City of Cooper City Comprehensive Plan

Chapter 4 Infrastructure Element

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INFRASTRUCTURE ELEMENT

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CHAPTER 4

INFRASTRUCTURE ELEMENT

I. INTRODUCTION

A. Scope Of The Element

This element has been prepared to meet the requirements of the Local Government Comprehensive Planning and Land Development Regulation Act, Chapter 163, Florida Statutes. The Act requires that each local government adopt a comprehensive plan which evaluates the availability of sanitary sewer, solid waste, drainage, potable water and aquifer recharge protection facilities that meet adopted levels of service.

Solid waste disposal is handled by Broward County as a countywide function. Local pickup of solid waste is handled by Waste Management, Inc., a private carrier, through a franchise agreement with the City of Cooper City. Cooper City has entered into an inter-local agreement with Broward County for solid waste disposal.

Drainage on an area wide basis is managed and controlled by both the Central Broward Water Control District and the South Florida Water Management District. Facilities for drainage proposed for municipal use or private development are reviewed by the above noted agencies as well as the Broward County Water Management Division and the Broward County Department of Planning and Environmental Protection. Cooper City engineering reviews plans for compliance with standards established by the above noted agencies, as well as Cooper City's adopted engineering standards.

Potable water and wastewater treatment service in the City is provided by Cooper City Utilities. This element summarizes the capacity and demand through 2030 for the potable water supply facility work plan only, in accordance with 2005 statutory changes and the most recent *Lower East Coast Water Supply Plan Update* approved by the South Florida Water Management District on September 12, 2013.

The data summarized in these elements was obtained from the following sources:

1) Contribution In Aid of Construction Study for the City of Cooper City Water and Wastewater System prepared by CH2M Hill, Inc., September 1989.

2) Cooper City Effluent Reuse Feasibility Report Update prepared by Hazen and Sawyer, June 2002.

3) Ten-Year Wastewater Master Plan for the City of Cooper City prepared by CH2M Hill, Inc., August 1987.

4) Operational and Planning data supplied by the Cooper City Utility Department.

5) Updated Capacity Analysis Report for the City of Cooper City Wastewater Treatment Plant prepared by CH2M Hill, March 2002.

6) Drainage and Water Control Study, Prepared for Interlocal Consortium, Prepared by Craven Thompson & Associates, December 2000.

7) Cooper City 20-Year Water and Wastewater Capital Improvement Master Plan, CH2M HILL, November 2007.

8) Technical Memorandum, Impact of Revised Population Projections on Cooper City's Water Demand Projections, CH2M Hill, April 17, 2008.

B. Planning Service Area and Planning Horizons

The planning service area is the incorporated areas of the City of Cooper City; which includes the recently incorporated enclaves of "Royal Palm Ranches", "Lake Maranatha Estates", areas and the "Monterra" development (formerly known as "Waldrep Dairy" property), as well as small sections of the Town of Davie and the Town of Southwest Ranches.

The goals, objectives and policies of this Chapter pertain to 2015 unless otherwise noted. The short term planning horizon for this Element and all sub-elements is 2006, with a long term planning horizon of 2015. The exception is the potable water sub-element which has a planning horizon of 2020 for the short term and 2030 for the long term in accordance with Florida Statutes and the most recent update to the Lower East Coast Water Supply Plan. .

Broward County Charter, Section 8.04, gives the Broward County Commission the authority to protect the County's environment. As a result, Broward County has regulatory authority related to certain components of the local infrastructure systems including wellfield protection, wastewater disposal and aquifer withdrawal. Broward County also provides solid waste disposal and processing facilities which are available to those municipalities that enter into an agreement with Broward County. The South Florida Water Management District and the Central Broward Water Control District have an integral part in the regulation and/or provision of drainage facilities in Cooper City. Due to the jurisdictional and operational responsibilities of these agencies, this element has been prepared to achieve consistency with the plans of those applicable agencies.

II. SANITARY SEWER SUB-ELEMENT

A. Wastewater Treatment and Sewage Collection

1. General

The City of Cooper City is located in southwestern Broward County and is generally bound by the Town of Davie to the north and east, by the City of Pembroke Pines to the south, and by Southwest Ranches to the west. It is characterized as a low density residential community supported by commercial centers. The utility service area comprises approximately nine (9) square miles. The current City utility service area boundary is shown in Exhibit 4-1.

The City operates water and wastewater utilities through its Utilities Department on behalf of its residents and certain small adjacent areas. Cooper City has taken on the obligation to provide adequate treatment and safe disposal of all wastewater generated in the service areas. In February 1983, to meet these obligations, Cooper City purchased the existing utility systems from the City of Sunrise. Since that time the City has operated and maintained water treatment, storage and distribution systems, as well as facilities for collection, treatment and disposal of wastewater.

For the purpose of this Comprehensive Plan, the long range service area boundary is generally described as the current City boundary in addition to very small sections of the Town of Davie and the Town of Southwest Ranches.

2. Existing Facilities

Figure 4-1 shows the existing utility service areas (which is the same as the build-out utility service areas). Table 4-1 shows the historic population and wastewater flow data. The flow data provided is the annual average daily flow (AADF) represented in million gallons per day (mgd).

TABLE 4-1
HISTORIC POPULATION AND WASTEWATER FLOWS

Year	Population	AADF (mgd)
1992	24,021	1.794
1993	25, 539	1.963
1994	26,723	2.153
1995	27,398	2.351
1996	27,699	2.454
2000	27,939	3.259
2001	28,134	3.057

Source: Updated Capacity Analysis Report for the City of Cooper City Wastewater Treatment Plant prepared by CH2M Hill, March 2002.

The existing Cooper City Wastewater Treatment Plant is an activated sludge treatment process, which is preceded by head-works screening, in-line equalization and an effluent pump station. Each of the three 1.25 MGD activated sludge package treatment plants consists of activated sludge treatment (with coarse bubble diffusers), RAS/WAS air lift pumps, secondary clarification, disinfection and aerobic digestion. Effluent leaves the package plants and enters the effluent storage ponds. Currently, the effluent pump station pumps effluent into either the outfall or deep well for disposal. Cooper City has entered into an agreement with the City of Hollywood which allows Cooper City to connect its effluent force main to the Southern Regional Wastewater Treatment Plant ocean outfall. The agreement reserves 3.5 mgd capacity through the ocean outfall for Cooper City. A deep injection well for effluent disposal began operation in September, 2002. The Florida Department of Environmental Protection (FDEP) permit for the Cooper City Wastewater Treatment Plant is 3.46 mgd for the three-month average daily flow (TMADF). At the present time, FDEP is reviewing the data prepared by the City's staff utility and CH2 M Hill for re-rating the flows as follows:

AADF – 3.44 MGD
M3MADF – 4.27 MGD
MMADF – 4.51 MGD

Wastewater is collected through a network of gravity collector sewers, 66 pump stations with capacities from 30 to 1,300 gpm and a force main system ranging in diameter from 4 inches to a 24 inch interconnect force main.

Table 4-2 below summarizes the historic seasonal peaking factors. The peaking factor represents the ratio of the TMADF to the AADF. As indicated below, the average peaking factor during the previous decade has been 1.06 mgd.

TABLE 4-2
HISTORIC SEASONAL FLOW PEAKING FACTORS

Year	Maximum TMADF (mgd)	AADF (mgd)	Maximum TMADF/AADF (mgd)
1992	1.908	1.794	1.06
1993	2.032	1.963	1.04
1994	2.290	2.153	1.06
1995	2.509	2.351	1.07
1996	2.539	2.454	1.03
1997	2.494	2.476	1.01
1998	3.131	2.877	1.09
1999	3.307	2.987	1.11
2000	3.564	3.259	1.09
2001	3.245	3.057	1.06
Average			**1.06**

Source: Updated Capacity Analysis Report for the City of Cooper City Wastewater Treatment Plant prepared by CH2M Hill, March 2002.

3. Infiltration/Inflow

Infiltration/inflow is wastewater that enters the system from groundwater and rainfall. Because it is pumped and treated, it represents costs to the City and uses a portion of the total capacity of the treatment facilities.

The Wastewater Treatment Plant collection system is inspected with T.V. cameras annually and corrective measures using slip lining procedures and grouting are used to reduce infiltration in the areas identified by the inspection program.

As infrastructure systems age and demand increases, it is necessary to control inflow/infiltration in order to maintain the adopted level of service standards. Due to the importance of this activity, the City has acquired equipment and added personnel to perform yearly evaluations of the transmission system and identify the source of inflow/infiltration. This process includes monitoring flow data as well as inspection of the utility lines. Based on the results of this analysis, the City implements an ongoing correction program to repair defective lines. The 2002 program eliminated approximately 100,000 GPD of infiltration.

4. Pumping and Transmission System

The City of Cooper City owns and operates 66 pump stations and there are 3 private pump stations which tie into Cooper City's collection system. Data on each of the City's pump stations are shown in Table 4-3.

TABLE 4-3
WASTEWATER PUMP STATIONS

No.	Location	Address	Type Construction	Year Lift Station Installed	Pump Size (inches)	Pump Design Capacity (gpm)	Pump Design Head (Feet)
	On Plant Site	9040 S.W. 51 St.	Below Ground	1958	4	450	35
50	Cooper Colony Est. Sec. 2A	5201 S.W. 90 Ave.	Above Ground	1974	4	325	50
49	Cooper Colony Est. Sec. 2A	5237 S.W. 90 Ave.	Above Ground	1974	4	350	43
48	Cooper Estates Sec. 2	9090 S.W. 55 St.	Above Ground	1974	4	250	50
45	Country Address	8675 S.W. 58 St.	Above Ground	1980	4	200	12
46	Country Address	8797 S.W. 56 Place	Below Ground	1980	4	150	75
51	Cooper Colony Est. Sec. 2	5200 S.W. 88 Terr.	Below Ground	1974	4	325	50
52	Timber Lake	5135 S.W. 87 Terr.	Below Ground	1973	4	325	71
53	Timber Lake- First Add.	5112 S.W. 87 Terr.	Below Ground	1973	4	225	30
54	Timber Lake – Third Add.	4900 S.W. 87 Ave.	Below Ground	1977	4	125	30
55	Industrial Park – 3411 Corp.	4795 S.W. 83 Terr.	Submersible	n/a	4	N/A	n/a
56	Cooper Colony Est. Sec. 2	4902 S.W. 88 Terr.	Below Ground	1970	4	225	40
2	Summertime Isles–First Add.	9427 S.W. 52 St.	Above Ground	1974	4	190	40
3	Summertime Isles-Second Add.	9469 S.W. 52 Ct.	Above Ground	1974	4	250	50
4	Dawn Homes	9900 S.W. 57 St.	Above Ground	1985	4	130	73
5	Stirling Springs	5601 S.W. 100 Ave.	Above Ground	1977	4	100	48
6	Guardian Estates	10300 S.W. 53	Above Ground	1976	3	60	60

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TABLE 4-3
WASTEWATER PUMP STATIONS
Continued

No.	Location	Address	Type construction	Year Lift Station Installed	Pump Size (inches)	Pump Design Capacity (gpm)	Pump Design Head (feet)
9	The Country, Sec. 2	4970 S.W. 94 Ave.	Above Ground	1974	4	225	40
	Private L.S. at Cooper City High School						40
11	Pine Lake	4850 S.W. 101 Ave.	Above Ground	1978	4	120	12
10	Pine Lake	4870 S.W. 103 Ave.	Below Ground	1978	4	100	57
15	West Plat	4900 S.W. 118 Ave.	Above Ground	1979	4	250	40
16	Griffin Elementary	5090 S.W. 116 Ave.	Submersible	1980	4	100	40
7	Flamingo Gardens	5204 S.W. 118 Ave.	Above Ground	1978	4	120	12
18	Flamingo Gardens	11710 S.W. 53 Pl.	Below Ground	1977	4	300	60
19	Flamingo Gardens	11750 S.W. 57 St.	Above Ground	1978	4	120	12
20	Flamingo Gardens	5851 S.W. 116 Ave.	Below Ground	1977	4	300	60
21	Rock Creek	6050 N. Lake Blvd.	Below Ground	1977	6	1300	60
22	Rock Creek	3405 Bridge Rd.	Above Ground	1977	4	100	34
23	Rock Creek	3900 W. Sailboat Dr.	Above Ground	1977	4	100	34
24	Rock Creek	12201 Stonebridge Pkwy.	Above Ground	1977	4	100	34
25	Rock Creek Ph II	2890 Garden Dr.	Above Ground	1981	4	125	40

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Table 4-3
WASTEWATER PUMP STATION
Continued

No.	Location	Address	Type construction	Year Lift Station Installed	Pump Size (inches)	Pump Design Capacity (gpm)	Pump Design Head (feet)
26	Rock Creek Ph II	19955 S. Aviary Drive	Above Ground	1981	4	52	48
27	Rock Creek Ph II	11950 Stonebridge Pkwy	Above Ground	1981	4	100	57
28	Rock Creek Ph II	11679 Stonebride Pkwy.	Above Ground	1982	4	100	65
30	Rock Creek Ph II	3051 Stonebridge Pkwy.	Above Ground	1982	4	215	53
31	Rock Creek Ph II	3605 Stonebridge Pkwy.	Above Ground	1981	4	160	39
32	Forest Lake	11288 S.W. 59 Ct.	Submersible	1986	4	380	85
33	Forest Lake	11291 S.W. 55 Ct.	Submersible	1986	4	120	85
13	Countryside Shops	5554 S. Flamingo Rd.	Submersible	1986	4	110	40
14	Flamingo Townhomes	5134 S.W. 122 Ave.	Submersible	1986	4	270	35
8	Cooper Groves	10450 Grove Lane	Submersible	1993	4	220	65
29	Reflections	2671 Regalia Way	submersible	1992	4	100	98
34	Embassy Lakes	2691 E. Saratoga Dr.	Submersible	1990	4	100	76
35	Embassy lakes	11070 Helena Dr.	Submersible	1990	4	173	44
36	Embassy Lakes	11000 S.E. Lake Blvd.	Submersible	1989	4	660	67
37	Embassy Lakes	10216 Panama St	Submersible	1989	4	160	90
38	Embassy Lakes	10308 Guatemala St.	Submersible	1988	4	110	71
39	Embassy Lakes	10702 NE Lake	Submersible	1989	4	128	42
40	Embassy Lakes	2911 Helsinki Circle	Submersible	1988	4	145	75
41	Embassy Lakes	4141 Embassy Drive	Submersible	1988	4	450	98
42	High Point	5960 SW 106 Ave.	Submersible	1988	4	290	155
43	Indian Pond	5635 SE 106 Ave	Submersible	1990	4	240	51
44	Colony @Stirling	4001 NW 97 Ave	Submersible	1989	4	75	92
47	Encore	5701 SW 89 Way	Submersible	1987	6	452	106
57	Country Glenn	12771 Country Glenn	Submersible	1994	4	135	25

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Table 4-3
WASTEWATER PUMP STATION
Continued

No.	Location	Address	Type construction	Year Lift Station Installed	Pump Size (inches)	Pump Design Capacity (gpm)	Pump Design Head (feet)
58	Diamond Head	3801 NW 98 Way	Submersible	1995	4	100	88
59	Church of God	9191 Stirling Road	Submersible	1994	4	175	123
60	Country Glenn	5101 Waters Edge way	Submersible	1994	4	135	25
61	Natalie's Cove	Natalie's Cove Road and SW 49 St.	Submersible	1996	4	100	53
62	McCarthy High School	5451 S.W. 124 Avenue	Submersible	1998	4	122	86
63	Schott Memorial	12401 Schott Circle	Submersible	1999	4	115	74
64	Country Glenn Phase III	5091 Regency Isles Way	Submersible	2000	4	90	14
65	Walgreens	Hiatus and Stirling Road	Submersible	2001	4	80	100
66	Cooper City Commons	Pine Island and Sheridan Street	Submersible	2002	4	178	56
12	Walmart	Flamingo Road & Griffin Road	Submersible	1992	4	120	86

Source: Cooper City Utilities Department

5. Regulatory Framework

a. Federal

The Federal Water Pollution Control Act (PL 92-500) is the controlling national legislation relating to the provision of sanitary sewer service. The goal of this act is the restoration and/or maintenance of the chemical, physical and biological integrity of the nation's waters,, This federal act is administered by the United States Environmental Protection Agency (USEPA), which controls our plant operation and effluent conditions through the National Pollutant Discharge Elimination System (NPDES) permitting system. At the present time NPDES Permit No. FL0040398 is the active permit for the City's wastewater system and effluent discharge to the Hollywood outfall and ultimate discharge to the Atlantic Ocean. This permit expired in November 2002 and the application for the new permit has been submitted.

b. State

The Florida Department of Environmental Protection (FDEP) is responsible for ensuring that the State carries out responsibilities assigned to it under PL 92-500. FDER has adopted rules for the regulation of wastewater facilities in Chapter 17-6, F.A.C. These rules apply to the Cooper City wastewater system and the system has been permitted by the FDEP under Permit No. FL0040398. Personnel from FDEP routinely inspect and review operational data related to the system. There have been no violations of standards issued to Cooper City for at least ten years.

c. Local

Local regulations of wastewater treatment facilities are conducted under the auspices of the Broward County Department of Planning and Environmental Protection (BCDPEP). The wastewater section of the BCDPEP is responsible for the maintenance of water quality in the County and for ensuring that liquid waste is disposed of in a manner that is consistent with maintaining environmental standards. This agency has permitted the City's wastewater treatment facilities under Permit No. FL0040398 and their inspection staff and laboratory staff make periodic inspections and sampling to ensure that effluent meets applicable standards. The facilities have not been in violation over the last ten years.

6. Future Conditions

Table 4-4 provides historic per capita flow rates. For the purpose of this analysis a per capita flow rate of 84.5 gallons per day was used to project long term flows. Based on this analysis, Table 4-5 demonstrates the existing wastewater treatment plant has adequate capacity to serve the City through the long range planning horizon.

TABLE 4-4
HISTORIC PER CAPITA WASTEWATER FLOW RATES

1992	24,021	1.794	75
1993	25, 539	1.963	77
1994	26,723	2.153	81
1995	27,398	2.351	86
1996	27,699	2.454	71
2000	27,939	3.259	95

Source: Updated Capacity Analysis Report for the City of Cooper City Wastewater Treatment Plant prepared by CH2M Hill, March 2002.

TABLE 4-5
WASTEWATER FLOW FORECASTS

Year	Estimated Population	Per Capita Flow Rate (gpd)	Estimated AADF (mgd)	Peaking Factor	Estimated TMADF (mgd)(2)
2001	28,134	84.5(1)	2.7	1.078	2.56
2006	29,649	84.5	3.09	1.078	2.69
2015	38,368	84.0	3.22	1.13	2.83

(1) 5 year average utilized for forecasting.
(2) Three month average daily flow.

Sources: Updated Capacity Analysis Report for the City of Cooper City Wastewater Treatment Plant prepared by CH2M Hill, March 2002. Leigh Robinson Kerr & Associates; City Staff 2008

7. Reuse Facilities

Since 1985 Cooper City has had an agreement with the City of Hollywood to dispose of its wastewater effluent through the Hollywood ocean outfall. In June 1992, Cooper City entered into an agreement with the City of Hollywood whereby Cooper City contributes a minimum of 1.7 mgd and up to 2.4 mgd of treated effluent to be reused after receiving additional treatment by the City of Hollywood. Hollywood's reuse system delivers reclaimed water to slow rate land application users in the vicinity of South Regional Wastewater Treatment Plant (SRWWTP). The effluent received from Cooper City has helped to make development of a reclaimed water system possible for the City of Hollywood. Cooper City's September 2007 Reuse Feasibility Report indicates the "No Action Alternative" meets the medium reuse alternative at existing and build-out conditions.

Cooper City will continue the existing level of reuse through the Hollywood reuse program. The results for the current, short and long range annual average daily (AADF) flow rates are shown are shown in Table 4-6. The Florida Department of Environmental Protection (FDEP) has identified the following three levels of reuse based upon the reused percentage of the AADF in the design year.

- Maximum Reuse: Over seventy-five percent reused
- Medium Reuse: Forty to seventy-five percent reused
- Minimal Reuse: Less than forty percent reused

The City's program will result in a medium reuse level (reuse levels as defined by FDEP. At no time does the reclaimed water use level drop below a "medium" reuse level (forty to seventy-five percent reused).

TABLE 4-6
REUSE LEVEL

	Annual Average Daily Flow	Reuse Level Percent of Build-out AADF
2001	2.7	63
2006	3.09	55
2015	3.140	54

Source: Cooper City Effluent Reuse Feasibility Report Update, Hazen and Sawyer June, 2002.

It is advantageous for the City of Hollywood to utilize the Cooper City effluent in its reuse program since its salinity is low and will reduce the overall high salinity of the Hollywood effluent which is marginal for reuse on certain vegetation. Furthermore, the Hollywood SRWWTP may increase reuse treatment capacity and reuse distribution to meet projected demands. According to the FDEP 2006 Reuse Inventory, the SRWWTP capacity for reuse is 5 mgd while the average flow is 2.39 mgd. The City of Hollywood reuse demand is currently limited by the number of large users in the reuse distribution system. In order to meet the maximum reuse category for the build-out condition with the no action alternative, the contribution of reuse water to Hollywood must be 3.19 mgd and Hollywood would need to add additional demand for this condition to be reached. Also refer to section 3.8 of part IV Water Supply Facilities Work Plan Sub-Element of this chapter.

8. Future Improvements

This analysis indicates that sufficient capacity exists in the city's wastewater system to accommodate the buildout population. No significant deficiencies exist in the current system. The new deep well injection system is operational. Other improvements include annual replacement and renewal of existing facilities. No major capital improvements are necessary or programmed at this time.

9. Analysis of Soil Surveys

According to Cooper City, there are five septic tanks within the City. The City is not aware of any problems associated with the operation of these septic tanks and no deficiencies or problems are known to exist. These septic tanks represent a minimal component of the wastewater disposal system in the City. The Soil Survey for Broward County indicates that the soil types for these tank locations have severe limitations for septic tank use. All new commercial and industrial uses must connect to municipal sewers in Cooper City. New residential uses must connect to sewers when the facilities are available or extensions of the sewer lines are economically feasible. Virtually all areas of the City are served by sanitary sewers with the exception of the rural ranches areas where the extensions of sewers are cost prohibitive. With these improvements in place and the City's policies regarding new septic tanks, it is likely that septic tanks will be phased out as build-out occurs, excluding the rural ranches. Therefore, the City does not consider this to be a significant issue.

III. POTABLE WATER SUB-ELEMENT

A. Existing System

Water for Cooper City residents is supplied by shallow wells pumping to a membrane softening and disinfection treatment process. The finished water is stored in above

ground storage tanks and is subsequently boosted into the distribution system by high service pumps. The City's 7.0 million gallons per day membrane softening potable water treatment plant was constructed in 1998 and expanded in 2002. The original lime softening plant has been dismantled.

There are six off site wells which supply raw water to the treatment facilities. The combined capacity of these wells is 7,590 gallons per minute. Together they have sufficient firm capacity (capacity with the largest well out of service) to match the treatment plant capacity.

Water storage facilities provide water supply capacity during times when demands are placed on the system which exceed the treatment plants' maximum day capacity. Storage is generally provided to meet demands, which occur during peak hour usage and fire emergencies. The system has two ground storage tanks and a clear well at the George A. Haughney Utilities Complex (the GAH WTP), and an additional 2 MG storage tank was constructed in 2006 on Pine Island Road. Water from these tanks is boosted into the distribution system with high service pumps.

The 7.0 mgd water plant has provided sufficient capacity to serve the needs of the City as indicated by Table 4-7.

TABLE 4-7
HISTORIC WATER CONSUMPTION

Year	Average Estimated Population*	Average Daily Treated Water Produced, MGD	Average Daily Per Capita Treated Water, GPCD
2008	30,269	2.99	98.83
2009	31,016	2.88	92.99
2010**	28,615	2.72	95.00
2011	29,068	2.87	98.85
2012***	30,568	3.03	99.00
2013	32,204	3.06	95.02
Average		**2.90**	**96.14**

Source: Cooper City Engineering Department
* Includes 68 people served outside City limits.
**Projections from Census Data.
***Emergency water interconnections with the Town of Davie open for 3 months; not included in average figures in table.

B. Existing Demand vs. Capacity

As shown on Table 4-8, the existing treatment capacity of 7.0 mgd is sufficient to meet maximum day demands to 2030.

TABLE 4-8
COOPER CITY WATER DEMAND PROJECTION

Year	Year End Estimated Population	Average Daily Treated Water Demand, MGD	Maximum Daily Treated Water Demand, MGD
2010	28,615	2.72	3.79
2020	33,538	3.22	4.83
2030	33,967	3.26	4.89

Source: Cooper City Engineering Department. Average Day to Maximum Day multiplier of 1.5

C. Distribution

The potable water distribution system provides a major loop benefiting the entire City and provides adequate pressure and fire flow. Water lines are available in all areas of the City and provide sufficient capacity to serve the current and projected residents.

D. Future Improvements

No major deficiencies in the potable water system have been identified that would cause a reduction in the level of service in the short or long range planning periods., The City's water conservation program continues to decrease the projected water demand. The City continues to upgrade the existing utility system through the water main replacement program. The City has also budgeted $7 million to address the Ocean Outfall Ban created by the 2008 ocean outfall statute (Subsection 403.086(9) F.S.) This investment will be used to ensure the required 0.9 mgd of reuse required by 2030 is accomplished. Details on the approach to meeting this reuse goal will be provided in the next update to the Long Term Water Supply plan.

IV. WATER SUPPLY FACILITIES WORK PLAN SUB-ELEMENT

The City adopts and incorporates the Water Supply Facilities Work Plan into this Infrastructure Element in accordance with the Florida Statute and recommendations of the Department of Economic Opportunity.

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

Section 1 – Introduction
Section 2 – Background Information
Section 3 – Data and Analysis
Section 4 – Work Plan Projects/Capital Improvement Element/Schedule
Section 5 – Goals, Objectives, Policies

1.0 INTRODUCTION

The purpose of the City of Cooper City Water Supply Facilities Work Plan (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. 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 its update. The *Lower East Coast Water Supply Plan Update* was approved by the South Florida Water Management District on September 12, 2013. Therefore, the deadline for local governments within the Lower East Coast jurisdiction to amend their comprehensive plans to adopt a Work Plan is March 12, 2015.

Residents of the City of Cooper City (the City) buy their water directly from the City. According to state guidelines, the Work Plan and the Comprehensive Plan amendments must address the development of traditional and alternative water supplies, bulk sales agreements, conservation and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. The city has chosen to use the same planning horizon as the Lower East Coast Water Supply Plan so the planning horizon associated with the potable water concurrency facility is now through 2030. This Work Plan is incorporated as a sub-element of the Infrastructure Element of the Comprehensive Plan.

2.0 BACKGROUND INFORMATION

2.1 Overview

The City was incorporated in 1959. The limits of the City encompass an area approximately nine (9) square miles bounded by the Town of Davie to the north and east, by the City of Pembroke Pines to the south, and by Southwest Ranches to the west. The municipal utility is owned and operated by the City and provides potable water to approximately 30,000 residents. Approximately 5 percent of the service area is commercial and industrial users. The City serves a small number of customers (less than 1 percent) in the Town of Davie, and Southwest Ranches. The service area is characterized as a low density residential community supported by commercial centers. The City is nearly built out with approximately 336 infill housing units and 128 Senior Lifestyle beds expected to be completed during the 2015-2030 planning horizon.

2.2 Relevant Regional Issues

As the state agency responsible for water supply planning within the Lower East Coast region, the South Florida Water Management District (SFWMD) plays a pivotal role in ensuring an adequate supply of water to protect, enhance and restore natural systems; meet population demands; and address all other existing and projected needs for water supply. The SFWMD 2013 *Lower East Coast Water Supply Plan Update* identified several issues of importance to the region's water supply including:

1. The need to reduce reliance on the regional system for future water supply needs by developing alternative water supplies.
2. The need for increased conservation, reclamation and re-use methods in order to reduce

per capita use and delay or avoid adding capacity.

3. The need to better integrate energy and water management.
4. The need to consider climate change and its hydrogeological effects such as sea level rise and salt water intrusion in water supply planning.
5. The need to limit withdrawals from both the Surficial Aquifer System and surface water from Lake Okeechobee.
6. The need to relieve pressure on the Everglades ecosystem by seeking alternative water supply sources that are not dependent upon the Everglades for recharge as per the 2007 Regional Water Availability Rule.
7. The need to reduce nutrient loadings to the environment by eliminating the use of six ocean outfalls in southeastern Florida as the primary means of disposal for treated domestic wastewater by December 20, 2025 as per the 2008 Leah G. Schad Ocean Outfall Program.

Cooper City will continue to address these regional issues by developing appropriate policies and establishing best practices at the local level including but not limited to the following:

1. Employment of alternative sources of water supply.
2. Promotion of water conservation through programs such as “Gimmee 5” which provides water saving rebates and encourages residents to save 5 gallons of water per day in their daily routine. The program also offers local businesses personalized reports detailing how to decrease water consumption and reduce costs.
3. Adherence to Broward County standards for water use including mandates for the use of water-conserving appliances in the construction of new homes, installation of automatic shut-off devices on outdoor sprinkler systems, restrictions on the hours of lawn irrigation, and establishment of a Florida Friendly Landscape Ordinance.
4. Incorporation of goals, objectives and policies within the Comprehensive Plan that ensure resiliency of existing and future water resources in areas vulnerable to climate change related impacts (see Objective 4.10 and Policy 4.10.1 thru 4.10.5).
5. Continued assessment as it relates the establishment of an inter-local agreement with reclaimed water utilities in Dade, Broward and Palm Beach counties for reclaimed water services in order to meet the milestones set out in the Leah Schad Memorial Ocean Outfall Program, which requires Cooper City to mitigate their ocean outfall by producing a minimum of 0.9 MGD of reuse water by the year 2025.

3.0 DATA AND ANALYSIS

The City revised its population projections to reflect recently available information. Both the Bureau of Economic and Business Research (BEBR) and the South Florida Water Management District have reviewed and accepted the city’s updated projections. Population data and analysis are summarized below.

3.1 Population Information

Population projections for the City service area are available from a variety of sources, including the Broward County Planning Department (BCPD), the SFWMD, and Cooper City's Growth Management Department. The population projections used for this Work Plan are based on those developed by the City's Growth Management Department. The rate of increase for customers outside of the City's municipal boundary was assumed to be the same as that projected by the Broward County Planning Department.

3.1.1 Cooper City Growth Management Department

The Cooper City Growth Management Department developed population projections using U.S. Census data and University of Florida Bureau of Economic and Business Research (BEBR) estimates as a baseline. Future projections were based upon existing and anticipated residential Certificates of Occupancy and Broward County's Department of Planning and Environmental Protection (DPEP) growth projection.

3.1.2 Cooper City Utilities

Cooper City Utilities developed population projections for its water service area as part of its 2010 water use permit (WUP) application. The population projections provided by the Cooper City Growth Management Department were used for customers located in incorporated Cooper City and those anticipated to be located within Monterra and Royal Palm Ranches after development. Additional water customers located in unincorporated Broward County were also included in Cooper City Utilities' projections.

The City has an ordinance prohibiting further extensions of its water and sewer systems beyond its corporate limits. As a result, the estimated population of this group of customers will be maintained at 68 individuals for the duration of the planning period.

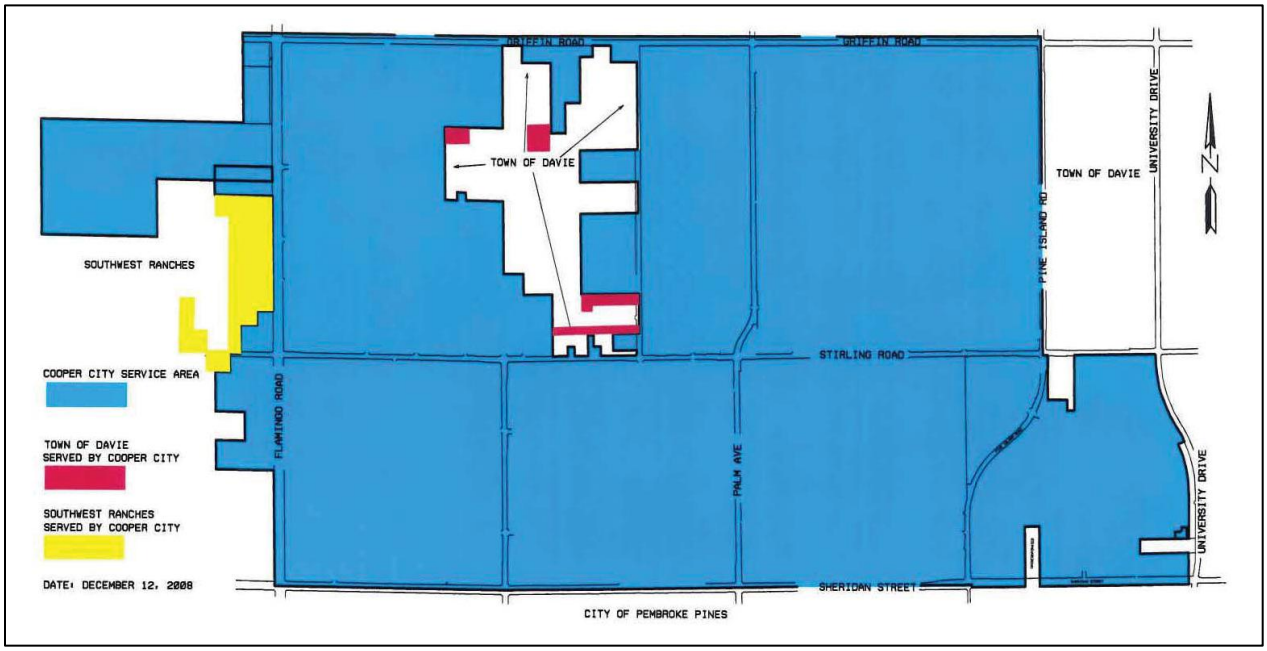
The average per-capita daily finished water demand for 2008-2013 was 96.615 gpd. In 2012, the City supported the Town of Davie with water supply for three months, so subtracting 2012 from the average reduces the average finished water demand to 96.138 for this period. The average maximum-day to average-day ratio was 1.5. A five-year average period was used in accordance with the SFWMD's water use permitting policies and procedures.

The previous work plan used 101.33 gpd as the per capita demand after adjustment for conservation. The current demand of 96 gpd shows 5% water saving from water conservation practices adopted by users in Cooper City. This reduced rate of water consumption is expected to level-off and continue at current demand levels for the planning period.

3.2 Maps of Current and Future Areas Served

Cooper City's current and future potable water service area is shown in the Figure 4-1 below.

FIGURE 4-1
MAP OF CURRENT AND FUTURE AREAS SERVED



Source: Cooper City Utilities Department

3.3 Potable Water Level of Service Standard

As described above, level of service for the utility service area is 96 gallons per capita per day for residential use. The non-residential level of service standards are 0.08 gallons per day per square foot for office buildings and 0.15 gallons per day per square foot for commercial businesses.

Based on the revised level of service standards, the 2030 potable water demand is projected at 3.26 mgd average day (4.13 mgd average day raw water demand) and 4.86 mgd maximum day finished water demand (6.2 mgd maximum day raw water demand). The water treatment plant production capacity is 7 mgd and is adequate to serve anticipated 2030 needs. Existing distribution system capacity is adequate to serve 2030 demands.

3.4 Population and Potable Water Demand Projections

Table 4-9 shows population projections and finished water demand projections. Table 4-10 depicts the raw water demand projections.

TABLE 4-9
FINISHED WATER DEMAND PROJECTIONS

Year	Cooper City Population	Population Served Outside City Limits	Projected Service Area Population	Per Capita Demand (gpcd)	Annual Use (MG)	Average Day Demand (mgd)	Max Day Demand (mgd)	Max/Avg	Avg Month (mgd)	Max Month (mgd)	Max Month /Avg Month Ratio
2014	32,761	68	32,829	96	1,149.8	3.15	4.73	1.50	95.82	113.07	1.18
2015	33,255	68	33,323	96	1,167.6	3.20	4.80	1.50	97.30	114.8	1.18
2016	33,298	68	33,366	96	1,169.1	3.20	4.80	1.50	97.43	115.0	1.18
2017	33,341	68	33,409	96	1,170.6	3.21	4.82	1.50	97.55	115.1	1.18
2018	33,384	68	33,452	96	1,172.1	3.21	4.82	1.50	97.68	115.3	1.18
2019	33,427	68	33,495	96	1,173.6	3.22	4.83	1.50	97.80	115.4	1.18
2020	33,470	68	33,538	96	1,175.2	3.22	4.83	1.50	97.93	115.6	1.18
2021	33,513	68	33,581	96	1,176.7	3.22	4.83	1.50	98.06	115.7	1.18
2022	33,556	68	33,624	96	1,178.2	3.23	4.85	1.50	98.18	115.9	1.18
2023	33,599	68	33,667	96	1,179.7	3.23	4.85	1.50	98.31	116.0	1.18
2024	33,642	68	33,710	96	1,181.2	3.24	4.86	1.50	98.43	116.1	1.18
2025	33,685	68	33,753	96	1,182.7	3.24	4.86	1.50	98.56	116.3	1.18
2026	33,728	68	33,796	96	1,184.2	3.24	4.86	1.50	98.68	116.4	1.18
2027	33,771	68	33,839	96	1,185.7	3.25	4.88	1.50	98.81	116.6	1.18
2028	33,814	68	33,882	96	1,187.2	3.25	4.88	1.50	98.93	116.7	1.18
2029	33,857	68	33,925	96	1,188.7	3.25	4.88	1.50	99.06	116.9	1.18
2030	33,899	68	33,967	96	1,190.2	3.26	4.89	1.50	99.18	117.0	1.18

Source: Cooper City Utilities Department

TABLE 4-10
RAW WATER DEMAND PROJECTIONS

Year	Annual Finished Water Demand (MG)	Annual Raw Water Demand (MG)	Average Day Raw Water Demand (mgd)	Maximum Month Raw Water Demand (MG)	Maximum Day Raw Water Demand (mgd)
2015	1,167.6	1,484	4.07	145.9	6.1
2016	1,169.1	1,486	4.07	146.1	6.1
2017	1,170.6	1,488	4.08	146.3	6.1
2018	1,172.1	1,490	4.08	146.5	6.1
2019	1,173.6	1,492	4.09	146.7	6.1
2020	1,175.2	1,493	4.09	146.8	6.1
2021	1,176.7	1,495	4.10	147.0	6.2
2022	1,178.2	1,497	4.10	147.2	6.2
2023	1,179.7	1,499	4.11	147.4	6.2
2024	1,181.2	1,501	4.11	147.5	6.2
2025	1,182.7	1,503	4.12	147.8	6.2
2026	1,184.2	1,505	4.12	148.0	6.2
2027	1,185.7	1,507	4.13	148.2	6.2
2028	1,187.2	1,509	4.13	148.4	6.2
2029	1,188.7	1,510	4.14	148.5	6.2
2030	1,190.2	1,512	4.14	148.7	6.2

Source: Cooper City Utilities Department

3.5 Water Supply Provided by Local Government

The City withdraws groundwater from the Biscayne Aquifer, a shallow sand and limestone system found primarily in Broward and Miami-Dade Counties. The City owns and operates six (6) active wells having a total rated capacity of 10.9 mgd as summarized in Table 4-11 with locations shown in Exhibit 4-2.

TABLE 4-11
CITY WATER SUPPLY BISCAYNE WELLS – CONSTRUCTION DETAILS

Well	Diameter, inches	Screened interval, ft below land surface	Pump Type	Capacity (mgd)	Capacity (gpm)
4	12	70-80	Submersible	1.30	900
5	12	70-80	Vertical turbine	2.02	1,400
6	12	70-80	Vertical turbine	2.02	1,400
7	12	70-80	Vertical turbine	2.02	1,400
8	16	70-80	Submersible	1.79	1,245
9	16	70-80	Submersible	1.79	1,245
TOTAL				10.93	7,590

Source: Cooper City Water System Capital Improvement Master Plan, 2007

3.5.1 Consumptive Use Permit Information

The City's 20-year WUP No. 06-00365-W was issued by SFWMD in April 2010. It allows the City to withdraw an annual allocation of 1,661million gallons (MG) (equivalent to 4.55 million gallons per day (mgd)) from the Biscayne Aquifer until 2030, with a monthly maximum allocation of 171.5 MG.

TABLE 4-12
RAW WATER PERMITTED ALLOCATIONS AND RAW WATER DEMAND PROJECTIONS

Year	Annual Raw Water Permit Allocation (MG)	Equivalent Annual Raw Water Allocation (mgd)	Projected Average Day Raw Water Demand (mgd)	Maximum Month Raw Water Permit Allocation (MG)
2015	1,661	4.55	4.07	171.5
2016	1,661	4.55	4.07	171.5
2017	1,661	4.55	4.08	171.5
2018	1,661	4.55	4.08	171.5
2019	1,661	4.55	4.09	171.5
2020	1,661	4.55	4.09	171.5
2021	1,661	4.55	4.10	171.5
2022	1,661	4.55	4.10	171.5
2023	1,661	4.55	4.11	171.5
2024	1,661	4.55	4.11	171.5
2025	1,661	4.55	4.12	171.5
2026	1,661	4.55	4.12	171.5
2027	1,661	4.55	4.13	171.5
2028	1,661	4.55	4.13	171.5
2029	1,661	4.55	4.14	171.5
2030	1,661	4.55	4.14	171.5

Source: Cooper City Utilities Department

3.5.2 Treatment Facilities and Planning Schedules

Cooper City's George A. Haughney Water Treatment Plant (the WTP) has a capacity of 7 mgd, which is sufficient to supply the projected 2030 maximum-day demand from the Biscayne Aquifer. With an annual average permitted Biscayne Aquifer withdrawal of 4.55 mgd, the plant can produce 3.64 mgd of treated water (at 80 percent recovery).

The City's projected 2030 average-day finished water demand is 3.26 mgd, or 0.39 mgd less than what the existing WTP can produce under the City's RWA limitation and current CUP. The City

plans to continue implementing the existing water conservation program which has proven effective in regard to reducing water consumption.

3.5.3 Storage and Distribution Facilities

Existing storage facilities include two ground storage tanks and a clear well at the WTP. Total storage in operation in the system is 3.55 MG. The 2 MG storage tank constructed in 2006 on Pine Island Road to serve the Monterra development has been placed in service and the two ground storage tanks at the East Plant have been retired and are no longer in service.

Water storage facilities provide water supply capacity during times when demands are placed on the system, which exceed the treatment plant's maximum day capacity. Storage is generally provided to meet demands, which occur during peak hour usage and fire emergencies. Water from these tanks is boosted into the distribution system with high service pumps. The distribution system consists of more than 130 miles of pipe.

3.5.4 Interconnects, Inter-local Agreements, and Bulk Sales

Cooper City maintains two 8inch interconnects with the Town of Davie, one 8-inch interconnect with the City of Sunrise, and one 8-inch interconnect with the City of Pembroke Pines for emergency water supply purposes. The City currently does not maintain any inter-local agreements, bulk sales, or purchases for water supply. In the near future, the City may negotiate an interlocal agreement with a reclaimed water utility in Dade, Broward, or Palm Beach county to provide the 0.9 mgd reuse requirement per the Leah Schad Memorial Ocean Outfall Program (Subsection 403.086(9))

3.5.5 Treatment and Distribution Losses

The City's WTP operates at an 80 percent recovery (20 percent loss to membrane concentrate). The City's annual unaccounted for water has been less than 10 percent per year as summarized below in Table 4-13. The SFWMD requires a leak detection program and water auditing when distribution system losses exceed 10 percent.

TABLE 4-13
UNACCOUNTED FOR DISTRIBUTION SYSTEM LOSSES

Month/Yr	Treated Water (MG)	Billed Water (MG)	Misc. Accounted-For Water (MG)	Unaccounted-For Water (Monthly, MG)	
2013	1,116.9	986.045	33.3	97.6	8.7%
2012	1,104.5	1,012.088	58.18	34.27	3.1%
2011	1,048.8	976.11	31.803	40.85	3.9%
2010	992.3	898.845	16.562	76.85	7.7%
2009	1,052.7	973.247	18.951	60.46	5.7%
2008	1,091.9	1,071.045	18.183	2.69	0.2%

Source: Cooper City Utilities Department

3.7 Conservation

3.7.1 County-wide Issues

Broward County has implemented an extensive water conservation program to reduce water consumption both indoors and outdoors. The County's program addresses water conservation in all of the following categories:

- Water Use Restrictions/Initiatives
- Use of Florida Friendly Landscape Principles
- Ultra Low Flow Appliance amendments to the S. Florida Building Code
- Water Conservation Based Rate Structure
- Rain Sensor Overrides for New Lawn Sprinkler Systems
- Public Information Program

County policies are supported by the Broward County Code of Ordinances, which, for example, requires the installation of automatic shut-off devices on outdoor sprinkler systems (Chapter 39, Article VIII); mandates the use of water-conserving appliances in the construction of new homes (Chapter 5 Article IV); and restricts the hours of lawn irrigation. (Chapter 36, Article II).

Broward County has developed a water conservation education and outreach program called "Water Matters". The "Water Matters" program addresses water conservation strategies to be employed inside the home, and emphasizes opportunities for water conservation in the homeowner's backyard, where 30% to 50% of household water consumption can occur. The

focus of this program is to educate Broward County homeowners about landscape Best Management Practices (BMPs) that help to conserve the quantity, and protect the quality of local and regional water resources. Examples of effective BMPs include limiting landscape irrigation to just twice a week, reducing the amount of pesticides and herbicides applied to landscapes, maintaining surface water management systems, and the use of native plants in landscaping.

Another water conservation program is the NatureScape Irrigation Service (NIS). The NIS, which operates similar to the Mobile Irrigation Labs (MIL) elsewhere in Florida and other states, is locally operated in cooperation with twenty-two municipal and water utility partners, along with Broward County. The NIS is designed to achieve water savings through more efficient design, maintenance, and operation of irrigation systems. Landscape evaluations are generally conducted on large, professionally managed properties where the opportunity for water savings is greatest, although residential properties served by Broward County Water and Wastewater Services are also eligible for free site assessments.

Another water conservation program developed by Broward County, in partnership with the SFWMD, is called "Know the Flow". While the "Water Matters" program focuses on water savings that can be achieved by the homeowner, the "Know the Flow" course targets the more than 10,000 registered professional property managers in Broward County and is designed to provide a half-day of instruction on water management in Broward County. Participants in the "Know the Flow" course can receive continuing education credits and are eligible to have an irrigation evaluation of their property.

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

The City will coordinate future water conservation efforts with the County and the 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 and Broward County in the implementation of new regulations or programs that are designed to conserve water during the dry season.

The City's current conservation plan consists of the following elements:

- Lawn irrigation hours are regulated by Broward County Water Conservation Ordinance No. 91-8, Section 3.
- Adoption of a Florida Friendly landscaping ordinance by the City and distribution of Florida Friendly landscaping information to customers.
- Adoption of the amended Florida Building Code, which requires ultra-low volume plumbing in new construction and adoption of an UltraLow Volume Fixtures Ordinance.

- Active leak detection and repair program with an unaccounted-for water loss rate of less than 10 percent, which is significantly lower than the national average.
- Adoption of a water conservation rate structure.
- Broward County Code (Section 39-78) requires rain sensors on automatic sprinkler devices.
- Water conservation information is distributed regularly.
- The City provides the City of Hollywood with secondary effluent for Hollywood's reclaimed water program.

3.7.3 Local Financial Responsibilities as Detailed in the CIE

The City's financial plan for implementing improvements to the water treatment and distribution system to maximize efficiency and minimize leaks is detailed in the Capital Improvements Element of the Comprehensive Plan.

3.8 Reuse

Leah Schad Memorial Ocean Outfall Program

In 2008, the Florida Legislature enacted an ocean outfall statute (Subsection 403.086(9), F.S.) requiring the elimination of the use of six ocean outfalls in southeastern Florida as the primary means for disposal of treated domestic wastewater. In addition, the affected wastewater utilities have to reuse at least 60 percent of the outfall flows by 2025. The objectives of this statute were to reduce nutrient loadings to the environment and to achieve the more efficient use of water for water supply needs. This statute became effective on July 1, 2008.

The 2008 Leah Schad Memorial Ocean Outfall Program applies to each of the facilities/utilities that have permits to discharge through an ocean outfall. All of the wastewater/reuse facilities utilizing ocean outfalls are located in the Lower East Coast (LEC) Planning Area. The facilities are as follows:

- South Central Regional Water Reclamation Facility (Delray Beach and Boynton Beach)
- Boca Raton Water Reclamation Facility
- Broward County North Regional Water Reclamation Facility
- Hollywood Southern Regional Water Reclamation Facility
- Miami-Dade North District Wastewater Treatment Plant (MDWASD)
- Miami-Dade Central District Wastewater Treatment Plant (MDWASD)

Additionally, Cooper City and the Town of Davie are permitted to discharge effluent through the outfall operated by the City of Hollywood at the Southern Regional Water Reclamation Facility. Therefore, these two local governments also have obligations to meet the outfall requirements.

Requirements of the outfall program include the following:

- Discharge through ocean outfalls must meet either advanced wastewater treatment and management by December 31, 2018, or an equivalent reduction in outfall nutrient loading.
- A functioning reuse system that reuses a minimum of 60 percent of the facility's actual flow on an annual basis installed no later than December 31, 2025.
- Timely submission of certain progress and planning summary documents.
- Inclusion of projects that promote the elimination of wastewater ocean outfalls in SFMWD's regional water supply plans.

State or SFWMD funding assistance must give first consideration to water supply development projects that replace existing sources or implement reuse projects to eliminate ocean outfalls.

By 2025, 60 percent of wastewater discharged through ocean outfalls must be beneficially reused as defined in Chapter 62-610, F.A.C. This percentage is computed from a baseline discharge flow of the ocean outfalls from 2003 through 2007. The baseline flows and the 60 percent reuse requirement for Cooper City is 1.5 MGD and 0.9 MGD respectively. Cooper City, therefore, must determine a strategy for implementing 0.9 MGD of reuse within the next ten (10) years. The City has initiated discussions with neighboring utilities that currently reclaim water, or plan to in the future, to determine whether it would be more cost efficient to contract with a utility to provide the required amount of reuse for the City than to construct and operate its own reclaimed water facility. It is anticipated that an agreement will be forthcoming prior to the initial 2018 deadline, by which time ocean outfalls must meet Advanced Water Treatment (AWT) standards in accordance with the Ocean Outfall Program legislation.

4.0 CAPITAL IMPROVEMENTS

The City anticipates it will have adequate water supply and infrastructure facilities to meet projected demands through 2030.

4.1 Work Plan Projects

The water transmission and distribution system serving Cooper City is generally functioning as intended, with no additional major capital changes required to meet anticipated water usage demands or regulatory compliance issues. The City has budgeted $7 million dollars to be spent between 2016 and 2018 in order to meet the reuse requirements resulting from the ocean outfall ban as previously described.

4.2.1 Capital Improvements Element/Schedule

Refer to the Capital Improvements Element of the Comprehensive Plan.

5.0 GOALS, OBJECTIVES AND POLICIES

The City has reviewed its Comprehensive Plan and has included additional goals, objectives, and policies (GOPs) in section VIII of this Infrastructure Element that address water supply sources and facilities, as well as conservation.

V. SOLID WASTE SUB-ELEMENT

Cooper City is currently served by Waste Management, Inc. for collection, removal and eventual transportation to a landfill or resource recovery facility of all solid waste within the corporate limits of Cooper City. In January 2001, the City Commission approved an exclusive franchise agreement with Waste Management, Inc. Waste Management, Inc. collects solid waste from residential uses twice per week. All commercial uses and other uses that require dumpsters for collection are serviced on an as-needed basis. The predominant land use served by Waste Management, Inc. in Cooper City is residential. Waste Management, Inc. takes solid waste collected within the corporate limits of Cooper City and deposits it in either the Broward County Interim Landfill Site or the South Resource Recovery Facility. The Level of Service provided for Cooper City residents is a maximum of 4.0 lbs. per capita per day.

Broward County and most of its accompanying municipalities have entered into agreements concerning the disposal of solid waste within Broward County. Through an interlocal agreement, Broward County has agreed to provide disposal facilities for the current and projected solid waste generated within the County. The amount of solid waste managed by Broward County has increased substantially over the past decade. Table 4-14 is a historic account of total tons of solid waste disposed in Broward County including Cooper City between 1991 and 1995. Table 4-15 projects future generation of solid waste in Broward County thru 2015 and includes Cooper City. Table 4-16 represents the countywide system facilities capacity and projected waste streams for the years 1997-2015.

TABLE 4-14
REPORTED LANDFILL DISPOSAL (TOTAL TONS)
BROWARD COUNTY
1991-1995

Years	Lbs.	Cap. /Day
1991	1,624,777	7.1
1992	1,961,179	8.6
1993	2,041,311	8.75
1994	2,453,298	10.13
1995	2,929,354	11.98

Sources: Resource Recovery and Solid Waste Management Plan Update, 1988. Florida Department of Environmental Protection, Solid Water Management in Florida (March 1996)

TABLE 4-15
SOLID WASTE GENERATION PROJECTIONS
BROWARD COUNTY, 1997 - 2010

Year	Est. Pop.	Total Waste (Tons)	Lbs./Cap. / Day
2001	1,518,230	2,414,664	8.7
2002	1,533,838	2,439,488	8.7
2005	1,590,654	2,529,851	8.7
2010	1,675,549	2,664,872	8.7

Source: Broward County Comprehensive Plan, Solid Waste Element, 1997.

TABLE 4-16
SANITARY LANDFILL AND ASH LANDFILL PROJECTED WASTE STREAMS AND FACILITY CAPACITY
BROWARD COUNTY (IN TONS)

YEAR	CDSL WASTE	CDSL CAPACITY	CDAL WASTE	CDAL CAPACITY	BICSL WASTE	BICSL CAPACITY	SBAL WASTE	SBAL CAPACITY
1997	420,058	1,939,642	230,000	220,000	80,000	2,814,000	230,000	195,000
1998	427,850	1,511,792	230,000	1,247,000[A]	80,000	2,734,000	230,000	2,922,000
1999	5,850	1,076,150	230,000	1,017,000	80,000	2,654,000	230,000	2,692,000
2000	443,434	632,716	230,000	787,000	80,000	2,574,000	230,000	2,462,000
2001	451,226	181,490	230,000	557,000	80,000	2,494,000	230,000	2,232,000
2002	456,687	3,434,803	230,000	327,000	80,000	2,414,000	230,000	2,002,000
2005	316,567	3,118,236	230,000	2,092,000	240,000	2,174,000	230,000	1,312,000
2010	186,272	2,931,669	230,000	942,000	400,000	1,774,000	230,000	0
2015	44,996	2,886,673	0	0	570,000	1,204,000		

Source: Broward County Comprehensive Plan, 1997.

The Broward County Interim/Contingency Sanitary Landfill (BICSL) site was opened in September of 1988. BICSL is a Class I landfill facility that receives general, non-hazardous household, commercial, industrial and agricultural wastes. This facility is used to accommodate trash and unprocessable waste. Cooper City and the majority of the municipalities south of Oakland Park Boulevard are served by BICSL. The site is in unincorporated Broward County and is bounded by very low density residential, agricultural uses and vacant land uses to the north and south; the Women's Correctional Institute and scattered low density residential uses to the east; and U.S. 27 and a Florida Power & Light substation to the west. The conservation area lies approximately 1.5 miles west of the site. The site is owned and operated by Broward County.

The site is approximately 588 acres in size and there are additional areas that can be developed for additional capacity. The current cell of landfill development has a capacity of 5,280,000 (cells 2 and 3) cubic yards (see Table 4-17) with the remainder of the site in cells 4 thru 7 projected to provide a total of 21,055,000 cubic yards of capacity. (See Table 4-19). This site is to be used to accommodate trash and waste that cannot be processed, in addition to being used as a backup waste facility for the Southern Resource Recovery Facility. It serves as the interim facility of Broward County's Southern Service Area.

TABLE 4-17
EXISTING SOLID WASTE FACILITIES
(CUBIC YARDS)
BROWARD COUNTY, 1996

Central Disposal Sanitary Landfill		
Cel1 1	(closing 1988)	16,400,000 (closed in 1988)
Cell 2	(not developed)	
Subcell 3	(open)	10,090,000
Broward Interim/Contingency Landfill		
Cell 1	(under development)	1,400 ,000 (under closure)
Cells 2 and 3	(open)	5,280,000
Cells 4,5,6,7	(not developed)	

Source: Broward County Comprehensive Plan, 1997

TABLE 4-18

FUTURE SANITARY LANDFILL FACILITIES
(CUBIC YARDS)
BROWARD COUNTY

Facility	*Design Capacity*
Broward Interim/Contingency Landfill Cells 4,5,6,7	21,055,000
Central Disposal Sanitary Landfill Cel1 2	5,300,000

Source: Broward County Comprehensive Plan, 1997

Table 4-16 documents the availability of sanitary landfill capacity based on the projected solid waste streams identified in Table 4-15. The data provided indicates that existing and planned sanitary landfill facilities provided by Broward County will have adequate capacity to meet the projected demand through the short term and long term planning horizons.

Waste Management, Inc. and the City also participate in special neighborhood cleanup drives by placing large waste containers at the Public Works complex and notifying residents to bring yard trash and other acceptable items for special timed disposals.

Two resource recovery plants currently serve Broward County. The resource recovery plant that serves southern Broward County is located south of Interstate 595 and east of U.S. 441. The second facility is located adjacent to the Central Disposal Sanitary Landfill. The two facilities are privately owned and operated and have a combined design capacity of 4,500 cubic tons that is expandable by 33 percent. (See Table 4-17)

TABLE 4-19
DESIGN CAPACITY OF AND CURRENT DEMAND ON
EXISTING INCINERATION FACILITIES
(CUBIC YARDS) BROWARD COUNTY, 1996

Facility	**Design Capacity**	**Current Demand**	**Available Capacity**
North Broward County Resource Recovery Facility (NBCRRF)	2,250	800	1,450
South Broward County Resource Recovery Facility (SBCRRF)	2,250	800	1,450
Total	4,500	1,600	2,900

Source: Broward County Comprehensive Plan, 1997

Each of Broward County's resource recovery facilities area expandable up to 33% from 2,250 tons per day to 2,990 tons per day. In addition, a site for a third resource recovery plant adjacent to the Broward County Interim Contingency Landfill is available to meet future needs. The existing resource recovery facilities are operating at 33 percent of capacity and sufficient capacity is available to meet projected long-term needs.

The City and Broward County area also participating in a County wide effort on recycling in accordance with the Solid Waste Act of 1988, as amended. In September 1993, the Broward Materials Recovery Facility (MRF), located in the Town of Davie was opened. This facility allowed for the expansion of residential recycling efforts. The Broward MRF can accommodate old newspapers, corrugated paperboard, glass bottles, plastic bottles, cans and polycoated paper.

VI. NATURAL GROUNDWATER AQUIFER RECHARGE SUB-ELEMENT

The City implements strict measures to maintain and improve groundwater quality and quantity in the City. The City supports and requires all development to comply with the Broward County Wellfield Protection Ordinance which limits the type of uses and chemicals that are permitted in the identified wellfield protection zones. Regulations also prohibit the disposal of hazardous materials directly to the ground (i.e., waste oils, pesticides), These wellfield protection zones have been identified on Exhibit 1-3 of the Future Land Use Element. These measures are implemented to reduce the volume of contaminants reaching the valuable water resources.

As discussed the city also limits the construction of new septic tanks and provides sanitary sewers in all areas of the City. The City cooperates with BCDPEP in requiring that all leaky above and below ground hazardous material storage tanks are replaced.

Another mechanism used to protect the quality of groundwater is the implementation of pre-treatment standards for all stormwater discharged into the primary drainage system. All development approved in the City must comply with the strict guidelines and standards adopted by the City, South Florida Water Management District, Central Broward Water Control District and Broward County.

In addition, the City requires that Best Management Practices (BMP's) are utilized during land development to further enhance the quality of water that percolates into the aquifer.

Groundwater should be conserved by reducing the volume of waste and by conserving water during the dry season and especially during periods of drought. South Florida's source of water supply is the groundwater in the Biscayne Aquifer. The groundwater of the Biscayne Aquifer is now classified by the State as G-11 water, a potable use designation. This designation is only applicable to groundwater aquifers containing less than 10,000 milligrams per liter (mg/1) of Total Dissolved Solids. Groundwater designations are based on the type of aquifer and (amount of total dissolved solids). The State recently recognized the Floridian Aquifer as a potable water source provided it first undergoes advanced water treatment such as osmosis. The major source of recharge to the Biscayne aquifer is the Everglades Water Conservation Areas. These water

conservation areas are located west of US 27 and encompass approximately 800 square miles. The aquifer is recharged as storm water is stored and purified through natural process in the conservation areas. The purified water then seeps into the aquifer.

VII. DRAINAGE SUB-ELEMENT

A. Background

1. Terms and Concepts

a. Drainage Systems

Water flowing overland during and immediately following a storm event is called stormwater drainage or stormwater runoff. Under the effect of gravity, the drainage flows toward sea level through depressions and channels, which comprise the drainage system of an area. The drainage system may consist of natural features, manmade features, or a combination of both.

Natural drainage systems are defined by the topography of an area. The largest feature of a natural drainage system is the drainage basin, or watershed. The boundary of the basin is called the basin divide. This is a line where the natural land elevation directs runoff from the basin toward a common major drainage feature, such as a river, lake or bay. The major drainage feature is, often called the receiving body and the smaller features are its tributaries.

Manmade drainage facilities are designed to store or convey stormwater runoff. Swales, ditches, canals and storm sewers are typical conveyance structures, collecting stormwater runoff and directing it toward downstream receiving waters. Stormwater storage structures are generally classified as either detention or retention facilities. Detention facilities are designed to temporarily impound runoff and release it gradually to downstream portions of the drainage system through an outlet structure. Retention facilities are impoundments, which release stormwater by evaporation and by percolation into the ground, with no direct discharge to surface waters.

b. Drainage and Stormwater Management

The occurrence of stormwater runoff is highly variable, dependent on the amount of rain falling during each storm event and on conditions within the drainage area. Since most storm events are relatively moderate, natural drainage features typically evolve to accommodate moderate quantities of stormwater runoff. As urbanization of a drainage basin increases, storm

events produce proportionately more and faster runoff, primarily due to the increase in impervious surfaces in the area. Soil eroding from development sites and materials such as oil, grease, pesticides and fertilizers from urban land uses are washed off by runoff, increasing pollutant loading on receiving waters. The increased velocity of runoff also disrupts natural drainage features by destabilizing channels, leading to further sediment loading and debris accumulation.

There are two basic factors involved in establishing a successful stormwater management program around these principles: 1) establishing and applying uniform design standards and procedures; and, 2) ensuring adequate maintenance of system components once they are constructed. The design standard, which is of primary importance, is the design storm event. This standard specifies the intensity (rate of rainfall) and duration of the rainfall event to be used in the design of facilities.

Standard procedures for sizing and designing facilities should also be part of the stormwater management program. This will ensure that systems are structurally and functionally compatible. The program should also provide for routine inspection and maintenance of facilities to ensure proper performance during the facility life.

c. Regulatory Framework

i. Federal

The Water Quality Act of 1987 is the federal law that established the rules for permitting of storm water discharges. The Environmental Protection Agency (EPA) implements this legislation. All of Broward County is subject to the permitting requirements of this legislation and Broward County has initiated a countywide permit application with the municipalities as co-applicants.

ii. State

Chapter 62-40, Florida Administrative Code, contains the State's water policies related to water quality, surface water protection and management, minimum flows and levels. All plans, rules and programs of the Central Broward Water Control District must be consistent with the goals and policies of this Chapter.

Treatment is generally accomplished through retention or through detention with filtration. Retention requires the diversion of the required volume of runoff to an impoundment area with no subsequent direct discharge to surface waters. Pollutant removal by

settling and by percolation of the stormwater through the soil is almost total. Detention facilities are typically within the line of flow of the drainage system. Stormwater from a site passes through the detention facility and is filtered prior to discharge to remove pollutants.

Implementation of the stormwater rule is achieved through a permitting process. DEP has delegated permitting responsibility to the South Florida Water Management with jurisdiction over the Cooper City Area.

iii. Local

The City of Cooper City has delegated its stormwater management to the Central Broward Water Control District. Central Broward Water Control District is a special taxing District with authority to regulate and maintain drainage within an area that encompasses Cooper City and the surrounding canal network

The Central Broward Water Control Drainage District reviews all plats and paving plans prior to the city, for compliance relative to paving and drainage. The District requires all new development to utilize best management practices to reduce pollutant levels in storm water runoff. Current standards require that the maximum allowable discharge from any project in the West Basin of the District is limited to three quarters (3/4") of an inch per acre per day and to one and one half inch (1 ½") per acre per day within the East Basin.

B. Existing Conditions

2. Existing Facilities

The City of Cooper City is divided into two basins at S.W. 100th. Avenue. See Exhibit 4-3. The west basin is controlled by a South Florida Water Management District pump station (S-9) located at approximately US-27 and Griffin Road. The Eastern basin is controlled by a pump station (S-13) on the C-11 canal. The S.W. 100th Avenue divide is an equalizer known as S-13A. This structure can be opened to control local storms or equalize west to east only.

Originally the City was located only in the Eastern basin, which consists of a major network of drainage canals with positive outlets into the South Florida Water Management District C-11 canal. The canal network is a gravity feed system of good deep and wide channels. Maintenance of these channels and their regulated use is provided by the Central Broward Water Control District.

As the City expanded west and south the dictates of detention refraction and

pollution abatement prevailed. These systems are confined to self-maintenance and overflow discharge only. The overflow is directed into a network of canals provided by the Central Broward Water Control District, which is responsible for maintenance and the regulation thereof.

The drainage facilities that serve the City are identified in Exhibit 4-4 and enumerated in Table 4-20.

Table 4-20 COOPER CITY DRAINAGE FACILITIES

NO.	SEC	TWS	RNG	PIPE SIZE	MATERIAL	PIPE INV.	AREA (ACRES)	RECEIVING WATER	LAND USE	ACCE DIRE
1	36	50	40	0			640.00	C-11-S	R5,CU, RC	ROCK
2	36	50	40	8	PVC	1.75	126.00	C-11-S	LM,C,I	COUN AND
3	36	50	40	18	CMP	2.44	207.00	C-11-S	L3	FLAM (STIR
4	36	50	40	15	CMP	1.34	112.00	C-11-S	L3	FLAM (52 ST
5	25	50	40	15	CAP	.5	8.00	C-11-S	L3	FLAM
6	31	50	41	18	CMP	1.7	104.00	S-25	L3,LM	FORE
7	6	51	41	54	CAP		640.00	S-22	R5,CCF	EMBA
8	31	50	41	48	CMP		207.00	S-22	L3	THE C
9	31	50	41	48	CMP	.8	90.00	S-22	L3	NATI
10	32	50	41	18	CMP	1.00	18.00	CC-5	R5	COLO
11	32	50	41	15	CMP	1.69	18.00	CC-5	R5	COUN WEST
12	30	50	41	18	CMP		54.00	S-24	C,L3	PINE
13	30	50	41	36	CMP	-.2	10.00	CC-5	C	WINN
14	33	50	41	30	CMP	-.5	61.00	S-18	L3	COUN
15	32	50	41	21	CMP	-1.8	55.00	S-18	L3	COUN
16	33	50	41	24	CMP		98.00	S-18	L3	TIMB
17	4	51	41	0		-1.65	640.00	S-18	-	BRIA

a. The Central Broward Water Control District's Stormwater Drainage Plan

The Central Broward Water Control District is a political subdivision of the State of Florida with ad valorem taxing privileges, created by a special act of the legislature. As a special district, Central Broward Water Control District is charged with the responsibility of not only maintaining the canal network, but also with the duty to regulate the drainage within its geographic area.

The existing canal network of the Central Broward Water Control District is fashioned on a minimum grid of ½ mile, unobstructed, connections into the South Florida Water Management's C-11 canal. Recent studies, by both South Florida Water Management and the Central Broward Water Control District, reflect a desire to maintain the standards of criteria for limited discharge by developments into the canal network.

The Broward County Water Management Division is responsible for implementing grading and drainage criteria for county rights-ofway. These standards are adopted by the Central Broward Water Control District and the City of Cooper City.

In April 1979 the District experienced a 16" rain in less then 24 hours. This storm was reported to be a 100-year event. Although there were no wind or debris factors, the volume and intensity of this event were, justly rated, and a good test of the City canal network. There was no house flooding during this storm. The most recent 100-year storm event occurred in October 1999 when Hurricane Irene dropped a total of 17.9 inches of rain in three (3) days as measured at the District’s office on Stirling Road. There were instances of street flooding in some areas of the City during this storm; however, there was no substantial damage to property as a result of flooding related to this storm.

b. Needs of the Central Broward Water Control District and the City of Cooper City

Following Hurricane Irene, the City, in conjunction with the Central Broward Water Control District, Broward County and the Town of Davie, participated in the Drainage and Water Control Study prepared by Craven Thompson & Associates. The improvements recommended for Cooper City included:

1. Installation of small yard type drains to serve the Embassy Lakes development to prevent future flooding on the sidewalk adjacent to Hiatus Road.

2. Regrading the swale along Hiatus Road to a deeper depth.

3. Connecting the existing exfiltration trench system along SW 90th Way and SW 91st Avenue into the existing storm drainage system located on SW 53rd Street.

4. Define swale system along both SW 50th Place and SW 51st Street.

Install additional catch basins with concrete aprons along SW 50th Place and connect them into the existing positive storm drainage system.

c. Cooper City Performance Assessment

In general the Cooper City drainage system operates smoothly and provides adequate protection from flooding. There have been two (2) instances of repetitive losses due to flooding in Cooper City. The City participates with the Federal Emergency Management Agency and the Insurance Services Office (ISO) in the Community Rating System program to reduce the threat of flood damage. Cooper City has received a flood protection rating of eight (8) which translates to a 10% discount on all flood insurance policies issued for property in the City.

The drainage system requires constant maintenance of debris and silt management and aquatic weed control. The Central Broward Water Control District is currently performing these tasks.

Water quality within the system of canals is generally good but the District staff is working with the South Florida Regional Planning Council staff to identify and reduce phosphorus loading within the canal system. As problems are identified, District staff notifies the responsible party to correct the problem. The District currently requires that all projects be engineered in accordance with Best Management Practices. In addition, the District requires that the water quality retention standards of the South Florida Water Management District are met as part of the plan approval and permitting process.

d. Summary and Recommendations

The City and the Central Broward Water Control District must maintain the open water body concept in order to prevent flooding from a major storm event. Developers who border on the canal network are required to provide for relocation not elimination of the system consistent with the adopted standards of the applicable regulatory agencies. Even during the last 100-year storm event, the City did not experience significant damage due to flooding. Therefore, the current mechanisms utilized to provide drainage facilities in the City to protect its residents and property is acceptable at this time. The City further reduces the threat of flood damage through its participation in the Community Rating System.

VIII. GOALS, OBJECTIVES AND POLICIES

Goal : Public infrastructure shall be provided, maintained and improved/adapted in a manner that will protect the natural groundwater aquifer, ensure the conservation of surface and groundwater resources with the intent of protecting future water supplies, adapt and protect the public infrastructure, services, natural systems and resources from climate change impacts, protect public health, safety, and quality of life and maintain continued liaison with the Central Broward Water Control District staff before development permits are issued to provide maximum flood protection.

Objective 4.1

The City will provide water and wastewater facilities in a manner that ensures present development, development for which permits have been issued and future development will be served in accordance with the LOS standards as specified and adopted in this plan.

Policy 4.1.1

The City shall reserve, through the future land use plan, and /or the LDR's sufficient land to construct necessary water and wastewater facilities.

Policy 4.1.2

Utility rates sufficient to fund operation and maintenance requirements, renewal and replacement requirements, principle and interest payments required by bond issues, State of Florida revenue generation requirements, will be established and the City will review and update utility rates periodically in order to accommodate changing conditions.

Policy 4.1.3

The City shall periodically conduct engineering studies to determine utility capital improvement needs and thus, to set Contribution In Aid of Construction requirements to ensure sufficient funds to accommodate the required expansion for growth.

Policy 4.1.4

Master Plans for wastewater and water supply will continue to be updated periodically during the planning period (2015-2030) in order to properly plan for future needs.

Policy 4.1.5

The City will staff water treatment plants and wastewater treatment plants with sufficient numbers of qualified and licensed treatment plant operators as required by State regulatory guidelines.

Policy 4.1.6

Field crews will be adequately staffed in order to perform the necessary preventative maintenance of water supply distribution system and sewage collection system and all associated appurtenances.

Policy 4.1.7

Ensure that sufficient lands and easements are set aside, on the future land use map, for utility needs such as lift stations, pump stations and transmission and collection lines for all future

developments.

Policy 4.1.8
Proposed capital improvement projects will be evaluated and ranked according to the following priority level guidelines:

> Level One - Whether the project is needed to protect public health and safety, to fulfill the City's and/or County's legal commitment to provide facilities and services, or to preserve or achieve full use of existing facilities.
>
> Level Two - Whether the project increases efficiency of use of existing facilities, prevents or reduces future improvement costs, provides service to developed areas lacking full service or promotes in-fill development.
>
> Level Three - Whether the project represents a logical extension of facilities and services within a designated service area.

Policy 4.1.9
Cooper City shall implement programs for the reuse of reclaimed water as part of its wastewater management program, where economically, environmentally, and technically feasible. (BCP 8.03.09)

Objective 4.2
Needed public facilities and improvements shall be coordinated and provided concurrent with planned and permitted growth.

Policy 4.2.1
All improvements for replacement, expansion or increase in capacity of facilities shall be consistent with the adopted level of service standards for the facilities.

Policy 4.2.2
The Engineering and Utility Department shall jointly develop and implement procedures to update facility demand and capacity information as development orders or permits are issued.

Policy 4.2.3
On an annual basis, the Engineering and Utilities Departments shall review facility capacity and provide updates on capacity surpluses and deficiencies to the City Manager.

Policy 4.2.4
All future permanent development shall be serviced by public water and sewer provided by Cooper City Utilities with the exception of residential estate and lower density residential areas where the provision of central water and wastewater facilities is shown not to be cost-effective for the City. (BCP 8.01.08)

Policy 4.2.5
No permits shall be issued for new developments, which would result in an increase in demand on deficient facilities prior to completion of improvements needed to bring the facility up to the

adopted level of service standard. Development orders shall not be issued prior to verification of consistency with the concurrency management section of the Capital Improvements Element. (Cross reference Policy 8.4.6 of the Capital Improvements Element)

Policy 4.2.6
The City will coordinate with Central Broward Water Control District within the designated service areas to ensure that their comprehensive plans and development permit procedures are compatible with City policy.

Policy 4.2.7
Coordinate with the South Florida Water Management District in the implementation of the western C-11 water quality improvement strategy and plan Cooper City will also cooperate with the implementation of the Southwest Broward/Northwest Dade Sub-regional Study by the South Florida Regional Planning Council and the Central Broward Water Control District's study of the jurisdiction. The City shall incorporate the findings of these studies into the Comprehensive Plan and Land Use Implementation Procedures of Volume 2.

Policy 4.2.8
Cooper City shall implement land development regulations in cooperation with Central Broward Water Control District to ensure maintaining open secondary drainage canals in order to prevent flooding from a major storm event.

Policy 4.2.9
Cooper City shall incorporate Broward County groundwater recharge area requirements by adopting open water drainage canals as identified above.

Policy 4.2.10
The design capacity of the Central Broward Water Control System is:

a. West of 100th Avenue equals 3/4" per acre per day.
b. East of 100th Avenue equals 1 1/2" per acre per day.
c. The South Florida Water Management C-11 is the same as above.
d. The current demand on the Central Broward Water Control District systems is limited to overflow discharge only. Based upon this limitation the system will function at full capacity upon total land development.
e. The secondary canal system will provide the county-wide level of 25 year frequency, 24 hours duration; rainfall intensity curve-zone 10 DOT Drainage Manual, 1986.

Policy 4.2.11
The City shall require all redevelopment activities within identified floodplains to address existing flooding problems, if any. (BCP 9.07.02)

Policy 4.2.12
Minimum floor elevation standards for building sites promulgated and administered by the Federal Emergency Management Administration shall be applied for new construction. (BCP 8.01.18)

Policy 4.2.13
Minimum road crown elevation standards as implemented by the South Florida Water Management District shall be applied. (BCP 8.01.19)

Policy 4.2.14
The City shall require existing development on septic tanks and private wells to hook up to centralized water and wastewater facilities as they become available. (BCP 8.01.10(a))

Objective 4.3
Future private treatment plants, septic tanks or private wells shall be discouraged except in the Estate, Rural Ranches or Rural Estate land use categories where the provision of central water and wastewater facilities is shown not to be cost-effective for the City and, in accordance with Broward County Ordinance No. 1998-40 (exception of central water hook-ups), when such facilities do not meet the proximity requirements of Broward County and the State of Florida.

Policy 4.3.1
The City shall enforce its present regulations pertaining to requiring all new developers to construct and tie new water and sewer lines into the existing municipal infrastructure system. (BCP 8.01.08)

Policy 4.3.2
The following level of service standards are hereby adopted, and shall be used as the basis for determining the availability of facility capacity and the demand generated by a development:

FACILITY/SERVICE AREA	LEVEL OF SERVICE STANDARD
Sanitary Sewer Facilities	Average Sewage Generation Rate 287 gallons per day per ERC
Solid Waste Facilities	Average Solid Waste Generation Rate Maximum 4 pounds per capita per day
Drainage Facilities	Design Storm 25-year frequency, 24-hour duration; rainfall intensity curve-zone 8, DOT Drainage Manual, 1979
Potable Water Facilities	Average Water Consumption Rate
Residential	96 gallons / day / capita
Nonresidential (Office)	0.08 gallons / day / sq.ft.
Nonresidential (Shopping)	0.15 gallons / day / sq.ft.

In order to ensure that these levels of service standards are maintained, methodologies for determining available capacity and demand shall incorporate appropriate peak demand coefficients for each facility and for the type of development proposed.

Objective 4.4
The City shall continue to implement all available means to maintain the reduction of overall usage of potable water in the City which has been achieved through implementation of the on-going water conservation program.

Policy 4.4.1
The Chief Building Official shall continue to enforce the energy and water conservation techniques adopted in the Florida Building Code.

Policy 4.4.2
Cooper City shall conform to South Florida Water Management District restrictions relating to potable water uses during periods of drought and continue the established public education program on water conservation practice.

Objective 4.5
The City will continue to require compliance with the Broward County Wellfield Protection Ordinance, as amended, for all businesses operating within wellfield cones of influence and for planned projects in the city.

Policy 4.5.1
Areas determined to be located within wellfield cones of influence will not be allowed to be constructed for industrial toxic storage purposes.

Policy 4.5.2
All existing homes in Cooper City with septic tanks (located within wellfield cones of influence) shall be phased out by extending municipal sewage treatment facilities to each site.

Objective 4.6
The City will meet the anticipated community needs for the next 15 years by expanding and improving its existing water and wastewater facility systems.

Policy 4.6.1
The City will regularly monitor the operation and effectiveness of the present system and upgrade as necessary.

Policy 4.6.2
The City has adopted, implemented, and will continue to maintain and update the Water Supply Facilities Work Plan to increase the coordination between land use and future water supply as required by Chapter 163, Florida Statutes. The City's Work Plan is provided in Section IV of the Infrastructure Element.

Policy 4.6.3
The City's adopted Work Plan will be updated at a minimum every five years or within 18 months of an update to the SFWMD's Lower East Coast Water Supply plan. The City shall ensure coordination of the comprehensive plan with the most current SFWMD Lower East Coast Water Supply plan when amending the City's adopted Work Plan.

Policy 4.6.4
The Work Plan will be used to prioritize and coordinate the replacement, expansion and/or upgrade of existing facilities used to withdraw, treat, transmit, store and distribute water to meet future needs.

Policy 4.6.5
The City will employ alternative sources of water supply as approved by the SFWMD and identified in the Lower East Coast Water Supply Plan, to supplement traditional sources of groundwater and surface water supplies. (Cross reference Policy 5.2.6 of the Conservation Element)

Policy 4.6.6
The City will provide annual progress reports to the SFWMD on the water supply development project(s) identified in the Work Plan.

Policy 4.6.7
The City will conserve potable water resources, including the implementation of potable water conservation strategies and techniques as identified in the Work Plan.

Policy 4.6.8
Planning for additional capacity and/or a reduction in per capita demand is included in the City's Water Supply Facilities Work Plan as required by Chapter 163 of Florida Statutes. The City's Work Plan is provided in Section IV of the Infrastructure Element.

Policy 4.6.9
Every five years from the date of permit issuance, the City will submit a water use compliance report for review and approval by the South Florida Water Management District, or in accordance with the conditions of its current Consumptive Use Permit. (Cross-reference Policy 2.10 of the ICE.)

Objective 4.7
Continue to implement adopted land development regulations containing standards for inclusion of recharge areas in open space preservation requirements.

Policy 4.7.1
In the interest of increasing infiltration and recharge of the groundwater aquifer, the City will continue to require in its land development regulations an increase in the amount and percent of pervious surface included in site plans and encourage greater use of partially pervious paving materials in development as well as the development of stormwater retention systems which contribute to recharge of the groundwater aquifer rather than channel stormwater to nearby surface waters.

Policy 4.7.2
The City will coordinate with local, state, and federal agencies through the land development permitting and approval process to achieve regional aquifer recharge protection objectives.

Policy 4.7.3
In conjunction with Broward County, the City shall identify, preserve and protect all aquifer

recharge areas, water conservation areas and groundwater recharge areas within Cooper City consistent with the requirements of the State Comprehensive Plan. (BCO 6.01.00)

Objective 4.8
The City shall prepare and implement a recycling program to reduce the solid waste disposed of in sanitary landfills 10% by December, 2006.

Policy 4.8.1
The City shall, through interlocal agreement and participation in joint planning efforts, coordinate and cooperate with Broward County to continue implementation of a solid waste reduction/recycling program.

Policy 4.8.2
Cooper City shall encourage source separation and the recycling of solid waste through the implementation of Cooper City's Recycling Ordinance 91-3-4, and in accordance with the Solid Waste Act of 1988, as amended, and Chapter 187.201(13)(b)1., F.S. (1991). (BCP 8.01.12)

Policy 4.8.3
The City shall utilize the mechanisms outlined in the Intergovernmental Coordination Element to ensure that any landfills and resource recovery facilities that may impact Cooper City shall be planned to minimize impacts on adjacent existing or planned land uses. (BCP 8.01.15)

Objective 4.9
Address the availability and appropriate use of regional water supplies as well as the impacts of development upon water resource management programs and planning efforts of the South Florida Water Management District, and those of other local, regional, state and federal agencies.

Policy 4.9.1
The City will continue to ensure coordination among the Growth Management and Utilities Departments with SFWMD, the Town of Davie, Southwest Ranches, and other agencies in the implementation of alternative water supply projects, establishment of level of service standards and resource allocations, changes in service areas, potential for annexation, and the sharing and updating of information as needed or as requested to meet ongoing water supply needs. (Cross Reference Policy 7.2 of the ICE.)

Policy 4.9.2
The Growth Management Department shall recommend the denial of future land use map amendments where densities or intensities are increased if:

1. Plans do not demonstrate that adequate water supplies and associated public facilities will be available to meet the projected growth demands, or
2. There is not a reasonable expectation that a consumptive use permit for the proposed water resource will be issued by the South Florida Water Management District, or

3. Plans to extend and/or develop potable water resources and facilities do not include a financially feasible capital improvement program.

Policy 4.9.3
The City will consult with the applicable water supplier (Cooper City or bulk or emergency supplier where applicable) prior to approving a building permit in order to ensure that adequate water supplies and facilities are available to serve a new development no later than the date on which the City anticipates issuing a certificate of occupancy. (Cross Reference Policy 7.1 of the ICE.)

Policy 4.9.4
The City will explore an agreement with reclaimed water utilities in Dade, Broward and Palm Beach counties for reclaimed water services to meet the milestones set out in the Leah Schad Memorial Ocean Outfall Program which requires Cooper City to mitigate their ocean outfall by producing a minimum of 0.9 MGD of reuse water by the year 2025.

Objective 4.10
Ensure resiliency of existing and future water resources, and water, wastewater and storm water infrastructure to the impacts of climate change and consider the development of adaptation strategies for areas vulnerable to climate change-related impacts.

Policy 4.10.1
Assess the adequacy of water supply and water/wastewater facilities and infrastructure to effectively capture, store, treat, and distribute potable water and reuse under variable climate conditions, including changes in rainfall patterns, sea level rise, and flooding, with potential water quality and quantity impacts.

Policy 4.10.2
Coordinate adaptive management implementation strategies for water and wastewater resources that address the potential impacts of climate change for long term operations.

Policy 4.10.3
Evaluate cost/benefit analysis for implementing adaptive management strategies including; planning, siting, construction, replacement and maintenance of public infrastructure as well as fortification or retrofitting of existing infrastructure.

Policy 4.10.4
Develop water demand projection scenarios that account for potential changes in demands if temperatures increase and drought conditions become more frequent or persistent.

Policy 4.10.5
Maintain infiltration and inflow programs to strategically reduce the flow of groundwater and stormwater to wastewater collection and treatment facilities.

IX. EXHIBITS