	1,440	180	13,684	4,691
2040	15,038.00	637	1,080	1,440	180	14,202	4,173
2045	15,038.00	637	1,080	1,440	180	14,607	3,768

* The City's ASR Well's Construction Permit renewal application is currently under review by the Florida Department of Environmental Protection.

**Raw water demand is based on a 5% loss factor during the treatment process and is calculated by taking 5% of finished water demand and adding it to finished water demand to get the raw water demand.

3.4 Potable Water Supply System

3.4.1 SFWMD Water Use Permit

The City received a twenty-year water use permit from the South Florida Water Management District on February 14, 2013. Permit information is as follows:

- WUP Number: 50-00615-W
- Raw Water Source:

  Ground Water from: ASR well for surface water storage/recovery and Surficial Aquifer System.

  Surface Water from: Clear Lake via M-Canal and Lake Mangonia from Grassy Waters Preserve and Lake Okeechobee via L-8 Tieback through control 2 (67 MGD).

- Raw Water Allocation Information:

Annual Allocation: 15,038.00 Million Gallons (MG)

Maximum Monthly Allocation: 1,392.32 Million Gallons (MG)

Annual allocation includes 15,038.00 Million Gallons (MG) from Clear Lake and 24,446 Million Gallons (MG) from SWFMD Canal (L-8) Tieback as existing surface water withdrawal and from Surficial Aquifer System 1,470 MG from West Wellfield (WWF) and 864 MG from East Wellfield (EWF). All allocations are for the Public Water Supply portion of the permit.

- Specific Source Limitation:

  Clear Lake Annual = 15,038.00 MG; Monthly = 1,392.32 MG
  Surficial Aquifer System West Wellfield (monthly)– 759.50 MG
  Surficial Aquifer System East Wellfield (EWF) (monthly)– 446.4 MG
  SFWMD Canal (l-8) Tieback (monthly)– 2,765.00 MG

- Permit Expiration: February 14, 2033.

3.4.2 Existing Withdrawal Facilities

Source: ASR well for surface water storage/recovery

1-24” x 1200’ x 4861 GPM Well Cased to 985 feet

Source: Surficial Aquifer System-Western Wellfield

1-18” x 152.5’x 2,780 GPM Well Cased to 82.5 feet
1-18” x 153.5’x 2,780 GPM Well Cased to 83.5 feet
1-18” x 154’x 2,780 GPM Well Cased to 84 feet
1-18” x 163’x 2,780 GPM Well Cased to 93.5 feet
1-18” x 166’x 2,780 GPM Well Cased to 96 feet
1-18” x 170’x 2,780 GPM Well Cased to 100 feet
4-18” x 150’x 2,780 GPM Well Cased to 80 feet

Ground Water: Surficial Aquifer System -Eastern Wellfield

1-24” x 98’x 1000 GPM Well Cased to 95 feet
1-24” x 186’x 1000 GPM Well Cased to 137 feet
1-24” x 181’x 1000 GPM Well Cased to 131 feet
1-24” x 95’x 1000 GPM Well Cased to 91 feet
1-24” x 101’x 1000 GPM Well Cased to 86 feet
1-24” x 170’x 1000 GPM Well Cased to 132 feet
1-24” x 97’x 1000 GPM Well Cased to 93 feet
1-24” x 125’x 1000 GPM Well Cased to 119 feet

1-24” x 195’x 1000 GPM Well Cased to 145 feet
1-24” x 142’x 1000 GPM Well Cased to 105 feet

Source: Clear Lake-Surface Water

4-14” x 100 HP x 8,400 GPM turbine pumps
1-16” x 100 HP x 5,250 GPM centrifugal pumps
2-18” x 125 HP x 10,500 GPM centrifugal pumps
1-30” x 150 HP x 17,500 GPM turbine pump
3-36” x 130 HP x 15000 GPM submersible pumps
4-42” x 200 HP x 33700 GPM axial flow pumps

3.4.3 Alternative Water Supplies

The City’s Water Use Permit requires the City to “use alternative water supplies to account for all increased demands from Clear Lake above the City’s historic use. The City has approved alternatives, urban stormwater treatment via the Renaissance Project (637 MGY), tidal capture from C-51 canal (up to 54 MGD) via Renaissance treatment process, tidal capture from C-17 canal (up to 72 MGD) and ASR well (stored surface water-up to 8 MGD, though on average have pumped out 2 MGD). The City is seeking an allocation of brackish water from the Floridan Aquiferas as an additional alternative water supply.

A discussion of the City’s alternative water supply projects can be found in Section 3.6 of this report.

3.4.4 Interconnects

The City maintains interconnections with other public water suppliers as follows:

1. One interconnection with the Solid Waste Authority for delivery of up to 0.35 MGD of finished water;

2. One interconnection with the Palm Beach County at Bay Hill Estates for delivery of up to 0.15 MGD of finished water;

3. One emergency interconnection with Lake Worth Utilities (1.0 MGD);

4. Five emergency interconnections with Palm Beach County at SR7 at Okeechobee (3.0 MGD), -M-Canal W to Coconut Blvd (0.15 MGD), Haverhill Road (1.5MGD), and Jog Road (3.0 MGD), Florida Mango Rd (1.0 MGD); and

5. Two emergency interconnections with the City of Riviera Beach with one at Military Trail (1.0 MGD) and one at Broadway Avenue (1.0 MGD).

3.5 Conservation

The City developed and adopted a Water Conservation Plan in July 2005. The Water Conservation Plan elements include an aggressive approach to the development and implementation of several alternative water supply projects, water conservation based water rate structures, leak detection programs, an irrigation limitation ordinance, native vegetation landscaping requirements, ultra-low volume plumbing fixture construction code, rain sensor override requirement ordinance, and extensive public education programs. The City will coordinate future water conservation efforts with SFWMD to ensure that proper techniques are applied. In addition, the City will continue to support and expand existing goals, objectives and policies in the comprehensive plan that promote water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the SFWMD in the implementation of new regulations or programs that are design to conserve water during the dry season.

The City's Water Conservation Programs strive to reduce the demand for water in a phased manner that will not only reduce water consumption but reduce utility bills and help to orient people's behavior in a way to conserve resources. The programs address Water and Resource Conservation goals within the City's Sustainability Action Plan through increasing education and awareness within the community. Conservation programs within the WPB Public Utilities service area include:

- High Efficiency Toilet Vouchers: for both residential and commercial customers, with 3,422 distributed within the 2012 to 2019 period. In 2019 vouchers allow a purchase of up to $125 per voucher and the program is funded for the period of 2020-2022.

- Rain Barrel Workshops: average 100 free rain barrels with installation/use trainings per year as of 2019.

- SFWMD WaterCHAMP: a free public education program that helps hotels and motels save water, improve energy efficiency and reduce operating costs using conservation educational placards and high efficiency faucet aerators. West Palm Beach has successfully implemented this program and over 50% of WPB hotels/motels are participating as of 2019.

- Wyland's Mayors Water Challenge: the City has participated annually in this national water conservation education and awareness program. In 2013, West Palm Beach was a winner for cities of our size.

- Sustainability outreach: The Office of Sustainability participates and implements multiple educational conservation programs annually, including E4 Home, E4 Life, E4 Climate, E4 Business/ Green Business Challenge, Imagine a Day without Water, DOE Better Buildings Challenge Water Pilot, Landlord-; Sustainability distributes over 500 water conservation kits per year at events throughout the year which include shower timers, high efficiency shower heads, faucet aerators, and other products.

- The City plans to track monthly water use in City buildings for the U.S. Department of Energy Better Buildings Challenge.

- The City's PACE (Property Assessed Clean Energy) programs include, whenever possible, water and energy savings.

- The City plans to continue following implementation of the district's mandatory year-around landscape irrigation conservation measures as detailed in chapter 40E-24 FAC by informing customers through press releases and social media and, if needed, by enforcement through violation fines.

3.6 Alternative Water Supply Projects/Reuse

The City is committed to developing and implementing alternative water supply projects, including reuse, to the extent possible. The City's AWS activities include:

- Renaissance Project: Constructed in 2002, the project is an innovative stormwater collection and reuse system that collects and treats stormwater normally discharged to tide. With an initial construction cost of $17,600,000 the project was completed with financial support from the Environmental Protection Agency, South Florida Water Management District, and Palm Beach County. The system captures, treat and stores approximately 637 million gallons per year, (MGY) or one (1.75) million gallons per day (MGD).

- Aquifer Storage and Recovery (ASR) Well: Upon completion of construction, the ASR well was rated at 8 mgd. Located at the Water Treatment Plant it is designed to store excess surface water during periods of heavy rainfall. The excess water is pumped into the upper Floridan Aquifer System and is recovered when the water is withdrawn to meet increased demands during dry weather. Cycle testing continues and in 2019 the well was acid cleaned, the injection pump rebuilt, and the effluent valve replaced. The ASR Well construction permit is currently in the renewal process with the Florida Department of Environmental Protection.

- C17 Canal Pump Structure: The pump station was constructed to capture water prior to being sent to tide from C17 Canal, this pump structure has the potential to capture up to 72 MGD (operational conditions based on water being released to tide and canal levels).

- Brackish Water Supply: The City is in the process of securing an allocation of brackish water from the Floridan Aquifer. The amount of the allocation, up to 50 MGD, will depend on need and availability as determined by the project population levels and impacts of the wellfields.

4.0 WORK PLAN PROJECTS/CAPITAL IMPROVEMENT ELEMENT/SCHEDULE

4.1 Existing Water Treatment Plant Process

The West Palm Beach Water Treatment Plant (WTP) is owned and operated by the City of West Palm Beach (City). The WTP and associated distribution system provides potable water to the residents, visitors and business of West Palm Beach and the towns of Palm Beach and South Palm Beach. The WTP is located in Palm Beach County, Florida at 1009 Banyan Boulevard, West Palm Beach, Florida.

The City was founded in 1894 and has been the seat of Palm Beach County government since 1909. The initial urbanized portion of the City was approximately eight miles long and 3 miles wide. A coastal ridge lies several blocks to the west and runs parallel to the Intercoastal Waterway for the entire length of the City. The original City site now constitutes the central business district. The development and maintenance of the utility infrastructure system continues to provide an acceptable level of service and an essential component in the City's growth.

From the first water supply system developed in the late 1800s, the City's utility system has grown from a service population of approximately 500 people in 1900 to its current estimated service population of approximately 125,000 residents covering 61 square miles. The utility system provides water for both indoor and outdoor use for about 34,334 residential and commercial customers accounts.

The City’s potable water system includes a raw water supply system, WTP, repump stations, storage tanks, the distribution system and various interconnections with neighboring utilities.

The City’s facilities including the source water supply, water treatment system, re-pump stations, available interconnection and the existing distribution system. Since the 2015 there have been several changes that include:

- Modification of Raw Water Pump #27;
- Construction of the 50.0 mgd Powered Activated Carbon (PAC) Basin;
- Filter Media Replacement;
- Abandonment of the 1 MG Clearwell/Storage Tank at the WTP;
- Construction and Operation of the 50 mgd Ultra-Violet Light (UV) Disinfection System;
- Construction of a direct suction header to the West Pump House;
- Installation of 4 new high service pumps in the West Pump House;
- Remote re-pump station switches from gaseous chlorine to sodium hypochlorite;
- Pre and post disinfectant injection at the Ibis Re-Pump Station; and
- Six Sigma project to address distribution system flushing volumes.

These projects total more than 25 million dollars ($25,000,000) invested in the PWS since 2015. The City continues to be committed to the proper operation and maintenance of its PWS to ensure public health and safety.

The WTP is a surface water treatment facility operating on a source water supply that is collected, stored and transported by various catchment areas including urban rain cropping, wetlands, lakes and canals to meet the water supply needs.

The source water supply includes facilities owned and operated by the City along with facilities within the Regional Systems operated by the South Florida Water Management District and the United States Army Corps of Engineers.

The existing source water supply system dates to 1894 with the construction of a single steam driven pump and an 8-inch pipe to move water from Clear Lake to Henry Flager's Royal Poinciana Hotel. Over the years the source water supply has been expanded. The history of the supply includes the following milestones:

1894	Clear Lake tapped as Water Supply.
1920's	Clear Lake is connected to Lake Mangonia.
1930's	M-Canal excavated to wetlands (Grassy Waters Preserve) west of the lakes.
1950's	Grassy Waters Preserve (19.3 Square Miles) purchased.
1960's	M-Canal Extension westward to the L-8 Canal and Lake Okeechobee.
1980's	Western Wellfield constructed.
1990's	Aquifer Storage and Recovery Well constructed.
2000's	Renaissance Project construction and the Okeechobee Divide Structure constructed.
2010's	Eastern Wellfield constructed, Australian Avenue Gates and Pumps constructed, and the C-17 Pump House constructed.
2020's	UV Treatment System constructed, Powdered Activated Carbon Basins constructed, upgraded high service pumps 4, 5, 6, and 7 installed, and high service pumps 1 and 2 equipped with variable frequency drives.

The WTP has a maximum permitted capacity of 47.3 mgd. The treatment process includes the following:

- Hypochlorite Pretreatment - Turbidity Control (Optional);
- Powered Activated Carbon - Cyanotoxin Reduction, Taste and Odor Control (Optional);
- Cationic Polymer - Turbidity Control;
- Ferric Sulfate - Turbidity Control;
- Lime – Softening, Turbidity and TOC Removal;
- Recarbonation - pH Adjustment;
- Filter Aid - Turbidity Control (Optional);
- Conventional/Biologically Active Filters – Turbidity Control, Taste and Odor Control;
- UV Disinfection - Bacteriological Control;
- Chlorine/Chloramines - Bacteriological Control;
- pH Adjustment (Sodium Hydroxide) - Lead and Copper Control;
- Orthophosphate (Corrosion Inhibitor) - Lead and Copper Control; and
- Fluoride - Dental Health.

The WTP uses conventional lime softening, filtration and chemical disinfection to comply with the federal and state safe drinking water regulations. The WTP includes a UV treatment system, PAC Basin, to improve the taste and odor characteristic of the finished water.

The primary source of the City's water supply is surface water. Surface water travels through the City's M-Canal to the City's water supply lakes, Lake Mangonia and Clear Lake, from the City's Grassy Waters Preserve, a 19.3 square mile aquatic preserve located in western West Palm Beach and from Lake Okeechobee through the L-8 Tieback through the City's control 2 structure.

Alternative sources of water that feed into this above-ground water supply system include the City's Renaissance Project, tidal water capture from C51 and C17 Canals, augmentation from surface water stored and recovered from the ASR well.

The Eastern and Western wellfield surficial wells and the Clear Lake Divide structure are available to the City during periods of drought conditions or elevated cyanotoxin levels.

4.2 Capital Improvements Element/Schedule

The City's financially feasible Capital Improvements Schedule, adopted annually, includes capital improvement projects necessary to maintain levels of service and provide for improved operational facility (See the Capital Improvements Element). The Utilities Department is currently performing/evaluating a condition assessment of the water treatment plant as well as distribution system assets and is in the process of prioritization of infrastructure projects including above ground and underground utilities. Based on the assessment and prioritization, the Utilities Department plans on borrowing money through a bond to address water treatment and distribution system needs.

- 2024: Recarbonation System Upgrades. Project includes replacement of the existing liquid carbon dioxide storage tanks and associated equipment. Project will decrease the plant's potable water demand freeing up capacity for customers and reduce liquid carbon dioxide consumption with an improved process.
- 2024: Floridan Aquifer Allocation: Project includes securing an allocation of the brackish water from the Floridan Aquifer through a new Consumptive Use Permit from the South Florida Water Management District.
- 2025: Lime Storage/Slaker Additions: Project includes the addition of a new lime silo and slaker. Project will increase lime storage capacity for storm events and slaker capacity for system reliability.
- 2025: Valley Forge Re-Pump Station Storage Tank Upgrade: Project includes the rehabilitation or replacement of the existing 3-million-gallon storage tank. Project will maintain the City's existing storage capacity.
- 2026: Treatment/Filtration System Expansion: Project includes the evaluation of ceramic membrane technology for the treatment of the City's surface water supply.

- 2028: Floridan Aquifer Well Construction: Project includes design, permitting, and construction of the first five (5) Floridan Aquifer Test Well.
- 2030: Brackish Water Treatment: Project involves the design, permitting, and construction of the first phase of the brackish water treatment (Membranes Technology) and associated systems.
- 2030: Valley Forge Repump Station Motor Control Center: Project includes installation of Variable Frequency Drives on the booster pumps. Project will increase energy efficiency within the plant and provide better control over distribution system pressures.
- 2030+: Surface Water Treatment: Project involves the design, permitting, and construction of additional ceramic membrane treatment for the surface water supply with a goal of reducing the use of the existing lime softening/conventional filtration systems.
- 2030+: Brackish Water Treatment: Project involves the design, permitting, and construction of brackish water membrane treatment for the Floridan Aquifer water supply with a goal of reducing the use of the existing lime softening/conventional filtration systems.

Upon reviewing the City's projected water demands, permitted allocation and alternative water supply projects, and after extensive long-term water supply evaluation and drought proofing measures the City does not anticipate the necessity of additional treatment capacity within the 20-year planning horizon. Nevertheless, the City has recognized that existing water quality conditions are not improving, and the emerging contaminants of concern will require use of advanced treatment strategies. As a result, the City will continue to explore current technology and options to secure safe water supply to meet anticipated future demands.