

CITY OF KEY WEST, FLORIDA

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**WATER SUPPLY FACILITIES WORK PLAN
(2020-2030)**

Prepared For:

**Florida Department of Economic Opportunity
and
City of Key West Planning Department**

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1.0 INTRODUCTION

The purpose of the City of Key West Water Supply Facilities Work Plan (Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within its jurisdiction. Chapter 163, 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 after its update every five years. The Lower East Coast Water Supply Plan Update was adopted by the South Florida Water Management District (SFWMD) on November 8, 2018.

Residents of the City of Key West obtain their water directly from the Florida Keys Aqueduct Authority (FKAA), which is responsible for ensuring that enough capacity is available for existing and future customers.

The City of Key West Work Plan is incorporated into the City of Key West's Comprehensive Plan, Appendix C, and will be updated upon its approval.

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. FKAA has not yet adopted its Water Supply Plan.

Key West is a retail buyer and FKAA is the sole provider of water to the City. The City of Key West Work Plan will, by reference, include the data, projected supply and demand numbers, conservation initiatives and capital improvements already identified in FKAA's:

- 20-Year Water System Master Plan (FKAA Master Plan, March 2020),
- Draft Population and Water Demand Forecast from their yet unreleased Water Supply Work Plan (Provided February of 2020)
- 5 Year Capital Improvement Budget from their 2020 Budget and Financial Plan (2020-2024)

Monroe County Water Supply Plan was adopted on June 17, 2020.

The City of Key West Work Plan will have the same planning time schedule consistent with the comprehensive plan and the Lower East Coast Water Supply Plan Update.

The City's Work Plan is divided into seven sections:

Section 1 – Introduction

Section 2 – Background Information

Section 3 – Data and Analysis

Section 4 – Work Plan Projects/Capital Improvement Element/Schedule

Section 5 – Proposed Comprehensive Plan Changes

Section 6 – Proposed Code of Ordinance / Land Development Regulation Changes

Section 7 – References

Section 8 - Figures

1.1 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 local land use planning and water supply planning.

1.2 Statutory Requirements

The City of Key West considered the following statutory provisions when updating the Water Supply Facilities Work Plan:

1. Coordinate appropriate aspects of its comprehensive plan with the South Florida Water Management District's (SFWMD) Lower East Coast Water Supply Plan, [163.3177(4)(a), F.S.]
2. Ensure that its future land use plan is based upon availability of adequate water supplies and public facilities and services [s.163.3177(6)(a), F.S.] 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 Department (DEO) 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 City anticipates issuing a certificate of occupancy and consult with the applicable water supplier prior to approving a 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 [s.163.3180 (2), F.S., effective July 1, 2005].
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 Lower East Coast Regional Water Supply Plan, or the alternative project proposed by the local government under s. 373.709(8)(b), F.S. [s. 163.3177(6)(c), 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 Lower East Coast Regional Water Supply Plan [s. 163.3177(6)(c), F.S.]; and
 - c. Update the Work Plan for at least a 10-year planning period for constructing the public, private, and regional water supply facilities identified in the element as necessary to serve existing and new development. [s. 163.3177(6)(c), F.S.]

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. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 5 above, revise the Conservation Element to assess projected water needs and sources for at least a 10-year planning period, considering the SFWMD Lower East Coast Water Supply Plan, as well as the Florida Keys Aqueduct Authority's consumptive use permit. [s.163.3177(6)(d), F.S.]

The plan must address the water supply sources necessary to meet and achieve the existing and projected water use demand for the established planning period, considering the appropriate regional water supply plan. [s.163.3167(9), F.S.]

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 the Lower East Coast Regional Water Supply Plan. [s.163.3177(6)(h)1., F.S.]
8. Address in the Evaluation and Appraisal Report the extent to which the local government has implemented the 10-year water supply facilities 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. [s.163.3191 (2), F.S.]

2.0 BACKGROUND INFORMATION

2.1 Overview

The City of Key West was incorporated in 1828, making it the 1st municipality established in Monroe County 17 years before Florida became a state. The City is at the end of island chain known as the Florida Keys (See Figure C1). The City boundaries incorporate the entirety of the main island and also the northern one half of Stock Island to the east. It also includes the Navy's properties of Fleming Key and Sigsbee. The projected permanent population for 2020, according to the 2010 Ear-based Comprehensive Plan amendments, is 23,997 residents.

The City also has a significant "seasonal population" (approximately 4,000), "transient residents" (over 14,000 on average), cruise ship visitors (high daily average of 3,100), "day trippers" (3,100) and commuters into the City (averaging 3,900). All of these population segments will utilize the City's potable water resources. The combined amount of all population segments above and others represents the "daily functional population" of the City and is estimated to be approximately 58,000 during peak periods. Based on factors unique to Key West, including the Building Permit Allocation System (BPAS), the daily functional population should remain constant throughout the planning period.

The City of Key West has a Building Permit Allocation System (BPAS) that limits new residential and transient development growth based on hurricane evacuation times. In 2013, the City was allocated

1,093 Equivalent Single-Family Units (ESFU) for development to be distributed over the following 10 years. Since then 300 additional affordable units have been allocated by the State, which was challenged and awarded in court, but is now awaiting the appeals process.

The functional population projections shown in Table C3.1 are compared with the service area functional population projections contained in the FCAA Master Plan. The Monroe County Planning Department's permanent and seasonal population projections were used to develop this functional population for FCAA's entire service area through 2040. The projected population was then multiplied by FCAA's projected per capita demand to project customer demand in the service area.

2.2 Relevant Regional Issues

As the state agency responsible for water supply in the Lower East Coast (LEC) planning area, the SFWMD plays a pivotal role in resource protection through criteria used for Consumptive Use Permitting. Consumptive water use permits are issued for a fixed period of time and allow the holder to withdraw a specified amount of water for reasonable-beneficial uses, while requiring water conservation to prevent wasteful uses. The permits also set limits on how much water can be withdrawn at each location in the aquifer or from surface water. These rules protect existing residents' water supplies and protect aquifers from saltwater intrusion damage, as well as to keep surface water sources from drying up.

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 water use permit program. This reduced reliance on the regional system for future water supply needs, mandated the development of alternative water supplies, and increased conservation and reuse.

The LEC Planning Area relies on fresh groundwater and surface water for urban, agricultural, and industrial uses. However, traditional freshwater sources in the LEC Planning Area are not sufficient to meet projected 2040 water demands. Analyses indicate increases in allocations of fresh groundwater from the Surficial Aquifer System of the Floridan Aquifer and surface water from Lake Okeechobee are not available to meet the growing needs of the LEC Planning Area during 1-in-10-year drought conditions.

The regional issues identified for 2040 in the Lower East Coast Water Supply Plan Update (adopted November 8, 2018) include:

1. Fresh surface water and groundwater are limited; further withdrawals could have impacts on the regional system, wetlands, existing legal uses, and saltwater intrusion. As a result, additional alternative water supplies need to be developed.
2. Expanded use of reclaimed water is necessary to meet future water supply demands and the Ocean Outfall Law.
3. Expanded use of brackish groundwater from the Floridan aquifer system requires careful planning and wellfield management to prevent undesirable changes in water quality.

The sole source provider of potable water to Monroe County is FKAA, whose wellfield is located in Florida City. The limited availability of Surficial Aquifer System withdrawals presents a potential risk to the water supply for all of Monroe County. While this is a ten-year plan, longer term threats from sea level rise, exacerbated by Turkey Point hypersaline plume have grave fiscal and physical consequences for our area that need to be planned for now.

Turkey Point

Industrial discharge with heavy levels of salt and weak radiation are spreading from a 6,000-acre cooling canal system (CCS) at the Florida Power & Light Company (FPL) Turkey Point nuclear plant.

A Florida Administrative Judge ruled on Feb 15, 2016 that FPL is polluting south Florida's groundwater, threatening to contaminate wellfields providing drinking water to the Florida Keys and parts of Miami Dade County. The Judge also faulted the Florida Department of Environmental Protection (FDEP) for approving a faulty management plan for the Plant. Both were ordered to remediate the cooling canals that continue to release contaminants into groundwater and surface water in Biscayne Bay National Park.

Formally, at its current rate of spread, the impacts from the pollution to our wellfields would not be happen for 40-80 years, which is beyond the scope of this Water Plan. However, the City feels that all efforts to halt the spread now combined with our Water Plans' efficiency and reuse regulations will ensure the health of our wellfield for many decades into the future.

FKAA is leading the effort to ensure the pollution is reversed, and the City of Key West, Monroe County and other Keys local governments have given monetary assistance. FKAA contends that FPL is not allowed to expand or get any permits until it has decommissioned the cooling canal system at the heart of the plume.

Sea Level Rise

Sea level rise has been identified as a regional water issue by the Southeast Florida Regional Climate Change Compact, which includes Palm Beach, Broward, Miami-Dade and Monroe Counties. The Compact communities have agreed to use a sea level rise projection of between 6 and 10 inches by 2030, and between 14 and 26 inches by the year 2060 for planning purposes in the Southeast Florida region until more definitive information on future sea level rise is available (See the Compact's, "A Unified Sea Level Rise Projection for Southeast Florida, October, 2015). The potential landward movement of the saltwater intrusion line resulting from the impact of sea level rise may affect future decisions regarding the implementation of capital improvements, requiring mitigation and adaptation strategies to preserve the potable water supply. Monroe County's climate change and sustainability consultants have recently summarized hydrologic modeling by the United States Geological Survey that suggests relatively low risk to the FKAA wellfields in Florida City under even the worst-case 2060 sea level rise scenarios. However, FKAA continues to monitor the most current data and analysis regarding this issue.

FKAA is currently in negotiations with Miami Dade County on a shared freshwater treatment facility. FKAA's treatment facility has extra capacity and Miami Dade's nearest wellfield cannot treat their potable water to the same quality. It is considered highly likely that this partnership will happen, although it isn't settled yet.

FKAA also operates Reverse Osmosis (RO) facilities in Marathon and Stock Island, with a combined supply capacity of 3 MGD, as an alternative water source for the County. Potable water costs are approximately 35x more per gallon when produced at these facilities and are for emergencies and extreme peaks in demand only. The Stock Island Plant will be receiving \$30 million in state funding to renovate and upgrade the plant, which should make it more efficient and less costly to operate.

2.3 Intergovernmental Coordination Activities

The City has no Memoranda of Understanding(s), water related bulk service agreements or contracts.

The City coordinates often with FKAA on water projects. The City has consulted with FKAA regarding water policy issues, collaborates with FKAA on local educational events such as the annual Rainbarrel Workshop and Cistern Presentations, and requests water services comments from them monthly at our Development Review Committee meetings.

Every five years, after the adoption of the Lower East Coast Water Supply Plan, the City hosts a workshop with SFWMD, FKAA and all the other Florida Keys local governments to review the LEC and brainstorm new conservation efforts.

Due to Turkey Point, the local governments have become even more engaged with FKAA, financially assisting their legal case. This Work Plan amends Element 8 of the City of Key West's Comprehensive Plan to include seeking an interlocal agreement with Miami Dade County providing the City of Key West with an opportunity to comment on land use and regulatory issues related to the Florida City wellfield, aquifer and aquifer recharge area.

3.0 DATA AND ANALYSIS

The intent of the data and analysis section of the Work Plan is to describe the information that local governments need to provide to state planning and regulatory agencies as part of their proposed comprehensive plan amendments, particularly those that would change the Future Land Use Map (FLUM) to increase density and intensity.

3.1 Population Information

Table 1 shows the City's permanent and functional population projections through 2040. The City of Key West population figures through 2030 are derived from the projections prepared by Keith and Schnars for the City of Key West Ear-based Comprehensive Plan amendments in 2012. The 2035 and 2040 estimates were extrapolated from FKAA's 2020 Water System Master Plan, as 34.54 percent of Monroe County's functional population.

Table C3.1
2010-2030: Population Projections

Year	Permanent Population	Seasonal and Temporary	Functional Population
2010	24,649	21,704	54,347
2015	24,348	22,104	54,446
2020	23,997	22,756	54,747
2025	23,660	23,407	55,061

2030	23,350	24,059	55,403
2035	X	X	56,891
2040	X	X	57,274

This decline in permanent population growth is reflective of the fact that the City’s future development potential and population growth are limited by the scarcity of vacant and developable land and the BPAS.

3.2 Maps of Current and Future Areas Served

The maps contained in the Figure C3.2 map series at the end of this document depict the FKAA Water System in its entirety. The map depicting current and future City boundaries served by the FKAA is provided in Figure 3.2a. At this time, there are no areas anticipated to be annexed.

3.3 Potable Water Level of Service Standard

FKAA’s potable water consumption level of service planning standard is 115 gallons/capita/day (GPCD) and Key West’s recent averages have been 101 GPCD. In light of Turkey Point and Sea Level Rise, it is advised that the City keep their 93 GPCD LOS standard, as well as adopt strong water conservation policies as outlined in this Plan and the associated Goals, Objectives and Policies to achieve 80 GPCD.

Key West’s non-residential LOS is recommended to be deleted as a separate standard. The rationale for this recommendation is that different non-residential uses vary significantly in their water needs. For example, a 20,000 square foot parking lot would require a fraction of water used in a 20,000 square foot laundry facility. Most municipal water supply plan LOS in the State of Florida are calculated on the same GPCD basis. For example, Monroe County uses 100 GPCD for all developments.

Table 2 – Level of Standards for Potable Water

	City of Key West	Monroe County
Residential	93 gallons/capita/day	100 gallons/capita/day
Non-Residential	650 gallons/acre/day	100 gallons/capita/day

3.4 Population and Potable Water Demand Projections by Local Government and Utility

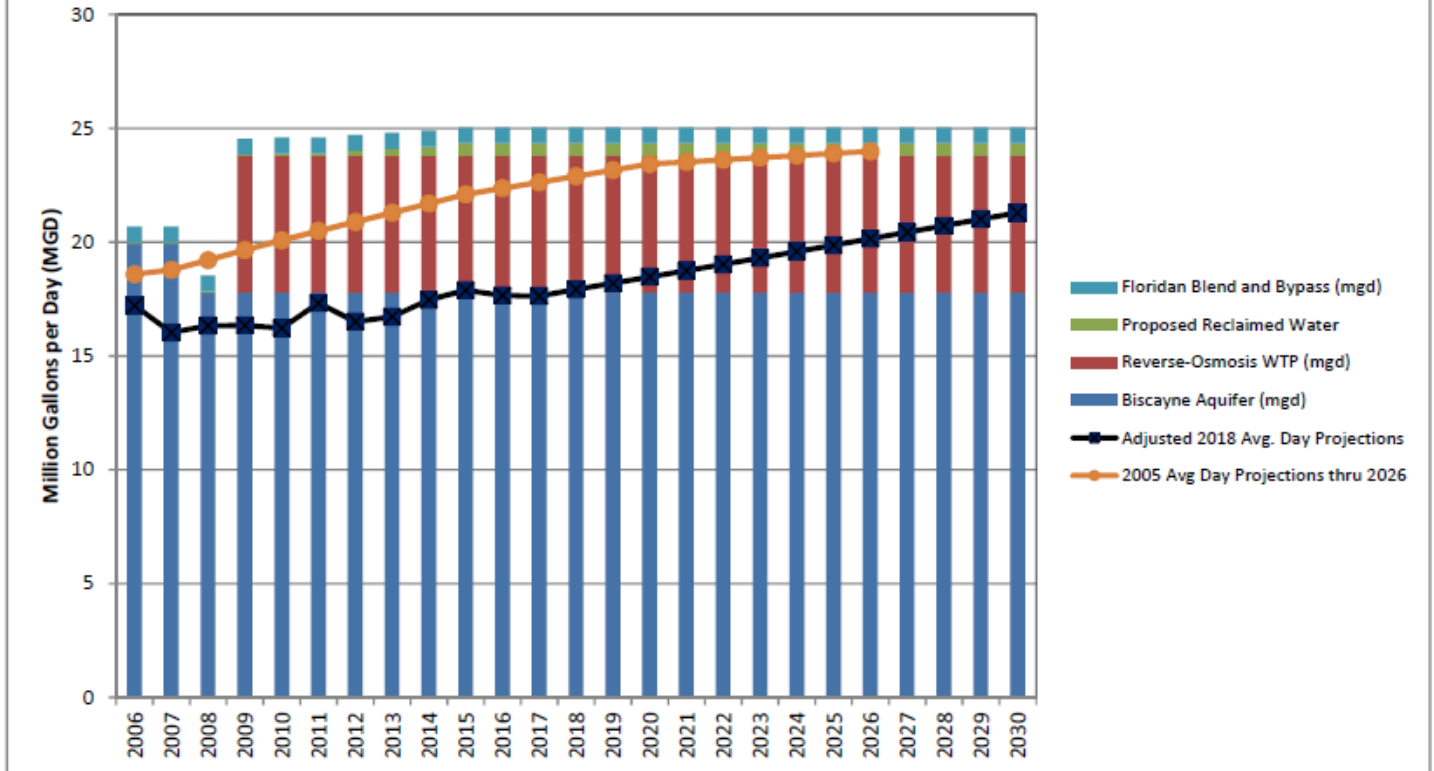
Table C3.4 - City of Key West Population and Water Supply Demands

WATER SUPPLY UTILITY SERVICE WITHIN WATER DISTRIBUTION SERVICE AREA								
SERVICE AREA	FUNCTIONAL POPULATION PROJECTIONS				WATER SUPPLY DEMAND Million Gallons per Day (MGD) Max			
YEAR	2020	2025	2030	2040	2020	2025	2030	2040
TOTAL FCAA SERVICE POPULATION *	159,252	161,604	163,956	165,797	22.9	23.2	23.6	23.8
Key West Daily Functional Population	54,747	55,061	55,403	57,274*	5.47	5.50	5.54	5.72

*estimated by multiplying 2040 Monroe County functional population by 2010-2030 Key West functional population percentage (34.54%).

Graph C3.4: FCAA 2019 Water Demand Projections Update

FLORIDA KEYS AQUEDUCT AUTHORITY Water Supply Available vs. Water Demand Projections



3.5 Water Supply Provided by Local Government

The FKAA is a retailer service provider to residents, businesses and other entities requiring water services. Therefore, water supply is not provided by the City.

3.6 Water Supply Provided by Other Entities

The FKAA wellfield is located in a pineland preserve west of Florida City in southern Miami-Dade County (See Figure C3.6, Miami-Dade County Wellfield Protection Areas). The water is treated at the FKAA's Water Treatment Facility in Florida City which has a maximum design capacity of 29.8 Million Gallons per Day (MGD). The primary water treatment process is a conventional lime softening/filtration water treatment plant and is capable of treating up to 23.8 MGD from the Biscayne Aquifer. The secondary water treatment facility at this location is the Reverse Osmosis (RO) plant which is capable of producing 6 MGD from the brackish Floridan Aquifer. Under CUP 13-0005-W (valid through March 13, 2028), the FKAA is allowed an annual withdrawal from the aquifers of 8.751 billion gallons of water.

Water from these facilities, with the aid of booster pump stations, travels the length of the Keys terminating at Key West (approximately 130 miles). Distribution is generally through a 36-inch transmission line decreasing in size to an 18-inch line upon entering the City. From that line a feeder system disperses the water throughout the community.

The FCAA maintains storage tank facilities which provide an overall storage capacity of 45.2 million gallons systemwide. The sizes of tanks vary from 0.2 to 5.0 million gallons. These tanks are utilized during periods of peak water demand and serve as an emergency water supply. Since the existing transmission line serves the entire Florida Keys (including Key West), and storage capacity is an integral part of the system, the capacity of the entire system must be considered together, rather than in separate service districts.

Additionally, two saltwater RO plants, located on Stock Island and Marathon, are available to produce water under emergency conditions. Their design capacities are 2.0 and 1.0 MGD, respectively.

At this time the FCAA system is a closed system that is not connected to any other system.

3.6.1 Demand for Potable Water

Tables 3.6.1 and 3.6.1a provide a historical overview of the water demands in the FCAA service area including Water Use Permit (WUP) allocation limits, yearly percent changes, and remaining water allocations. Along with the reverse osmosis water treatment plant in Florida City, compliance with withdrawal limits can also be accomplished by using other alternative water sources (blending of the Floridan Aquifer, reclaimed water and operation of the RO desalination plants), pressure reduction, public outreach, and assistance from municipal agencies in enforcing water conservation ordinances.

Table 3.6.1 - Annual Water Withdrawals 2002-2018

Year	Annual Withdrawal (MG)	% Change	WUP Limit (MG)	WUP +/- Annual Allocation (MG)
2002	6,191	10.03%	7,274	1,083
2003	6,288	1.57%	7,274	986
2004	6,383	2.74%	7,274	813
2005	6,477	0.16%	7,274	803
2006	6,283	-2.49%	7,274	964
2007	5,850	-7.35%	7,274	1,428
2008	5,960	1.89%	8,751	2,791
2009	5,966	0.09%	8,751	2,785
2010	5,919	-0.79%	8,751	2,832
2011	6,327	6.89%	8,751	2,424
2012	6,042	-4.50%	8,751	2,709
2013	6,105	1.04%	8,751	2,646
2014	6,377	4.46%	8,751	2,374
2015	6,530	2.40%	8,751	2,221
2016	6,462	-1.04%	8,751	2,289
2017	6,324	-2.13%	8,751	2,427
2018	6,526	3.10%	8,751	2,225

Source: Florida Keys Aqueduct Authority, 2019

In 2018, the FCAA distributed an annual average of 17.64 MGD from the Biscayne Aquifer plus 0.24 MGD from Floridan RO Production (Table 5). This table also provides the water treatment capacities of the emergency RO plants. Since the emergency RO plants utilize seawater, a Water Use Permit (WUP) is not required for these facilities.

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Table 3.6.1a – FKAA Projected Water Demand in 2019 (in MG)

	FKAA Permit Thresholds	2018 Water Demand	2019 Water Demand Projected
Annual Allocation			
Average Daily Demand	23.98	17.64	18.2
Maximum Monthly Demand	809.01	586.04	604.37
Annual Demand	8,751	6,440	6,641
Biscayne Aquifer Annual Allocation/Limitations			
Average Daily Demand	17.79	17.64	17.79
Annual Demand	6,492	6,439	6,492
Floridan RO Production			
Average Daily Demand	6.00	0.24	0.41
Emergency RO WTP Facilities			
Kermit L. Lewin Design Capacity	2.00 (MGD)	0.00 (MGY)	0.00

The 2019 figures and projections for 2020 indicate a slight increase in annual average daily demand from 17.64 to 18.2 MGD and an increase in maximum monthly demand from 586.04 MGD to 604.37 MG. Preliminary projections from FKAA for 2020 indicate no increase in annual average daily demand from the 2019 projections.

Table 3.6.1b provides the amount of water used on a per capita basis. Based on Functional Population and average daily demand, the average future water consumption expected is 115 gallons per capita (person), which reflects the entire FKAA service area, including unincorporated Monroe County, Key West, Marathon, Islamorada, Key Colony Beach, and Layton.

Table 3.6.1c breaks down the jurisdictions, showing Key West predicted at 101 gallons per capita.

Table 3.6.1b – Keyswive Per Capita Water Use

Year		Permanent ¹	Seasonal ²	Functional	Per capita (MGD)
Actual	2005	76230	73737	149967	118
	2006	74252	75228	149480	111
	2007	73499	76453	149952	103
	2008	73333	78647	151980	106
	2009	73299	77516	150815	105
	2010	73219	78401	151620	107
	2011	73981	77974	151955	114
	2012	74627	78431	153058	108
	2013	75914	78887	154801	108
	2014	76492	79343	155835	112
	2015	77003	79800	156803	114
	2016	77304	80270	157574	112
	2017	77013	80740	157753	112
	2018	77101	81211	158312	112
Projected	2019	77101	81681	158782	115
	2020	77101	82151	159252	115
	2021	77101	82622	159723	115
	2022	77101	83092	160193	115
	2023	77101	83562	160663	115
	2024	77101	84033	161134	115
	2025	77101	84503	161604	115
	2026	77101	84973	162074	115
	2027	77101	85444	162545	115
	2028	77101	85914	163015	115
	2029	77101	86384	163485	115
	2030	77101	86855	163956	115
	2031	77101	87037	164138	115
	2032	77101	87220	164321	115
	2033	77101	87403	164504	115
	2034	77101	87587	164688	115
	2035	77101	87771	164872	115
	2036	77101	87955	165056	115
	2037	77101	88140	165241	115
	2038	77101	88325	165426	115
	2039	77101	88510	165611	115
	2040	77101	88696	165797	115

**From FCAA WSP Draft : Table 2-1, Finished Water Production*

Table 3.6.1c – Potable Water Demand Summary

FLORIDA KEYS AQUEDUCT AUTHORITY				
Potable Water Demand Summary - New Water Demand, Actual Water Demand, and Expected Water Demand				
Municipality	Year - 2019		Year - 2019	Year 2020
	New Water Service - Gallons/Year	Metered Water - Gallons/Year	Actual Water Demand - Gallons/Year*	Expected Water Demand - Gallons/Year
Unincorporated Monroe County	2,335,000	2,194,005,542	2,824,051,412	2,826,386,412
City of Key West	617,000	1,569,905,703	2,020,730,729	2,021,347,729
City of Marathon	1,337,700	586,491,003	754,911,833	756,249,533
City of Key Colony	0	108,107,301	139,152,144	139,152,144
City of Layton	0	12,290,772	15,820,275	15,820,275
City of Islamorada	324,500	654,275,664	842,162,008	842,486,508
Entire Florida Keys	4,614,200	5,125,075,985	6,596,828,401	6,601,442,601
SFWMD WUP Annual Allocation			8,751,000,000	8,751,000,000
*metered + unmetered water demand (ie. flushing, leaks, etc.)				

**From FCAA, Potable Water Demand Summary, 2020 Update*

3.6.2 Improvements to Potable Water Facilities

FCAA has a 20-year Water System Capital Improvement Master Plan for water supply, water treatment, transmission mains and booster pump stations, distribution mains, facilities and structures, information technology, reclaimed water systems, and Navy water systems.

In 1989, FCAA embarked on the Distribution System Upgrade Program to replace approximately 190 miles of galvanized lines throughout the Keys. FCAA continues to replace and upgrade its distribution system throughout the Florida Keys and the schedule for these upgrades is reflected in their long-range capital improvement plan.

Table 3.6.2 provides the schedule and costs projected for the capital improvements to the potable/alternative water systems planned by the FCAA. The total cost of the scheduled improvements is approximately \$140 million over the next 5 years. These projects are to be funded by water rate structure, long-term bank loans, and grants.

Table 3.6.2 – FCAA Projected 5 Year Capital Improvement Plan

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	Total
Key West Administrative Building	9,000,000	9,000,000	4,364,000	-	-	22,364,000
Stock Island RO Facility	3,000,000	14,000,000	18,000,000	15,000,000	-	50,000,000
Grassy Key Transmission Line Replacement	8,000,000					8,000,000
Transmission Terminus Replacement				840,000	3,360,000	4,200,000
Simonton, Front, Whithead	750,000				1,250,000	2,000,000
Islamorada Transmission Line Replacement	2,670,000	13,350,000	10,680,000			26,700,000
Ocean Reef Distribution and Storage Improvements				3,200,000	3,900,000	7,100,000
New Distribution System at No Name Key	2,600,000					2,600,000
Stock Island Garage Replacement	-				420,000	420,000
Box Girder Bridge Coating/coupling Replacement	-				3,870,000	3,870,000
Florida City Generator Control Panel Replcaemnt					500,000	500,000
Stock Island Pump Station And Generator Replacement	7,000,000					7,000,000
Repair/Upgrade Subaqueous Crossing	2,000,000					2,000,000
Repair/Replace Cathodic Protection	2,700,000					2,700,000
Repair/Upgrade Electrical and Instrumentation	1,000,000					1,000,000
Totals	38,720,000	36,350,000	33,044,000	19,040,000	13,300,000	140,454,000

Source: Florida Keys Aqueduct Authority, 2019 Budget & Financial Plan

In summary, based on current conditions and projects, an adequate supply of water to meet current and future demands is provided by the following: The Biscayne permitted water supply of 17.79 MGD, the 6.0 MGD RO water treatment plant, the new reclaimed water systems, and the ability to operate the 3.0 MGD RO combined desalination plants during emergency situations. The FCAA continues to monitor and track conditions and events that could negatively impact the existing water supply. Any such impacts will be evaluated to determine future changes necessary to continue servicing Monroe County with adequate water supply.

3.7 Conservation

A high priority is placed on water conservation by the SFWMD, FCAA, Monroe County and the City of Key West. It is a mandate to implement Best Management Practices in addition to various irrigation, xeriscape, plumbing fixture efficiency and wastewater reuse requirements.

3.7.1 Regional and County-wide Issues

Water conservation continues to be of the highest priority within the Lower East Coast region of Florida, no more so than in the Keys:

- Monroe County and the City of Key West have Rate of Growth Ordinances that limit new residential and transient development growth based on hurricane evacuation times.
- Monroe County and the City of Key West have irrigation restrictions (Chapter 74, Article III, Division II, Subdivision II), including 5pm-9am watering hours, outlawing wastage, and requiring a water sensing device. They have also adopted the State's Water Shortage Plan (F.A.C. ch. 40E-21).
- The use of potable water for irrigation is regulated by SFWMD's mandatory year-round landscape irrigation conservation measures under Chapter 40E-24, Florida Administrative Code. Key West intends to incorporate this as an ordinance upon the acceptance of this plan.

- SFWMD’s offers many funding opportunities to help enact water conservation projects under the WaterSIP and Cooperative Funding Program programs
- FKAA implements a high base water rate for water use, which deters the most wasteful water uses.
- Other programs that have been instituted by the FKAA and as outlined in its 2007 Water Conservation Plan include: leak detection, a public information program, the Florida-Friendly Landscape Ordinance/Permanent Irrigation Ordinance, plumbing fixture efficiency standards, filter backwash recycling, reuse of wastewater, and metering.
- FKAA is transitioning to smart meters which allow customers to electronically monitor usage and receive leak status reports. These meters have shown to help conservation greatly.
- One Conservation Program available in the LEC that would be very helpful for the Keys would be to have our own dedicated urban Mobile Irrigation Lab for one year.

3.7.2 Local Government Specific Actions, Programs, Regulations, or Opportunities

The City of Key West continues to strive to reduce potable water use, with a gallons/capita/day (GPCD) lower than the whole of the Keys (101 vs 114 GPCD). The City’s goal is to reduce the GPCD of Key West from 101 to 80 GPCD.

The City’s Building Permit Allocation System (BPAS) requires the installation of a cistern for every new residential building, with its capacity equal to the roofs’ square footage. Every new residential building also has to build to a Green Building Certification of at least “bronze”, which incorporates many water saving measures. Through just six (6) years of BPAS, not only have 266,600 gallons of cistern capacity been approved, but 79% of the buildings built to a higher tier than Bronze, including 74 Platinum units. This program has been very successful.

Since 2012, the City has partnered with the FKAA for a Rainbarrel Workshop in April for Water Conservation Month. Through this small program, we have supported the construction of more than one hundred rainbarrels that can each hold up to fifty gallons of rainwater. This program hasn’t been as successful, as we only host it once per year. It is expected that the 2023 update to the Stormwater Master Plan will highlight more opportunities for water catchment based on our urban environment.

For the first Water Supply Facilities Work Plan, the City coordinated multiple meetings with all six planning departments across the Keys’ local governments and worked alongside FKAA and SFWMD to help each other create policies that could be adopted across jurisdictions. The City repeated the process this year as well, which led to a ranking of future water conservation projects, as considered from the LEC Plan Update and other local opportunities:

Table 3.7.2 – Keyswide Planners Ranking for Water Efficiency Actions

Rank	Action
1	Formally support FKAA in opposing Turkey Point cooling systems and their FDEP permits for expansion
2	Enact <u>Building Code amendments</u> to mandate high efficiency water fixtures like <u>Miami Dade County</u>
3	Enforce existing water conservation rules (soil moisture sensors, daytime watering)
4	Enact Building Code amendments to mandate fixtures have Water Sense Certification
5	Explore feasibility of Toilet to Tap at Fleming Key Wastewater Treatment Plant
6	Partner with FKAA to examine feasibility of further refinement of their Water Consumption Tiers

#1) Formally support FKAA in opposing Turkey Point cooling systems and their FDEP permits for expansion

The topmost ranked action has already happened, with the City Commission providing funds for FCAA's legal fees. This Work Plan also amends Element 8 of the City of Key West's Comprehensive Plan to include seeking an interlocal agreement with Miami Dade County providing the City of Key West with an opportunity to comment on land use and regulatory issues related to the Florida City wellfield, aquifer and aquifer recharge area. These acts serve to conserve the water in our wellfield.

#2) Enact Building Code amendments to mandate high efficiency water fixtures like Miami Dade County

This Work Plan amends Chapter 14 of our Code of Ordinances to mandate high efficiency water fixtures as part of our Building Code.

#3) Enforce existing water conservation rules

As part of our Planners Forum, many jurisdictions discovered that they had land development regulations requiring soil moisture sensors in all new irrigation systems, but because they were not a part of the Building Code, were not being enforced. The group intends to work together on a Building Code amendment and supporting material similar to Miami Dade's high efficiency water features amendment.

The Work Plan enacts additional Ordinances that the City will need to be ready to enforce, including Chapter 108's addition of the Mandatory Year-Round Landscape Irrigation Conservation Measures, as detailed in chapter 40E-24, Florida Administrative Code, adopted by the Districts' Governing Board in 2010. Once the Work Plan is adopted and the Ordinance is passed, the City shall run an educational campaign for landscapers and homeowners before Code officers write tickets.

#4) Enact Building Code amendments to mandate fixtures have Water Sense Certification

The Planners Forum decided to wait and see how well #2 worked to meet water conservation goals before pursuing this goal. The Work Plan amendments that do address certification programs include:

- The Coastal Management Element will recognize the importance of certification and licensing programs like WaterSense and Florida's WaterStar.
- The Conservation Element will incorporate Florida-Friendly Landscaping Design Standards and research sections of the International Green Construction Code for efficiency standards.

#5) Explore feasibility of Toilet to Tap at Fleming Key Wastewater Treatment Plant

This goal is a high planning priority but is not budgeted yet. The City intends to have studied this before the next Work Plan.

#6) Partner with FCAA to examine feasibility of further refinement of Water Consumption Tiers

This is another Planners Forum workshop that will happen during the 5 years between now and the next years Work Plan. It was prioritized because the group believes that the existing Tiers do not foster conservation.

Overall, the Work Plan amendments to the City's Comprehensive Plan and Code of Ordinances create many new avenues to address water conservation in the City:

- The Future Land Use Element will include many innovative tools and technologies to the City's toolkit for water conservation into the future.
- The Conservation Element will incorporate SFWMD's Year-Round Permanent Landscape Irrigation Measures, Water Supply Demand Goals, and High efficiency/ultra-low volume fixtures.

The City will continue to coordinate future water conservation efforts with the FCAA, the SFWMD, Monroe County and all other Florida Keys municipalities as necessary 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, FCAA and Monroe County in the implementation of new regulations or programs that are designed to conserve water. As stated previously, the FCAA Planning Standard potable water consumption is 115 gallons/capita/day. As part of this Water Supply Plan, it is recommended that the City maintain its 93 GPCD LOS standard, while working towards a goal of 80 GPCD by the end of this Planning period.

3.8 Reuse

Water reuse is a method for supplementing water availability. Desalination at the source through reverse osmosis is presently incorporated within the design of new water treatment facilities that tap into the Floridan Aquifer. The City's Golf course on north Stock Island, receives reuse water for irrigation from Monroe County's WWTP on south Stock Island.

FCAA and the City have looked into incorporating reuse from the Fleming Key WWTP, but the cost of developing a separate distribution system for recycled water in a very urban area creates significant disturbance and cost challenges.

3.8.1 Regional and County-wide Issues

State law supports reuse efforts. Florida's utilities, local governments, and water management districts have led the nation in implementing water reuse programs that increase the quantity of reclaimed water used and public acceptance of reuse programs. Section 373.250(1) F.S. provides that "water reuse programs designed and operated in compliance with Florida's rules governing reuse are deemed protective of public health and environmental quality." In addition, Section 403.064(1), F.S., provides that "reuse is a critical component of meeting the State's existing and future water supply needs while sustaining natural systems."

The LEC Work Plan noted that additional alternative water supplies need to be developed and that expanded use of reclaimed water is necessary to meet future water supply demands.

The City supports water reuse policies and programs being implemented by the SFWMD, Monroe County and the FCAA. The FCAA has committed to implement water reuse/reclaimed water projects. Reclaimed water serves as an Alternative Water Supply. The benefits of reclaimed water include the disposal of appropriately treated effluent (sewage) in an environmentally friendly manner (such as into marshland), extending the life of water sources, postponing water supply related infrastructure, and irrigation. Both the Big Coppitt Wastewater Treatment Plant and the Hawk's Cay/Duck Key Wastewater Treatment Plant are water reclamation facilities providing reclaimed water to a portion of their service areas.

3.8.2 Local Government Specific Actions, Programs, Regulations, or Opportunities

The City's Richard A. Heyman Environmental Protection Facility is a Wastewater Treatment Plant (RH-WWTP) that is one treatment step away from potable water. This resource would have been very useful during Hurricane Irma when household line breakages greatly reduced the volume of water that could be delivered.

The City's June 2018 Application for Operations Permit Renewal to FDEP for the RH-WWTP included a Reuse Feasibility Study that looked at multiple reuse options as well as direct potable treatment. At this time, the annualized costs of all the projects fall below the minimum consumption charge from FCAA, making them unattractive in the short term, but still viable in the long term. The City will continue to monitor these options going forward.

Policy 6-1.2.5: Protection and Conservation of Potable Water Supply states that where nonpotable alternative sources of irrigation water are available, potable water supplies may not meet irrigation needs.

The City will support the SFWMD, FCAA and Monroe County water reuse projects and implementation of new regulations or programs designed to increase the volume of reclaimed water used and the public acceptance of reclaimed water.

4.0 CAPITAL IMPROVEMENTS

4.1 Work Plan Projects

The City's Five-Year Capital Improvements Program for FY 2020/2021 – 2024/2025 does not include improvements to the Potable Water System, as all Potable Water is provided by FCAA.

The Work Plan incorporates FCAA's 20-Year Water System Capital Improvement Master Plan by reference and FCAA's 2020 5-Year Capital Improvement Program 2020-2024 as Figure 4.1. These Plans list all proposed work projects within Monroe County.

4.2.1 Capital Improvements Element/Schedule

Table 7-2 of the FCAA 20-Year Water System Capital Improvement Master Plan (see Figure 4.1) will serve as the City of Key West's 10-year Water Supply Plan and CIE for potable water.

Projects that affect the City of Key West are:

- **Stock Island Reverse Osmosis Facility** (\$50M) will greatly help in emergency situations.
- **Distribution Main on Simonton, Front and Whitehead** (\$2M) streets is underway and well-coordinated with the City.
- **Stock Island Pump Station** (\$7M) will maintain water pressure and power resiliency.
- **Key West Administration Building Replacement** (\$22M) will not affect water supply
- **Stock Island Garage Replacement** (\$420K) will not affect water supply

The City of Key West will continue to work with FCAA on the Findings and Recommendations (Figure 4.2.1) from their 20-Year Water System Capital Improvement Master Plan.

5.0 PROPOSED COMPREHENSIVE PLAN CHANGES

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5.0 PROPOSED COMPREHENSIVE PLAN CHANGES

That the following modifications and/or additions of Goals, Objectives and Policies to the 2013 City of Key West Comprehensive Plan are hereby modified as follows*:

INTRODUCTION

WATER SUPPLY PLAN

The Florida Water Resources Act, Chapter 373, Florida Statute addresses the state's water supply needs to improve coordination between the local land use planning and regional water supply planning. Residents of the City of Key West obtain their water directly from the Florida Keys Aqueduct Authority (FKAA), which is responsible for ensuring that enough capacity is available for existing and future customers.

The purpose of the City of Key West Water Supply Facilities Work Plan (Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within its jurisdiction. The City of Key West Work Plan is a ten year planning document that gets updated every 5 years to address changes in population, demand, regional supply, conservation efforts and reuse goals.

CHAPTER 1: FUTURE LAND USE ELEMENT

OBJECTIVE 1-1.7: IMPLEMENT WATER SUPPLY PLANNING IN ACCORDANCE WITH STATE GROWTH MANAGEMENT REQUIREMENTS.

Adoption and Update of Water Supply Plan within 18 months after the governing board of South Florida Water Management District approves its Lower East Coast Water Supply Plan, expected every 5 years.

Monitoring Measure(s): Adoption and Update of Water Supply Plan every five years after 2015.

OBJECTIVE 1-1.12: CONSIDER APPLICATION OF INNOVATIVE LAND AND WATER RESOURCE MANAGEMENT, CLIMATE ADAPTATION, AND ENERGY CONSERVATION CONCEPTS.

Policy 1.1.12.6: Water Efficiency in Building and Construction.

As necessary to meet goals, the City shall explore and enact progressive water efficient building codes and retrofits, including but not limited to retrofit at resale, mandatory reuse areas, conservation tier rates, irrigation pump pressure control reduction, and the International Green Construction Code.

As necessary to meet goals, the City shall explore regulatory and/or incentive programs and timelines to increase submetering, fixed interval metering, irrigation audits, rain/moisture sensor retrofits.

The City shall promote attendance at regional training workshops in water conservation in construction and continue to foster cooperative relationships between building trades, architects, engineers and building officials.

Policy 1.1.12.7: Conservation Tier Rates. The City shall coordinate with the FKAA and other local governments on a conservation rate structure before the next Work Plan update.

Policy 1.1.12.8: Stormwater Mitigation. The City shall research and adopt new methodologies for rainwater retention in order to increase freshwater recharge as well as reduce stormwater flooding and nonpoint pollution before the next Work Plan update. These new methodologies could include but are not limited to cisterns, percolation tanks, green infrastructure, and stormwater mitigation fees.

CHAPTER 4: PUBLIC FACILITIES ELEMENT

Objective 4-1.2: Adoption of the Key West Water Supply Facilities Work Plan.

The City of Key West shall comply with its Water Supply Facilities Work Plan 2020-2030 (Work Plan) adopted TBA, 2022, as required by section 163.3177(6)(c), F.S. within 18 months after the governing board of South Florida Water Management District adopted its Lower East Coast Water Supply Plan Update on November 8, 2018.

The Work Plan incorporates Capital Improvements listed in the Florida Keys Aqueduct Authority's' 20-Year Water System Capital Improvement Master Plan and Capital Improvement Program 2020-2024,

The Work Plan shall be updated, at a minimum, every 5 years, within 18 months after the governing board of the South Florida Water Management District approves an updated Lower East Coast Water Supply Plan as required by 163.3177(6)(c)3.

The City's Work Plan is designed to: assess current and projected potable water demands; evaluate the sources and capacities of available water supplies; and identify those water supply projects, using all available technologies, necessary to meet the City's water demands for the planning period.

Monitoring Measure: The Work Plan will be updated, at a minimum, every 5 years and within 18 months after the South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan.

Policy 4-1.2.1: Compliance with the Adopted Water Supply Facilities Work Plan.

The City of Key West shall comply with its Water Supply Facilities Work Plan (2020–2030)

Policy 4-1.2.2: Intergovernmental Coordination with Water Supply Planning

Coordinate appropriate aspects of its Comprehensive Plan with the South Florida Water Management District's Lower East Coast Regional Water Supply Plan update adopted November 8, 2018, with the Florida Keys Aqueduct Authority (FKAA) 20-Year Water System Capital Improvement 2020 Master Plan and as updated by the agency's subsequent budgets and with the Monroe County Water Supply Plan adopted June 17, 2020). The City shall amend its Comprehensive Plan and Work Plan, as required, to provide consistency with the District, County and FKAA plans.

CHAPTER 5: COASTAL MANAGEMENT ELEMENT

Policy 5-1.2.2: Limit Impacts of Development and Redevelopment Upon Water Quality and Quantity, Wildlife Habitat and Living Marine Resources and Implement Policies for Shoreline Land Uses.

6. Ocean, Gulf, and Estuarine Water Quality.

In order to protect the water quality of the Atlantic Ocean and the Gulf of Mexico, no new point source pollution shall be permitted to discharge into these waters or into ditches or canals flowing into these waters. In addition, in order to reduce nonpoint source pollutants, the City shall require the following:

- e. By 2022, the City shall incorporate rainwater collection, distribution and percolation systems into stormwater management planning.
- f. The City shall support and advertise certification and licensing programs which encourage responsible business practices. This includes, but is not limited to EPA's WaterSense, Florida's WaterStar, Green Industries – Best Management Program and the irrigation specialty contractor's license.

CHAPTER 6: CONSERVATION ELEMENT

Policy 6-1.2.5: Protection and Conservation of Potable Water Supply.

The City of Key West has no wellfields and has no need for a wellfield protection ordinance. In order to comply with policies of the South Florida Water Management District directed toward conservation of potable water supply, reduce irrigation needs and to achieve a reduction in the current rates of water consumption, Land Development Regulations shall be amended to incorporate the following performance standards:

- 3. At least seventy (70%) percent of all landscaping material obtained from offsite sources for use on any site should be native plant material adapted to soil and climatic conditions existing on the subject site. Further, at least fifty (50%) percent of all trees used in landscaping shall be native species adapted to soil and climatic conditions existing on-site in order to lessen water demand.
- 6. At least 75% of the landscape must utilize 'right plant, right place' practices, as defined by Florida-Friendly Landscaping Design Standards.
- 7. In order to reduce demand for potable water used as irrigation, the City intends to adopt SFWMD's mandatory year-round permanent landscape irrigation measures into its Code of Ordinances, with the intent and purpose of establishing a regulatory framework to protect the water resources of the City of Key West.

Policy 6-1.2.8: Water Supply Demand.

Implementation of the Work Plan shall ensure that adequate water supplies and public facilities are available to serve the water supply demands of any population growth that the City may experience.

The City shall work to reduce the water supply demand from 101 gallons per capita per day to 80 gallons per capita per day through efficiencies and conservation.

Policy 6-1.2.9: Coordinated Water Supply Planning.

The City shall coordinate the planning of potable water and sanitary sewer facilities, water supply sources, demands, other services and level-of-service standards with the FCAA, South Florida Water Management District, other local municipalities, and through the Lower East Coast Water Supply Plan Update adopted November 8, 2018, as necessary.

Policy 6-1.2.12: Efficient Equipment and Appliances.

The City shall require the use of high efficiency/ultra-low volume toilets, showerheads, faucets, clothes washers and dishwashers that are Energy Star rated and WaterSense certified in all new residential and commercial projects, including major and minor development plans.

Policy 6-1.2.14: Landscape Guidelines.

The City shall adopt Florida-Friendly Landscape guidelines and principals; gutter downspouts, roof runoff, and rain harvesting through the use of cisterns, rain barrels and directing runoff to landscaped areas; drip irrigation or micro- sprinklers; rain or moisture sensor irrigation controllers; and the use of porous surface materials (bricks, gravel, turf block, mulch, pervious concrete, etc.) on walkways, driveways and patios.

By 2022, the City shall research and enact policies and guidelines allowing cistern capacity to satisfy some portion of stormwater storage requirements.

Policy 6-1.2.19: Proactive Building Codes

By 2024, the City shall research and adopt sections of the International Green Construction Code or other established efficiency standards that increase efficiency without substantially increasing cost or complexity.

CHAPTER 8: INTERGOVERNMENTAL COORDINATION ELEMENT

Policy 8-1.3.5: Coordinated Facility Planning.

The City shall coordinate the planning of potable water and sanitary sewer facilities, water supply sources, demands, other services and level-of-service standards with the FCAA, South Florida Water Management District, other South Florida local governments and through the Lower East Coast

Water Supply Plan Update adopted November 8, 2018, as necessary. This includes the City of Florida City activities that protect its wellfield area.

Policy 8-1.3.7: Inter-Local Agreements.

Negotiate or renew inter-local agreements with water supply providers, ensuring contractual agreement of the adopted level of service standards, service area, populations and times for services provided.

Seek an interlocal agreement with Miami Dade County providing the City of Key West with an opportunity to comment on land use and regulatory issues related to the Florida City wellfield, aquifer and aquifer recharge area. This will set forth procedures for review of land use and regulatory activities identified as having potentially significant impacts on the aquifer recharge and water supply systems especially concerning hazardous waste generation. Criteria for determination of significant impacts shall be included in the interlocal agreement.

CHAPTER 9: CAPITAL IMPROVEMENTS ELEMENT

Policy 9-1.6.1: Level of Service Standards.

Potable Water Level of Service

Quantity: 93 gallons/capita/day
Minimum Pressure: 20 PSI at customer service
Minimum Potable Water Quality: Shall be defined by Chapter 62-550 F.A.C.

Policy 9-4.1.3: Capital Improvement Schedules of Other Agencies.

The City shall incorporate capital improvements affecting City levels of service by referencing the Capital Improvements Schedules of the FCAA (FY2020 through FY2024) state agencies and other units of government providing services, but not having regulatory authority over the use of land, into its Five-Year Schedule of Capital Improvements (Fiscal Years 2020 through 2024). The City Schedule shall be maintained and updated annually.

APPENDIX A

CITY OF KEY WEST 2012 UPDATES TO THE DATA AND ANALYSIS FOR EAR-BASED COMPREHENSIVE PLAN AMENDMENTS

Chapter 5.2 – Potable Water

Existing Level of Service Standard

Residential Uses: 93 gallons per capita per day

Non-Residential Uses: 93 gallons per capita per day

Analysis

Total Functional Population 158,051

Total capacity required: 6,280,910 gallons per day

Actual daily use: 5,617,830 gallons per day

Potable water to the City of Key West is provided by the Florida Keys Aqueduct Authority (FKAA). The FKAA has the capacity to provide 23 million gallons per day to Monroe County as a result of: the South Florida Water Management District's issuance of Water Use Permit #13-0005, which allocates 17 million gallons per day in the dry season; 17.79 million gallons per day which can be withdrawn from the Biscayne Aquifer; and six million gallons per day provided by a reverse osmosis treatment plant in Florida City. As documented above, the City is meeting its Level of Service Standard for Potable Water. The City projects a slight permanent population decrease, and only a slight increase in its functional population and non-residential development during short and long range planning periods, so the current capacity should remain adequate. Ongoing capital improvements will be necessary to maintain and improve standards and service delivery.

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6.0 PROPOSED CHANGES TO CODE OF ORDINANCES

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6.0 PROPOSED CHANGES TO CODE OF ORDINANCES

That the following modifications and/or additions of regulations to the City of Key West Code of Ordinances are hereby modified as follows*:

SUBPART A – GENERAL ORDINANCES

CHAPTER 14 – BUILDINGS AND BUILDING REGULATIONS

ARTICLE II. – BUILDING CODES

Section 14-35. - Amendments to Building Code.

The Florida Building Code adopted by the provisions of section 14-31 is amended in the following respects:

Sec. 604.4, Florida Building Code, Plumbing

The City hereby adopts the following local technical amendments to Chapter 6 (Plumbing) of the Florida Building Code.

604.4 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table 604.4. Effective November 1, 2022, permit applications for all residential and commercial new construction and renovations shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table 604.4. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications in Table 604.4 or have received the U.S. Environmental Protection Agency (EPA) WaterSense or EnergyStar Certification labels.

Exceptions:

1. Blowout design water closets [3.5 gallons (13L) per flushing cycle].
2. Vegetable sprays.
3. Clinical sinks [4.5 gallons (17 L) per flushing cycle].
4. Service sinks.
5. Emergency showers.

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES, FIXTURE FITTINGS AND APPLIANCES

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY ^(b)
Lavatory, private	WaterSense Certified (1.5 gpm at 60 psi)
Lavatory, public, (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi

Shower head ^(a)	WaterSense Certified (1.5 gpm at 80 psi)
Sink & Kitchen faucet	WaterSense Certified (1.5 gpm at 60 psi)
Urinal	WaterSense Certified (Waterless or 0.5 gallon per flushing cycle)
Water closet	WaterSense Certified (1.28 gallons per flushing cycle)
Dishwasher (residential)	Energy Star Certified (3.5 Gallons/Cycle)
Dishwasher (commercial)	Less than 1.2 gallons per rack for fill and dump machines and less than 0.9 gallons per rack for all other types of machines
Dishwasher (under the counter machines)	1.0 gallon or less per rack for high-temperature machines and 1.7 gallons per rack for low-temperature machines
Washing machine	Energy Star Certified (4.3 Water Factor) ^(c)

For SI:

1 gallon = 3.785 L

1 gallon per minute = 3.785 L/m

1 pound per square inch = 6.895 kPa.

- (a) A hand-held shower spray is a shower head.
- (b) Consumption tolerances shall be determined from referenced standards.
- (c) Water factor in gallons per cycle per cubic foot.

P2906.2, Florida Building Code, Residential

The City hereby adopts the following local technical amendments to Chapter 29 (Residential) of the Florida Building Code.

P2903.2 Maximum flow and water consumption.

The maximum water consumption flow rates and quantities for all plumbing fixtures, fixture fittings and appliances shall be in accordance with Table P2903.2. Effective November 1, 2022, permit applications for all residential and commercial new construction and renovations shall include high efficiency plumbing fixtures, fixture fittings and appliances as provided in Table P2903.2. Such high efficiency plumbing fixtures, fixture fittings and appliances shall comply with the specifications in Table P2903.2 or have received the U.S. Environmental Protection Agency (EPA) WaterSense or EnergyStar Certification labels.

TABLE P2903.2

MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES, FIXTURE FITTINGS AND APPLIANCES ^(b)

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	WaterSense® Certified (1.5 gpm at 60 psi)
Shower head ^(a)	WaterSense® Certified (1.5 gpm at 80 psi)
Sink faucet	WaterSense® Certified (1.5 gpm at 60 psi)
Water closet	WaterSense® Certified (1.28 gallons per flushing cycle)
Dishwasher	EnergyStar® Certified (3.5 Gallons per Cycle)
Washing machine	Energy Star® Certified (4.3 Water Factor) ^(c)

For SI:

1 gallon = 3.785 L

1 gallon per minute = 3.785 L/m

1 pound per square inch = 6.895 kPa.

(a) A handheld shower spray shall be considered a shower head.

(b) Consumption tolerances shall be determined from referenced standards.

(c) Water Factor in gallons per cycle per cubic foot.

SUBPART A – GENERAL ORDINANCES

Chapter 74 – UTILITIES

ARTICLE III – WATER AND WATER MANAGEMENT

Division 2. - CONSERVATION

Subdivision II. Permanent Water Conservation Measures

Sec 74-295. – Title; purpose

- (a) This subdivision shall be known as the "City of Key West's Water and Irrigation Conservation Ordinance."
- (b) This subdivision sets restrictions, constraints and prohibitions on persons in Key West in order to enhance the city's water resources and provides a permanent water conservation measure. Unless otherwise provided, nothing in this subdivision shall be construed to relieve any person from compliance with any applicable regulations enacted by the city or any other political subdivision of the state.
- (c) The purpose of this subdivision is to establish a regulatory framework to ensure that water and landscape irrigation conservation will be consistent throughout the city and with the South Florida Water Management District's (District) mandatory year-round landscape irrigation conservation measures.

Sec. 74-296. - Definitions.

The following definitions shall apply:

Address means the "house number" (a numeric or alphanumeric designation) that, together with the street name, describes the physical location of a specific property. This includes "rural route" numbers, but excludes post office box numbers. If a lot number in a mobile home park or similar community is used by the U.S. Postal Service to determine a delivery location, the lot number shall be the property's address. If a lot number in a mobile home park or similar residential community is not used by the U.S. Postal Service (e.g., the park manager sorts incoming mail delivered to the community's address), then the community's main address shall be the property's address. If a property has no address, it shall be considered "even-numbered."

Agriculture means the growing of farm products including, but not limited to, vegetables, citrus and other fruits, sod or nursery stock including, but not limited to, ornamental foliage and greenhouse plants.

Athletic Play Area means all golf course fairways, tees, roughs, greens, and other athletic play surfaces; including, football, baseball, soccer, polo, tennis, lawn bowling fields, and rodeo, equestrian and livestock arenas.

Consumptive Use Permit (CUP) means a permit issued pursuant to Chapter 40E-2, F.A.C., authorizing the consumptive use of water.

District means the South Florida Water Management District, a government entity created under Chapter 373, Florida Statutes.

Even-Numbered Addresses means an address ending in the number 0, 2, 4, 6 or 8; rights-of-way or other locations with no address; or the letters A-M.

Existing Landscaping means any landscaping which has been planted in the ground for more than ninety (90) days.

Impervious means land surfaces that do not allow the penetration of water, including paved roads, sidewalks, driveways, parking lots and highly compacted areas such as shell or clay.

Irrigation means the direct application of water by means other than precipitation.

Irrigation systems means equipment and devices that deliver water to plants being irrigated including, but not limited to pipelines, control structures, pipes and ditches, pumping stations, emitters, valves and fittings. This does not include the transfer of water through water management systems from one location to another.

Landscaping means shrubbery, trees, lawns, sod, grass, ground covers, plants, vines, ornamental gardens, and such other flora not intended for resale, which are situated in such diverse locations as residential landscapes, recreation areas, cemeteries, public, commercial, and industrial establishments, public medians, and rights-of-way, except athletic play areas.

Landscape Irrigation means the outside watering of shrubbery, trees, lawns, sod, grass, ground covers, plants, vines, ornamental gardens, and such other flora not intended for resale, which are planted and are situated in such diverse locations as residential landscapes, recreation areas, cemeteries, public, commercial, and industrial establishments, public medians, and rights-of-way, except athletic play areas.

Law Enforcement Official(s) means city/county/village/town should include a definition of a law enforcement, code enforcement, or any local government employee who may be responsible for enforcing this Ordinance.

Low Volume Hand Watering means the watering of landscape by one (1) person, with one (1) hose, fitted with a self-canceling or automatic shutoff nozzle.

Low Volume Irrigation means the use of equipment and devices specifically designed to allow the volume of water delivered to be limited to a level consistent with the water requirement of the plant being irrigated, and to allow that water to be placed with a high degree of efficiency in the root zone of the plant. The term also includes water used in mist houses and similar establishments for plant propagation. Overhead irrigation and flood irrigation are not included.

Micro-irrigation means the application of small quantities of water on or below the soil surface as drops or tiny streams of spray through emitter or applicators placed along a water delivery line. Micro-irrigation includes a number of methods or concepts such as bubbler, drip, trickle, mist or micro-spray, and subsurface irrigation.

New Landscaping means any landscaping which has been planted and established for ninety (90) days or less.

Odd-Numbered Address means an address ending in the number 1, 3, 5, 7 or 9; or the letters N-Z.

Person includes any natural person, individual, public or private corporation, firm, association, joint venture, partnership, municipality, governmental agency, political subdivision, public officer or any other entity whatsoever, or any combination of such, jointly or severally.

Reclaimed Water means wastewater that has received at least secondary treatment, and basic disinfection and is reused after flowing out of a wastewater treatment facility as defined by Rule 62-40.210, F.A.C.

User means any person, individual, firm, association, organization, partnership, business trust, corporation, company, agent, employee or other legal entity, whether natural or artificial, the United States of America, and the State and all political subdivisions, regions, districts, municipalities, and public agencies thereof, which directly or indirectly takes water from the water resource, including uses from private or public utility systems, uses under water use permits issued pursuant to Chapter 40E-2, F.A.C., or uses from individual wells or pumps.

Wasteful and unnecessary means allowing water to be dispersed without any practical purpose to the water use; for example, excessive landscape irrigation, leaving an unattended hose on a driveway with water flowing, allowing water to be dispersed in a grossly inefficient manner, regardless of the type of water use; for example,

allowing landscape irrigation water to unnecessarily fall onto pavement, sidewalks and other impervious surfaces; or allowing water flow through a broken or malfunctioning water delivery or landscape irrigation system.

Water Resource means any and all water on or beneath the surface of the ground, including natural or artificial watercourses, lakes, ponds, or diffused surface water, and water percolating, standing, or flowing beneath the surface of the ground.

Water Shortage means when the District determines there is the possibility that insufficient water will be available to meet the present and anticipated needs of the users, or when conditions are such as to require a temporary reduction in total use within a particular area to protect water resources from serious harm. A water shortage usually occurs due to drought.

Water Shortage Emergency means when the District determines the provisions listed in Part II of Chapter 40E-21, F.A.C., are not sufficient to protect the public health, safety, or welfare; the health of animals, fish, or aquatic life; a public water supply; or commercial, industrial, agricultural, recreational, or other reasonable-beneficial uses.

Sec. 74-297. - Restrictions.

- (a) Irrigation of any residential, commercial, institutional, governmental or industrial landscape areas shall be restricted to the hours of 5:00 p.m. to 9:00 a.m.
- (b) It shall be unlawful to operate or cause the operation of any irrigation system or device in a manner causing potable water to be wasted. Such unlawful operations shall include, but not be limited to, unnecessary watering of impervious areas, other than that which may occur incidental to the proper operation of the primary irrigation system.
- (c) Upon the effective date of Ordinance [No. 02-28, January 1, 2003,] new installations of automatic irrigation systems shall be equipped with a water sensing device that shall automatically discontinue irrigation during periods of rainfall.
- (d) Irrigation of existing landscaping shall comply with the following provisions:
 - (1) Even-Numbered Addresses and rights-of-way, or other locations without an address, may accomplish necessary landscape irrigation only on Thursdays, and/or Sundays.
 - (2) Odd-Numbered Addresses may accomplish necessary landscape irrigation only on Wednesdays, and/or Saturdays.
- (e) Irrigation of new landscaping shall comply with the following provisions:
 - (1) New Landscaping may be irrigated once on the day it is installed without regard to the listed watering days and times. Irrigation of the soil immediately prior to the installation of the new landscaping is allowed without regard to the listed watering days and times.
 - (2) A ninety (90) day establishment period begins on the day new landscaping is installed. The new landscaping shall be installed within a reasonable time from the date of purchase, which may be demonstrated with a dated receipt or invoice.
 - (3) Irrigation of new landscaping which has been in place for thirty (30) days or less may be accomplished on Monday, Tuesday, Wednesday, Thursday, Saturday, and/or Sunday.

- (4) Irrigation of new landscaping which has been in place for thirty-one (31) to ninety (90) days may be accomplished on Monday, Wednesday, Thursday, and/or Saturday.
- (5) Irrigation of the new landscaping is limited to areas containing only the new landscaping. An entire zone of an irrigation system shall only be utilized for landscape irrigation under this Code if the zone in question is for an area that contains at least fifty percent (50%) new landscaping. If a zone contains less than fifty percent (50%) new landscaping, or if the new landscaping is in an area that will not typically be irrigated by an irrigation system, only the individual new plantings are eligible for additional irrigation. Targeted watering may be accomplished by low volume hand watering, or any appropriate method which isolates and waters only the new landscaping.
- (f) Irrigation systems may be operated outside restricted days and/or times for cleaning, maintenance, and repair with an attendant on-site in the area being tested. Landscape irrigation systems may routinely be operated for such purposes no more than once per week, and the run time for any one (1) test should not exceed ten (10) minutes per zone.
- (g) Landscape irrigation for the purpose of watering-in fertilizers, insecticides, pesticides, fungicides, and herbicides, where such watering-in is required by the manufacturer, or by federal, state or local law, shall be allowed under the following conditions:
- (1) Such watering-in shall be limited to one (1) application in the absence of specific alternative instructions from the manufacturer; and
 - (2) Such watering-in shall be accomplished during normal watering days and times listed above unless a professional licensed applicator has posted a temporary sign containing the date of application and the date(s) of needed watering-in activity.
- (h) Any plant material may be watered using low volume irrigation, micro-irrigation, low volume hand watering methods, rain barrels, cisterns, or other similar rain-harvesting devices without regard to the listed watering days or times.
- (i) In addition to the specific listed measures, all wasteful and unnecessary water use is prohibited.
- (j) In the event the District imposes restrictions on landscape irrigation for new and existing installations which are more restrictive than those imposed by this Code, such as under the declaration of a water shortage or water shortage emergency, the more restrictive regulations shall apply for the applicable duration of the more restrictive regulations.
- (k) It shall be the duty of each user to keep informed as to the landscape irrigation conservation measures within this Code, which affect each particular water use.

Sec. 74-299. - Enforcement.

- (a) Every law enforcement official having jurisdiction in the area governed by this Code shall, in connection with all other duties imposed by law, diligently enforce the provisions of this Code by issuance of a citation, summons, or notice to appear in county court, or by filing an action in civil court for injunctive relief. The city manager may also delegate enforcement responsibility for this Code to other departments of the town government.

- (b) A failure to comply with the requirements of this subdivision shall constitute a violation, punishable as provided in section 2-680. Each day a person is in violation of a provision of this subdivision shall constitute a separate offense.
- (c) In addition to the penalties contained herein, the city may take appropriate action, including but not limited to, administrative action and requests for temporary and permanent injunctions, to enforce the provisions hereof.

Sec. 74-300. - Variance relief.

- (a) Any person affected by the provisions of this subdivision may make written application to the city manager for a variance, if compliance would impose a unique, unnecessary and inequitable hardship on such person. Relief may be granted only upon a demonstration that such hardship is peculiar to the person or the affected property and is not self-imposed, and that the grant of the variance will be consistent with the general intent and purpose of this subdivision.
- (b) Examples of circumstances for a variance include, but are not limited to:
 - (1) Two (2) or more properties which share a common source of water;
 - (2) A public or private water system experiencing or anticipating distribution problems;
 - (3) A user maintains an irrigation system that uses soil moisture sensors or weather-based irrigation controllers; or
 - (4) Where a contiguous property is divided into different zones, a variance may be granted so that each zone may be irrigated on days different than other zones of the property; or
 - (5) Where a user maintains, manages, or owns a non-residential property, such as a house of worship or weekly market (farmer/flea), where the primary day of use, operation, or attendance for the property coincides with the prescribed watering day for the address.
- (c) Upon receipt of an application for variance, the city manager shall render a decision on the variance within ten working days. The decision of the city manager shall constitute final administrative action.
- (d) An application for a variance, and/or the granting of a variance, shall operate prospectively, and shall not affect any pending enforcement action against the property owner pursuant to the provisions of this subdivision.

7.0 REFERENCES

- Florida Keys Aqueduct Authority, 20-Year Water System Capital Improvement Plan, 2020
- Florida Keys Aqueduct Authority, Annual Water Demand Update through 2030
- Florida Keys Aqueduct Authority, Annual Water Demand Update by Municipal Boundary
- Florida Keys Aqueduct Authority, Projected 5-Year Capital Improvement Plan
- Keith and Schnars, P.A. and Fishkind and Associates, Monroe County 2010-2030 Population Projections, March 15, 2011
- Monroe County Growth Management, Monroe County 2030 Comprehensive Plan
- South Florida Water Management District, Lower East Coast Water Supply Plan Update, November 8, 2018
- Southeast Florida Regional Climate Change Compact, Integrating Climate Change & Water Supply Planning in Southeast Florida, June 10, 2014
- Southeast Florida Regional Climate Change Compact, A Unified Sea Level Rise Projection for Southeast Florida, October 2020.

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8.0 Figures

Figure C1 – Maps (General Location, Water Service, Wellfield Cones of Influence)

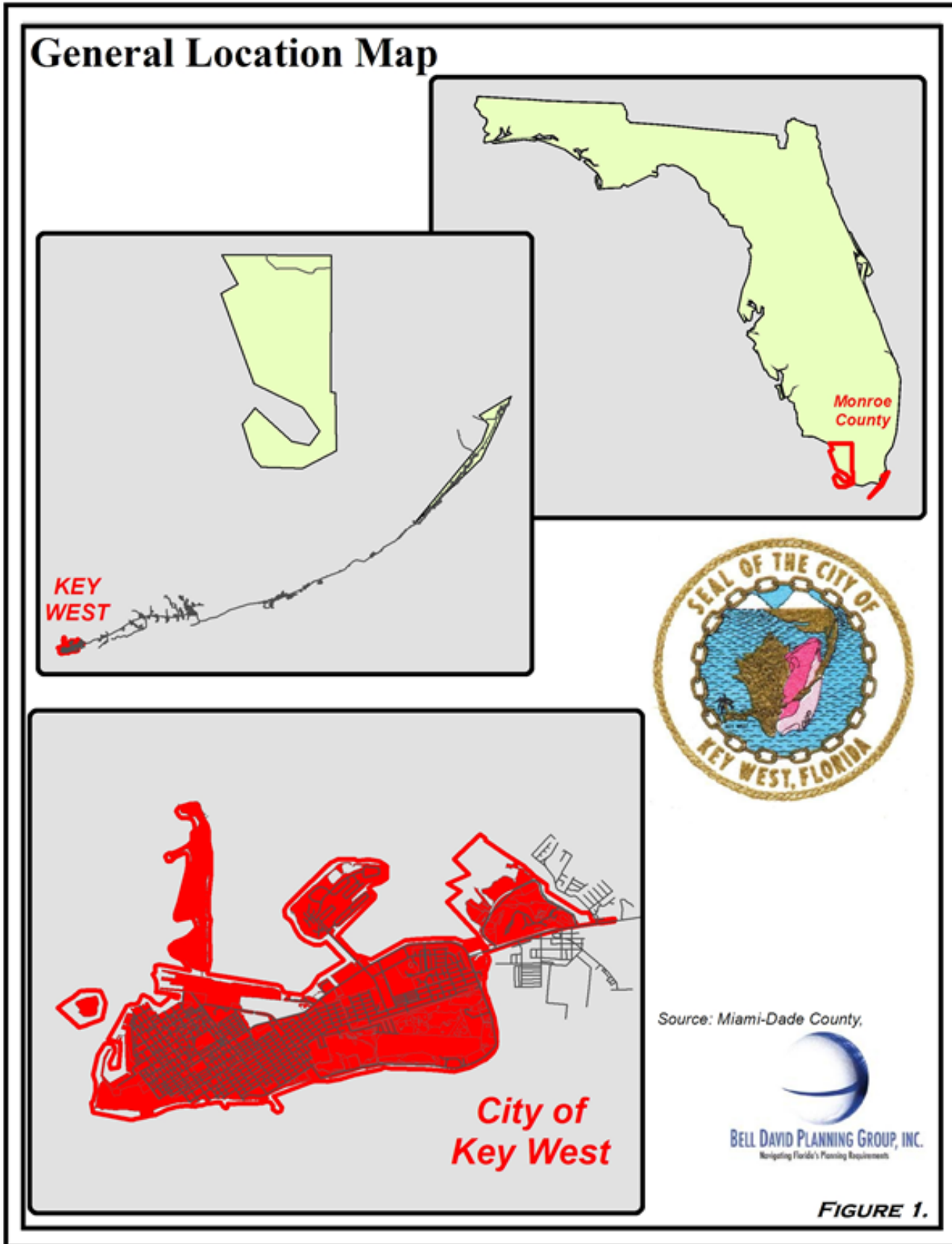
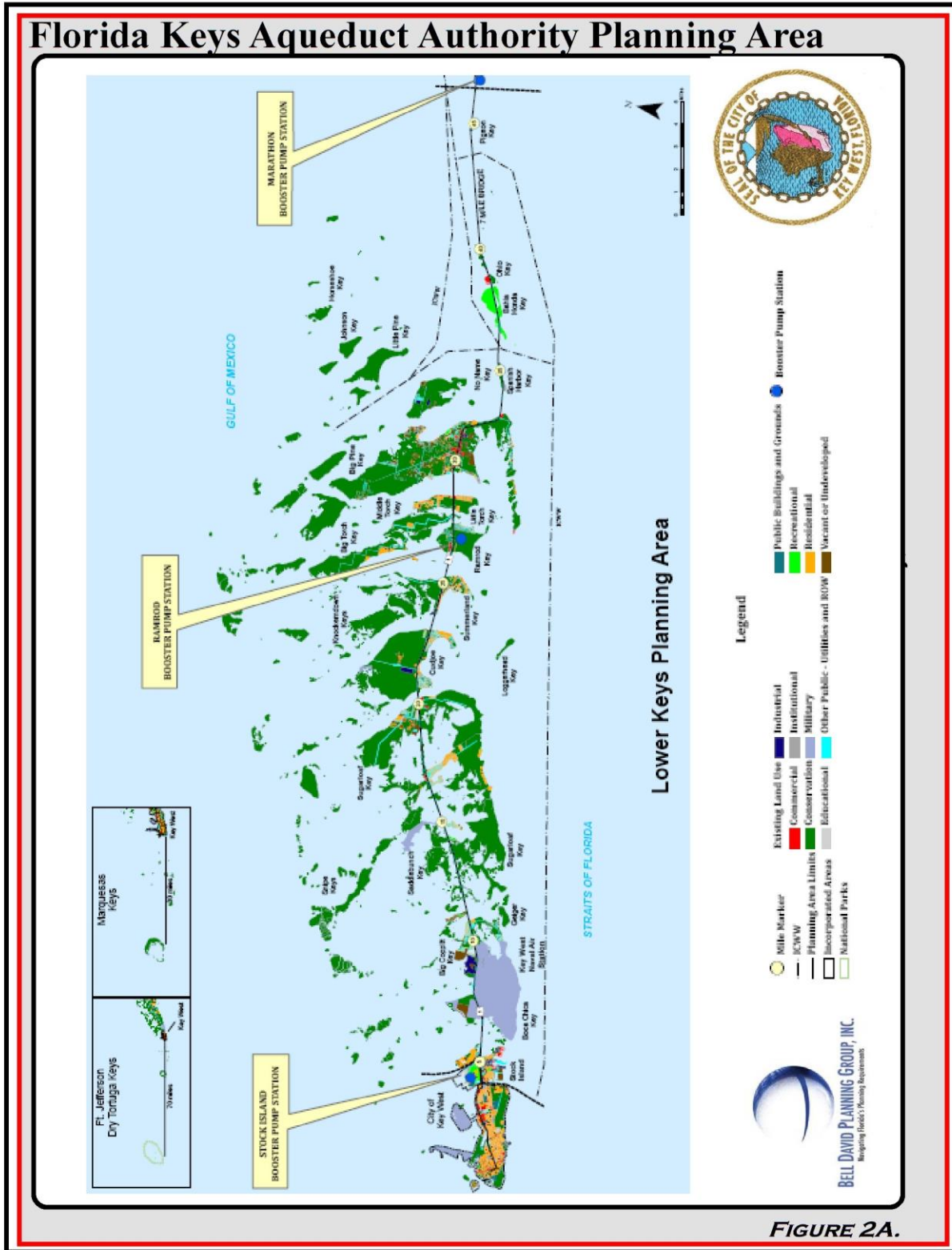
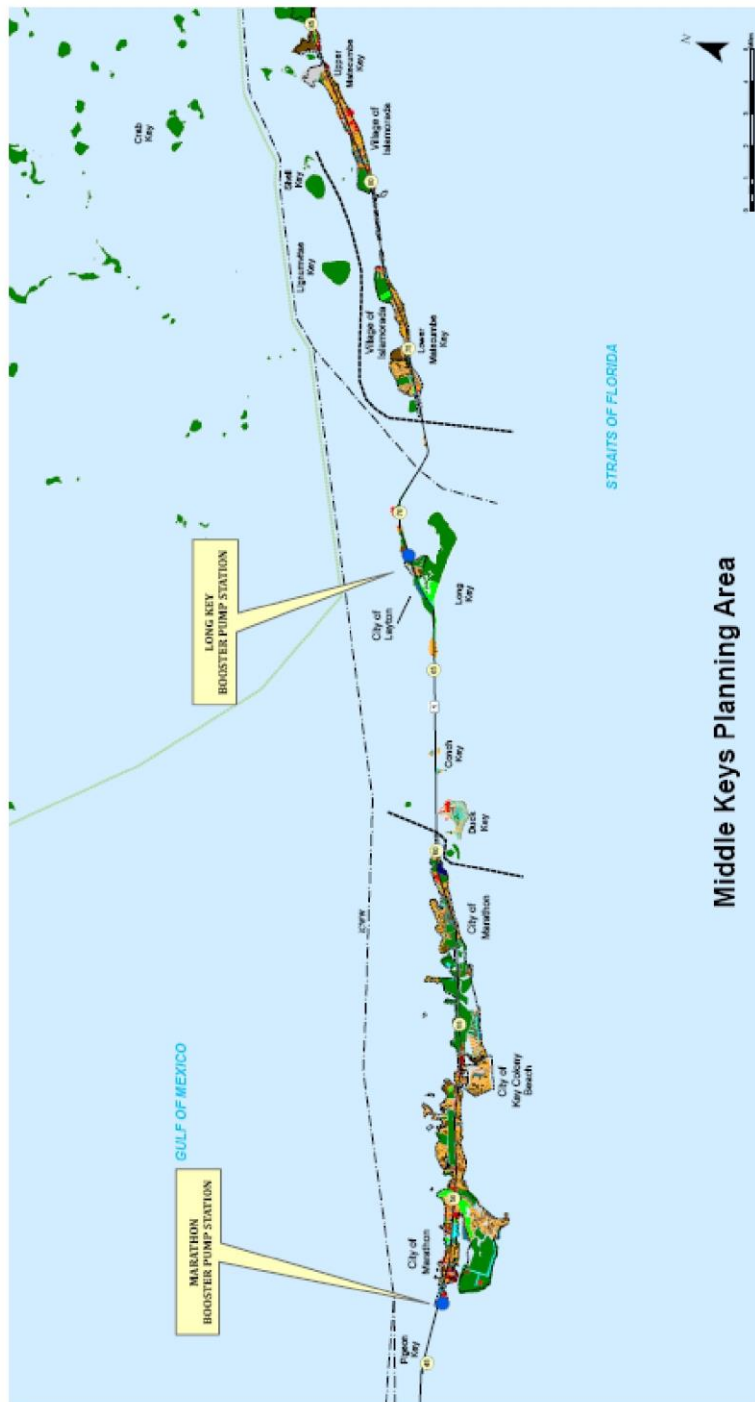


Figure C3.2 – Water Service Maps



Florida Keys Aqueduct Authority Planning Area



Middle Keys Planning Area



- Legend**
- Mile Marker
 - Existing Land Use
 - Commercial
 - Industrial
 - Institutional
 - Conservation
 - Educational
 - Military
 - Other Public - Utilities and 2016
 - Planning Area Limits
 - Incorporated Areas
 - National Parks
 - Public Buildings and Grounds
 - Recreational
 - Residential
 - Vacant or Undeveloped
 - Booster Pump Station



FIGURE 2B.

Florida Keys Aqueduct Authority Planning Area

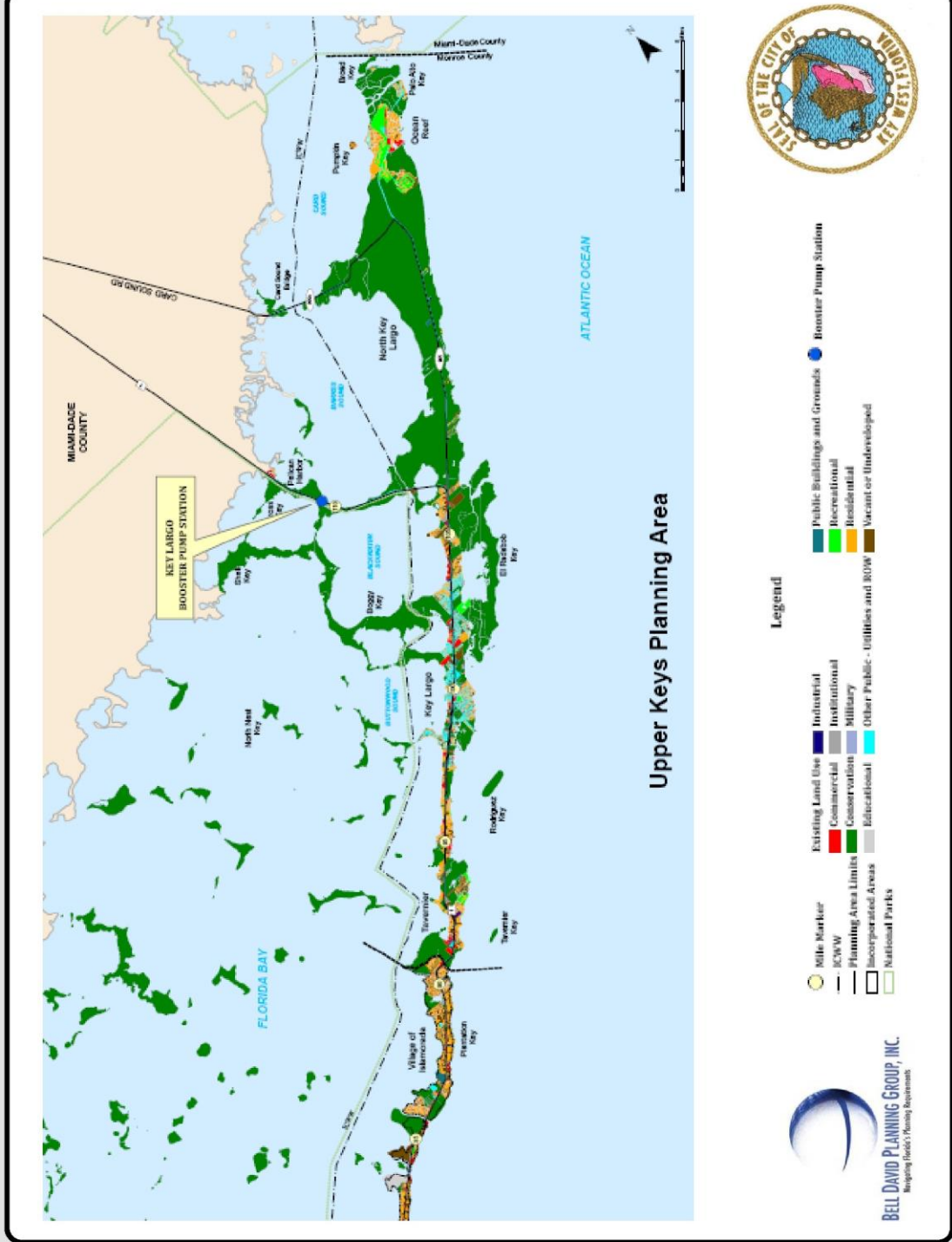


FIGURE 2C.

Florida Keys Aqueduct Authority Planning Area

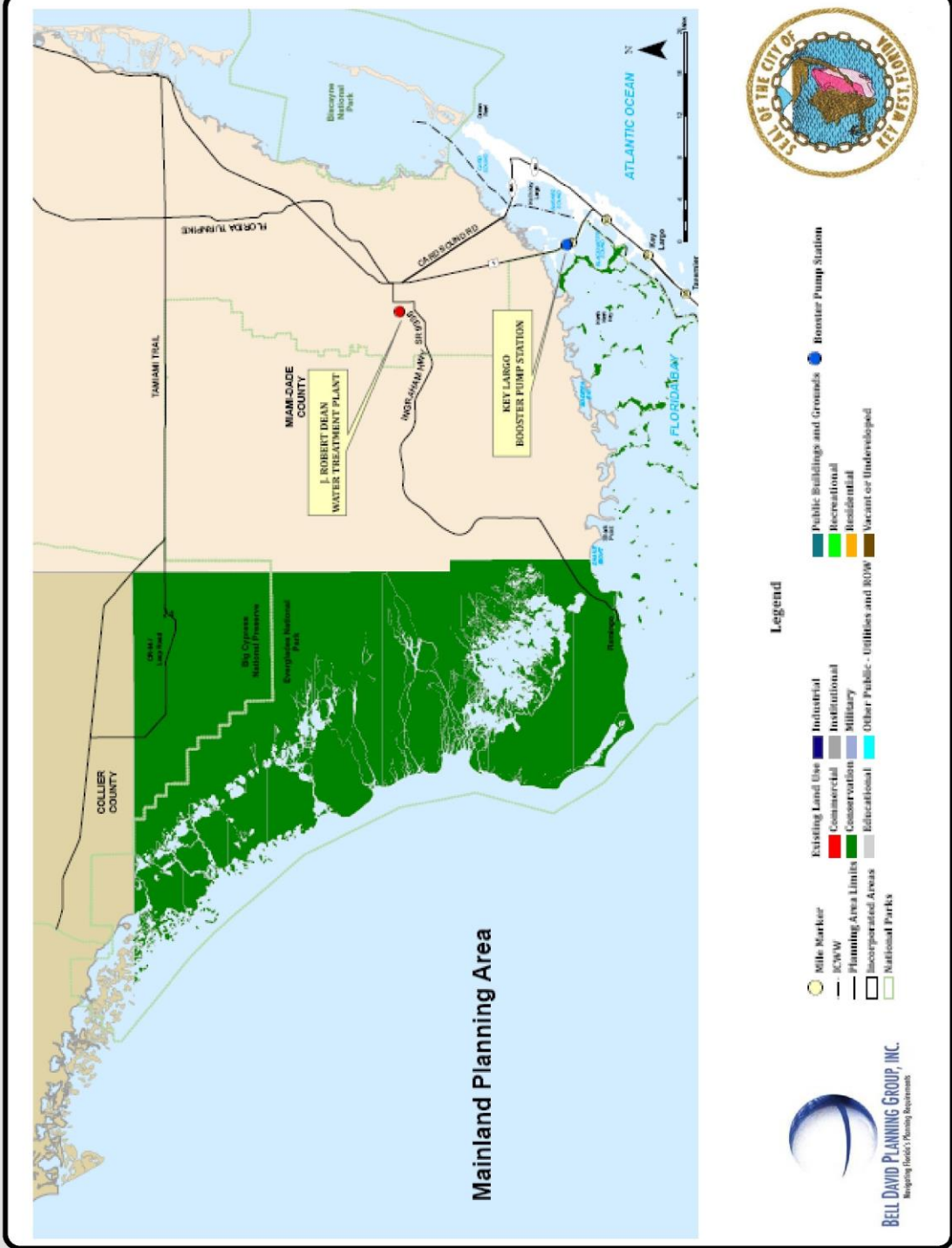


FIGURE 2D.

Figure C3.2a – City of Key West Water Service Boundaries



Figure C3.6 – Wellfield Cones of Influence

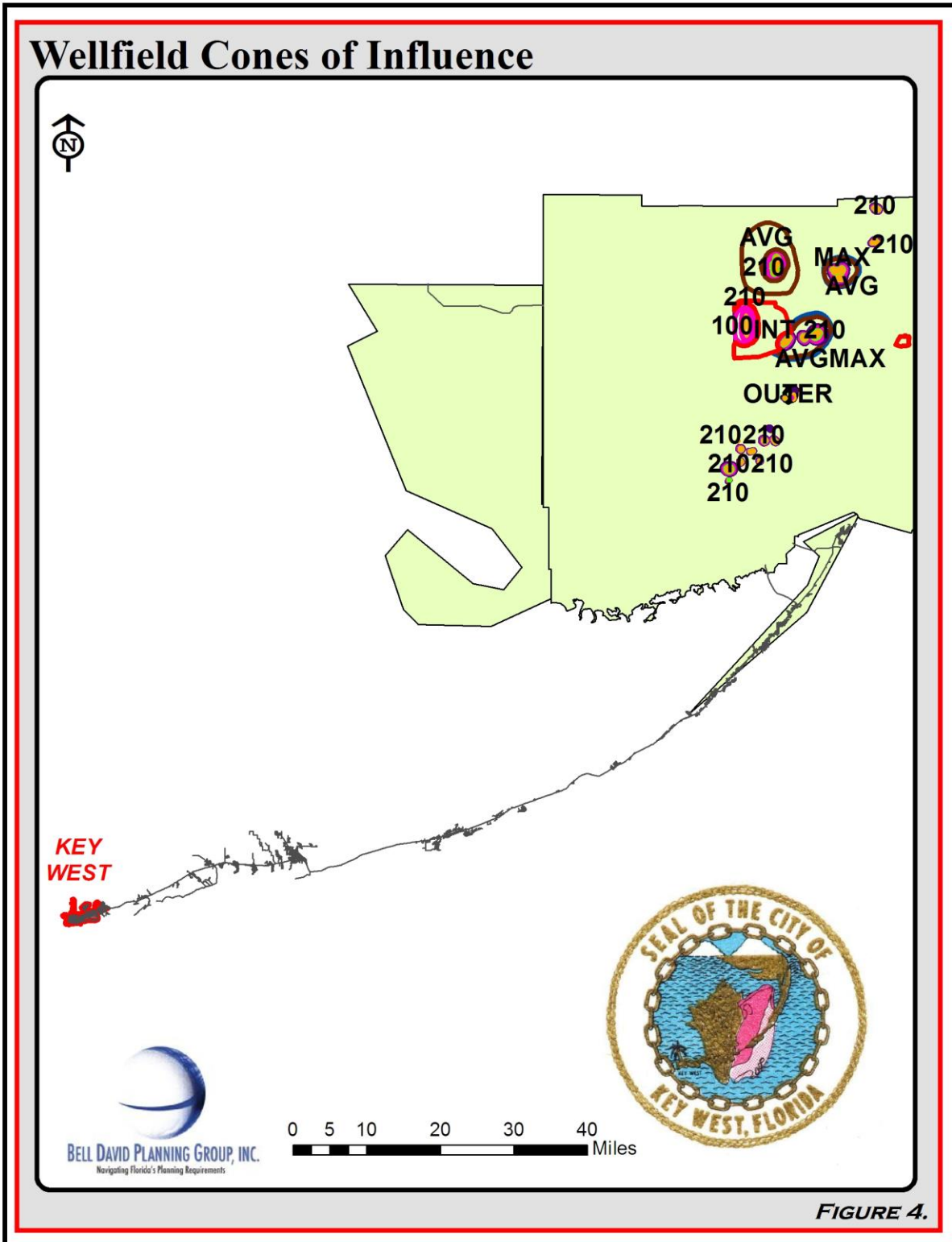


Figure C4.1 – Table 7-2 of the FCAA 20-Year Water System Capital Improvement Master Plan

TABLE 7-2

Five-Year Capital Improvement Funding Plan

Line No.	Description	Funding Source	Projected Fiscal Year Ending September 30					Total
			2020	2021	2022	2023	2024	
CAPITAL COSTS - WATER SYSTEM								
Facilities and Structures								
1	Key West Administration Building Replacement	Series 2019A	\$ 9,000,000	\$ 9,000,000	\$ 4,364,000	-	-	\$ 22,364,000
2	Stock Island garage replacement	RR	-	-	-	-	\$ 420,000	\$ 420,000
3	Total Water Supply		\$ 9,000,000	\$ 9,000,000	\$ 4,364,000	-	\$ 420,000	\$ 22,784,000
Water Treatment Plant								
4	SIRO Facility	RR & Series 2021	\$ 3,000,000	\$ 14,000,000	\$ 18,000,000	\$ 15,000,000	-	\$ 50,000,000
5	Total Water Treatment Plant		\$ 3,000,000	\$ 14,000,000	\$ 18,000,000	\$ 15,000,000	-	-
Water Transmission System								
6	Grassy Key transmission line replacement	Series 2019A	\$ 8,000,000	-	-	-	-	\$ 8,000,000
7	Transmission Terminus rehabilitation	RR	-	-	-	\$ 840,000	\$ 3,360,000	\$ 4,200,000
8	Islamorada transmission line replacement	Series 2019A & RR	\$ 2,670,000	\$ 13,350,000	\$ 10,680,000	-	-	\$ 26,700,000
9	Total Water Transmission System		\$ 10,670,000	\$ 13,350,000	\$ 10,680,000	\$ 840,000	\$ 3,360,000	\$ 38,900,000
Other Water System Projects								
10	Simc Whit Distr Repl	RR	\$ 750,000	-	-	-	\$ 1,250,000	\$ 2,000,000
11	Ocean storage tank	RR	-	-	-	\$ 3,200,000	\$ 3,900,000	\$ 7,100,000
12	New No. 1 station	RR	\$ 2,600,000	-	-	-	-	\$ 2,600,000
13	Total		\$ 3,350,000	-	-	\$ 3,200,000	\$ 5,150,000	\$ 11,700,000
Repairs and Upgrades								
14	Box girder bridge coating/coupling replacement	RR	-	-	-	-	\$ 3,870,000	\$ 3,870,000
15	Generator control panel replacement at Florida City	RR	-	-	-	-	\$ 500,000	\$ 500,000
16	Stock Island pump station and generator replacement	RR	\$ 7,000,000	-	-	-	-	\$ 7,000,000
17	Repair/upgrade subaqueous crossing	RR	\$ 2,000,000	-	-	-	-	\$ 2,000,000
18	Repair/upgrade cathodic protection	RR	\$ 2,700,000	-	-	-	-	\$ 2,700,000
19	Repair/Upgrade electrical and instrumentation	RR	\$ 1,000,000	-	-	-	-	\$ 1,000,000
20	Total Distribution Pump Station & Storage		\$ 12,700,000	-	-	-	\$ 4,370,000	\$ 17,070,000
21	Total		\$ 38,720,000	\$ 36,350,000	\$ 33,044,000	\$ 19,040,000	\$ 13,300,000	\$ 140,454,000
22	Revenue and reserves	RR	\$ 19,756,400	\$ 17,532,000	\$ 2,825,600	\$ 4,040,000	\$ 13,300,000	\$ 57,454,000
23	Series 2019A Bonds	Series 2019A	\$ 18,963,600	\$ 18,818,000	\$ 12,218,400	-	-	\$ 50,000,000
24	Future Revenue Bonds	Series 2021	-	-	\$ 18,000,000	\$ 15,000,000	-	\$ 33,000,000
25	TOTAL WATER SYSTEM FUNDING SOURCES¹		\$ 38,720,000	\$ 36,350,000	\$ 33,044,000	\$ 19,040,000	\$ 13,300,000	\$ 140,454,000

Figure 4.2.1 - Section 8, Findings and Recommendations of the FCAA 20-Year Water System Capital Improvement Master Plan

TABLE 8-1

Findings and Recommendations

Section	Findings	Recommendations
<p>Section 2 <i>Population and Water Demand Forecast</i></p>	<ul style="list-style-type: none"> • The permanent population in Monroe County is not expected to grow over the next 20 years and the seasonal population will grow at an annual rate of 0.2 percent. • FCAA has a historic and projected consumption rate of 115 gpcd based on its combined permanent and seasonal population. This value includes non-revenue water. 	<ul style="list-style-type: none"> • Continue to promote conservation to reduce max day demand. • Continue to reduce non-revenue water • Update population growth and consumption estimates every two years.
<p>Section 3 <i>Water Supply System</i></p>	<ul style="list-style-type: none"> • The existing water supply system has sufficient capacity to meet average and maximum day demands during non-drought conditions. • During drought conditions, an additional 1 MGD will be needed to meet future maximum day demand. • The boundary of seawater intrusion into the Biscayne Aquifer is slowly approaching the FCAA wellfields. 	<ul style="list-style-type: none"> • Construct new Stock Island Reverse Osmosis Facility to supply maximum day demand. • Construct new Biscayne Aquifer wellfield further upstream of saline water interface.
<p>Section 4 <i>Water Treatment and Standards</i></p>	<ul style="list-style-type: none"> • The existing water treatment plants have sufficient capacity for future average and maximum day demands. • The Stock Island Reverse Osmosis Facility is in poor condition and needs to be replaced. • New regulations for emerging contaminants, such as perfluoroalkyl and polyfluoroalkyl substances (PFAS) may be promulgated during this planning horizon. 	<ul style="list-style-type: none"> • Construct new Stock Island Reverse Osmosis Facility to provide potable water in Lower Keys in the event of a failure of the transmission main. • Evaluate treatment alternatives for the lime softening WTO, such as Granular Activated Carbon, to meet future water quality standards.

Section	Findings	Recommendations
<p>Section 5 <i>Water Transmission System</i></p>	<ul style="list-style-type: none"> • The transmission system is at the limit of its maximum capacity to convey the future maximum day demand assuming that the pipe is capable of operating at its design pressures. • However, due to the failing condition of the pipeline, the operating pressures in the transmission system have been reduced until the poor sections of pipe are replaced. • The Marathon Storage Tank is in poor condition and needs to be replaced. 	<ul style="list-style-type: none"> • Replace approximately one percent of the transmission mains per year. • Prioritize pipe replacement using Asset Management System. • As the transmission system is replaced, increase the pipe diameter to increase system capacity and lower operation costs. • Replace 3-MG Marathon Storage Tank with 4-MG tank. • Maintain retired portions of the transmission main so they can be rehabilitated in the future to provide system redundancy.
<p>Section 6 <i>Water Distribution System</i></p>	<ul style="list-style-type: none"> • Most of the distribution system is comprised of PVC pipe, which is generally in good condition. • The small diameter (2-inch) pipe, thin-walled PVC and galvanized pipe should be replaced. • The Capital Improvement Plan includes supplying potable water to some areas (No Name Key and Middle Torch Key) • The Ocean Reef storage tanks and pump station system are operating at the maximum capacity. 	<ul style="list-style-type: none"> • Develop pipe replacement schedule using Asset Management System. • Implement recommended alternative to upgrade Ocean Reef storage and pumping system. • Once the Marathon Storage Tank is replaced, decommission the 69th Storage Tank and Pump Station.
<p>Section 7 <i>Financial Plan</i></p>	<ul style="list-style-type: none"> • FCAA has a projected cumulative rate increase of 17.5% between 2020 and 2024. • FCAA debt service coverage will increase from 1.37 to 1.63 between 2020 and 2024. 	<ul style="list-style-type: none"> • FCAA will evaluate the Capital Improvement Plan (CIP) and operating budget on an annual basis to determine appropriate funding needs.