



Reedy Creek Improvement District
Comprehensive Plan

**INFRASTRUCTURE
ELEMENT**

**Part A:
Policies**

INTRODUCTION

The Infrastructure Element addresses the provision of water, sewer, solid waste, and stormwater management services within the Reedy Creek Improvement District. It is divided into four “Subelements,” corresponding to these topics. The element consists of a “Policies” component, which includes adopted goals, objectives, and policies for infrastructure, and a “Supporting Data and Analysis” component, which provides narrative text, tables, and maps describing existing and future conditions.

GOALS, OBJECTIVES, AND POLICIES

GOAL

It is the goal of the Reedy Creek Improvement District to provide water, sewer, solid waste, and stormwater management services to existing and future development within its boundaries in the most efficient, cost-effective, and environmentally sound manner possible.

POTABLE WATER

Objective 1

To extend and increase the capacity of central water facilities in a manner that meets future needs and maintains current levels of service.

Policy 1.1: The following level of service standards are adopted for the purposes of determining the adequacy and design capacity for potable water facilities:

Land Use	Unit	Gallons/Day
Residential	dwelling	350
Hotel (general)	keys	200
Luxury/Deluxe	keys	250
First Class	keys	200
Moderate/Economy	keys	150
Other Resort	keys	250
Convention Space	square foot	0.25
Support/ Office	square foot	0.25
Retail/General Commercial	square foot	0.30
Restaurant	seat	25
Theme Parks (general)	guest	50
Theme Parks (water)	guest	75

The Hotel and Other Resort standards listed above presume that reclaimed water is available for irrigation use. In the event that reclaimed water is not available, hotel and other resort standards shall be multiplied by 1.5.

(Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Policy 1.2: The adopted level of service standards shall be used as the basis for replacing, expanding, or increasing the capacity of potable water facilities and potable water supplies. (Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 1.3: Development approvals shall be conditioned upon a specific finding that the increase in potable water demand resulting from the development can be met without a reduction in the adopted level of service no later than the date on which the District anticipates issuing a certificate of occupancy. (Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 1.4: Potable water system improvements shall be undertaken in accordance with the priority list identified in the Capital Improvements Element. This list shall be based on the following criteria:

- (1) first priority shall be for correcting deficiencies in the system, should such deficiencies arise in the future, and for improvements that serve health and safety functions or maximize the efficiency of the existing system;
- (2) second priority shall be for extensions to the system that accommodate development through 2015; and
- (3) third priority shall be for extensions to the system that accommodate development beyond 2015.

(Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Policy 1.5: All new development in the District shall continue to include a water system of sufficient size and design to supply water for fire protection within each building or structure to be erected within the development.

Policy 1.6: The potable water system shall have the following minimum design criteria:

- (1) *Design Flow:* The greater of instantaneous peak demand or fire flow (3,500 gpm minimum) plus peak-day demand.
- (2) *Storage Capacity:* Volume sufficient to meet peak firefighting demands, plus maximum day system demand, for a minimum four hours in duration and at least 25% of the peak day demand.
- (3) *Pressure:* Greater than or equal to 50 pounds per square inch at remote points in the system under normal operating conditions and greater than 30 psi under fire flow conditions.

(Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 1.7: All new development in the District shall continue to include a water system of sufficient size and design to supply water for fire protection within each building or structure to be erected within the development. (Added by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Objective 2

To ensure that groundwater resources are used efficiently and conservatively within the District and that their use results in no anthropogenic adverse impacts to surface waters and wetlands between 2008 and 2018. (Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 2.1: The RCID building and plumbing codes shall continue to require the use of water-saving showerheads, faucets, and other fixtures in new construction that minimize the consumption of water, consistent with the State Water Conservation Act (Section 553.14, Florida Statutes).

Policy 2.2: The District shall continue to promote educational programs that foster water conservation and reduction measures by collecting information from water control districts, publications, and other sources and making it available to current and future uses.

Policy 2.3: The District shall restrict irrigation to evenings, nights, and early morning hours, continually review and revise building codes to reflect new water conservation technology, comply with all water restrictions imposed by the Water Management District, and maintain an emergency water conservation plan that is consistent with Water Management District, standards. Consideration will be given to revising rate structures to provide incentives for water conservation. (Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 2.4: All landscaped areas within new development parcels shall be required to either connect to the water reuse system or use native plant material in accordance with the Xeriscaping Policy of the South Florida Water Management District (SFWMD). (Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Policy 2.5: A continuing effort shall be made to reduce the use of potable water for irrigation and expand the reclaimed water system to serve older development areas within District boundaries. The success of this effort may be measured in part by the ratio of average day wastewater flows to average day potable water withdrawal (0.55 in 1991, 0.60 in 1997, and 0.78 in 2007). As the District shifts away from using potable water for irrigation, a larger volume of potable water will be returned to the treatment plant and this ratio will rise closer to the theoretical maximum of 1.0. (Amended by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 2.6: The District shall continue to investigate feasible techniques for other applications of reclaimed and treated effluent which will result in the reduced use of potable water.

Policy 2.7 To ensure efficient use of reclaimed water, RCID shall require all new development and all conversions of existing irrigation systems from potable water to reclaimed water to be equipped with weather sensors that control the amount and rate of reclaimed water application to match the needs of the vegetation. Such weather sensors shall measure effective rainfall and calculate evapotranspiration rates to determine the optimum irrigation rate and duration. Overriding of the weather sensors for the purpose of increasing landscape irrigation shall not be permitted. (Added by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008) (Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Objective 3

To maintain levels of potable water quality that meet or exceed state and federal standards.

Policy 3.1: The District shall locate future wells in accordance with all appropriate SFWMD and FDEP regulations, and in compliance with its own Land Development Regulations (LDRs). The well protection standards given in the LDRs shall be updated as necessary to ensure that they meet or exceed state and federal standards.

Policy 3.2: The RCID shall not establish new wells in areas where the potential for unsuitable groundwater exists because of current or historic activities and land uses.

Policy 3.3 The RCID shall not establish new wells in areas where the groundwater withdrawal impacts may adversely affect surface waters or wetland. (Added by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Objective 4

To maintain an administrative system that ensures the efficient, safe, and reliable delivery of potable water services and ensures that land use and water facility planning are integrated.

Policy 4.1: The RCID shall continue to provide potable water services to customers within its boundaries.

Policy 4.2: The RCID shall continue to require new development within the current utility service area to be linked to the District's water system.

Policy 4.3: The RCID shall maintain a Master Utilities Plan which estimates potable and reclaimed water demand and identifies water and reclaimed water facility needs. The District shall update this Plan not less than once every five years.

Policy 4.4: The RCID shall continue to ensure compliance with standards in its Land Development

Regulations that specify the procedure for delivery of water services to new development.

Policy 4.5: The RCID shall continue its current program of preventive maintenance for the potable water system.

Policy 4.6: The RCID shall not extend water services to land outside its boundaries unless provided for by interlocal agreements. Water extensions beyond District boundaries may be considered appropriate if the area to be served will be developed with affordable housing or other uses providing local and regional benefits and consistent with the receiving jurisdiction's comprehensive plan.

Policy 4.7: The RCID shall meet with the major landowners as needed but not less than once a year to discuss pending development plans and their probable impacts on water facility needs.

Policy 4.8 The RCID shall strive to make additional interconnections with Orange County and Toho Water Authority to provide and receive supplies in time of emergency. (Added by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Policy 4.9 The RCID shall partner with neighboring local utilities and the water management districts in the development and regionalization of alternative water supply sources for future needs as identified in the Infrastructure Element, Part B: Supporting Data and Analysis Table 5-12 and Table 5-13. Partnering shall include:

- 1) The development and execution of an interlocal agreement with the STOPR group and the water management districts to implement a Central Florida regional water resources plan by 2009;
- 2) Funding the evaluation of the alternative water supply sources in Table 5-12 and Table 5-13 by the end of calendar 2010; and
- 3) Implementing selected alternative water supply sources to match future needs.

(Added by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

Objective 5

(Added in its entirety by Ordinance/Resolution No. 482 adopted 09/24/2008 and Ordinance Nos. 121 and 122 adopted 09/22/2008)

To maintain a Water Supply Facilities Work Plan for at least a ten (10) year planning period for constructing the water supply facilities to serve existing and new development necessary to achieve and/or maintain the level of service standards adopted in this Element.

Policy 5.1 The conversion of non-potable uses of groundwater to reclaimed water has the greatest potential and appears to be the easiest and least costly for RCID and is the alternative water supply source selected by RCID to meet future water use demand.

Policy 5.2: The RCID shall convert all potable water irrigation and cooling towers to reclaimed water use as shown in Table 5-6 – Proposed Implementation Plan for Reclaimed Water Conversions as contained in the Infrastructure Element, Part B: Supporting Data and Analysis as necessary to achieve and maintain the level of service standards adopted in this Element.

Policy 5.3 All potable water irrigation within RCID shall be performed with reclaimed water and conversion of existing irrigation systems from potable water to reclaimed water needs to be completed no later than December 31, 2017.

Policy 5.4 All centralized RCID cooling towers shall be converted to reclaimed water no later than December 31, 2017.

Policy 5.5 The following Five-Year Schedule of Capital Improvements for water supply facilities is adopted:

Project Description	Source	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
1000 LF of 8-inch main on 7 Seas Dr 4-inch & 6-inch mains on Buena Vista Dr 4-inch main extensions on Buena Vista Dr 6-inch main extensions from World Dr 12-inch main along Epcot Resorts Blvd from World Dr 12-inch main along Epcot Resorts Blvd from World Dr 4-inch, 6-inch, & 8-inch main extensions on Hotel Plaza Blvd	Bond Funds (On Hand) or Net Revenues	\$0	\$370	\$590	\$1,090	\$910	\$0

Notes:

Funding Source: Net Revenues = consist of sewer and reclaimed water sales, investment income, and miscellaneous revenues net of operating and maintenance expenses, reserves and replacements, and debt service.

Estimates reflect 2008 costs and have not been inflated to year of construction

(Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

SANITARY SEWER

Objective 6

To extend and increase the capacity of sanitary sewer facilities in a manner that meets future needs and maintains current levels of service.

Policy 6.1: The following level of service standards are adopted for the purposes of determining the adequacy and design capacity for sanitary sewer facilities:

Land Use	Unit	Gallons/Day
Residential	dwelling	300
Hotel (general)	keys	180
Luxury/Deluxe	keys	230
First Class	keys	180
Moderate/Economy	keys	130
Other Resort	keys	230
Convention Space	square foot	0.20
Support/ Office	square foot	0.20
Retail/General Commercial	square foot	0.25
Restaurant	seat	20
Theme Parks (general)	guest	30
Theme Parks (water)	guest	50

(Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Policy 6.2: The adopted level of service standards shall be used as the basis for replacing, expanding, or increasing the capacity of sanitary sewer facilities.

Policy 6.3: Development approvals shall be conditioned upon demonstration that the increase in sanitary sewer demand resulting from the development can be met at the time of its occupancy without a reduction in the adopted level of service.

Policy 6.4: Development in the RCID shall continue to require wastewater collection lines of sufficient size to receive and carry wastewater from all buildings and structures to the District's main system. Minimum gravity sanitary sewer size for lines maintained or owned by RCID will be eight inches in diameter. Non-RCID laterals may be less than eight inches in diameter but not less than four inches.

Policy 6.5: The District shall continue to maintain a treated effluent disposal system which minimizes the potential for surface water pollution. The disposal system should be designed so that a majority of the District's treated effluent can be disposed through the reclaimed water system during dry weather periods.

Objective 7

To maintain levels of effluent quality that meet or exceed state and federal standards.

Policy 7.1: The following annual average effluent quality standards shall be maintained at the RCID wastewater treatment plant:

- 1) 5 mg/l biochemical oxygen demand;
- 2) 5 mg/l total suspended solids;
- 3) 3 mg/l total nitrogen;
- 4) 1 mg/l total phosphorus; and
- 5) pH 6.0 to 8.5.

Policy 7.2: New technologies to improve the quality of wastewater effluent shall continue to be explored as they become available and economically feasible.

Objective 8

To maintain an administrative system that ensures the efficient, safe, and reliable delivery of sanitary sewer services, and ensures that land use and wastewater facility planning are integrated.

Policy 8.1: The RCID shall continue to provide sanitary sewer services to customers within its boundaries.

Policy 8.2: The RCID shall continue to require all new development to be linked to the central wastewater system. New, independent package plants and collection systems serving individual developments shall not be permitted, unless accompanied by a bona fide plan for feasible connection to the central system within five years. Independent package plants and circulation systems may be permitted to treat pools within animal related exhibits at theme parks, provided that their backwashings and other liquid wastestreams are discharged to the sanitary sewer.

Policy 8.3: The RCID shall maintain a Master Utilities Plan which estimates long-term wastewater demand and wastewater facility needs. The District shall update this plan not less than once every five years.

Policy 8.4: The RCID shall continue to ensure compliance with standards in its Land Development Regulations that specify the procedure for delivery of sanitary sewer services to new development.

Policy 8.5: The RCID shall continue its current program of preventive maintenance for the sanitary sewer system.

Policy 8.6: The RCID shall not extend sanitary sewer services to land outside its boundaries unless provided for by interlocal agreements. Wastewater extensions beyond District boundaries may be considered appropriate if the area to be served will be developed with affordable

housing or other uses providing local and regional benefits and consistent with that jurisdiction's comprehensive plan.

Policy 8.7: Septic tanks shall continue to be permitted only under the following circumstances:

- 1) residential development with an average gross density of one unit per acre or less, no central sewer available, and demonstration that soils are suitable for septic tank use; or
- 2) free-standing recreational or service buildings more than one-quarter mile from a developed area with average daily wastewater flow not to exceed 1,000 gpd, no central sewer available, and demonstration that soils are suitable for septic tank use.

Policy 8.8: The RCID shall meet with the major landowners as needed but not less than once a year to discuss pending development plans and their probable impacts on sanitary sewer facility needs.

SOLID WASTE

Objective 9

To increase the capacity of solid waste facilities in a manner that meets future needs and maintains current levels of service.

Policy 9.1: The following level of service standards are adopted for the purposes of determining the adequacy and design capacity of solid waste facilities:

Land Use	Unit	Lbs/Day
Residential	dwelling	11.5
Hotel (general)	keys	7.5
Luxury/Deluxe	keys	11.0
First Class	keys	7.5
Moderate/Economy	keys	6.0
Value	keys	3.5
Other Resort	keys	6.0
Convention Space	square foot	0.0325
Support/ Office	square foot	0.002
Retail/General Commercial/Restaurant	square foot	0.0325
Theme Parks (general)	park	10 to 20 tons*
Theme Parks (water)	park	0.5 to 1.0 tons*

*depending on size and amenities

(Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)

Policy 9.2: The adopted levels of service standards shall be used as the basis for replacing, expanding, or increasing the capacity of solid waste facilities. The primary facility to which the level of service standards shall be applied will be the solid waste transfer station. The service standards may also be used to estimate vehicle fleet requirements and capacity requirements for recycling and processing facilities.

Policy 9.3: Development approvals shall be conditioned upon demonstration that the increase in demand for solid waste services resulting from the development can be met at the time of its occupancy without a reduction in the adopted level of service.

Policy 9.4: The RCID shall continue to transport its commercial and domestic solid wastes to permitted landfill facilities. The transfer of wastes to permitted facilities shall be governed by written service agreements.

Policy 9.5: Growth in solid waste volumes shall continue to be accommodated through expansion of the solid waste transfer station, addition of vehicles and equipment, and development of new facilities for processing, recycling and resource recovery. New landfills may not be established within the District.

Policy 9.6: Within new development, sites for solid waste compacting and collection equipment shall be

provided in an efficient and cost-effective manner.

Objective 10

To provide capacity to divert at least 50 percent of the Class I waste generated within District boundaries from landfill disposal.

- Policy 10.1: The RCID shall maintain and expand its program for recycling newspaper, office paper, aluminum cans, glass, and plastics.
- Policy 10.2: The RCID shall promote the processing of lawn and gardening waste, biosolids, food, and other materials.
- Policy 10.3: All new development that employs or houses more than ten people shall be required to set aside areas for source separation of solid waste.
- Policy 10.4: The RCID shall maintain an effective public awareness and information program to increase and maintain public participation in recycling and waste reduction programs.
- Policy 10.5: The RCID shall continue to investigate and review the latest available technology for resource recovery and other alternative solid waste management technologies.
- Policy 10.6: The RCID shall continue to encourage innovative and experimental plans and programs that maximize the efficient collection, storage, handling, disposal, and recovery of solid waste materials.
- Policy 10.7: The RCID shall continue to explore options for reducing the percentage of construction debris requiring landfill disposal.
- Policy 10.8: The RCID shall promote the application of new technologies, including waste pelletization, to reduce landfill disposal needs.

Objective 11

To ensure environmental safety in the collection, storage, handling, and disposal of all solid wastes, including hazardous materials.

- Policy 11.1: The RCID shall prohibit the holding of hazardous materials, as defined by the Florida Substances list, within the 100-year flood plain, and within 200 feet of a designated Section 404 wetland.
- Policy 11.2: The RCID shall maintain agreements with off-site landfills for the disposal of a majority of the non-recyclable Class III (construction) waste-stream. The existing construction landfill within District boundaries will not be expanded and will only be used for disposal of small quantities of non-recyclable construction and plant debris, or as a stockpiling area for materials to be recycled.

Objective 12

To maintain an administrative system that ensures the efficient, safe, and reliable delivery of solid waste services.

- Policy 12.1: The District shall ensure that its waste collection, transfer, and landfill transportation system is economical, efficient, and environmentally sound. On-site collection and transfer services will be provided by a District vehicle fleet. Transfer to landfills may occur by third-party contractors, as provided by service agreements.
- Policy 12: The RCID shall continue preparing regular reports indicating the amount of solid waste generated at each major collection point and the percentage of this waste diverted from landfills. This information shall be used to evaluate the need for additional collection and recycling vehicles. The tonnage of waste requiring handling at the transfer station shall be compared to transfer station capacity to determine if additional capacity is needed.
- Policy 12.3: The RCID shall update its transfer station as needed to incorporate new technologies, particularly technologies which reduce the volume of waste requiring landfill disposal.
- Policy 12.4: The RCID shall continue to ensure compliance with standards in its Land Development Regulations that specify the solid waste provisions that must be made in new developments.
- Policy 12.5: The RCID shall meet with the major landowners as needed, but not less than once a year, to discuss pending development plans and their probable impacts on solid waste facility needs.
- Policy 12.6: As needed but not less than once every two years, the District shall assess its waste disposal agreements and ensure that adequate long-range capacity exists at the landfills where its solid waste is disposed.

STORMWATER MANAGEMENT

Objective 13

To correct any stormwater management system deficiencies identified in this Plan, or identified in the future.

Policy 13.1: The following criteria shall be used for determining stormwater management system priorities:

- 1) Flooding projected to occur within existing developed areas in a 10-year storm event.
- 2) Flooding projected to occur within existing developed areas in a 50-year storm event.
- 3) Flooding projected to occur within vacant areas programmed for development in the Future Land Use Element in a 10-year storm event.
- 4) Flooding projected to occur within vacant areas programmed for development in the Future Land Use Element in a 50-year storm event.

Policy 13.2: The District shall, at least biennially, reassess stormwater management system conditions by running its drainage model.

Policy 13.3: The District shall continue to prepare an annual report assessing the operation of its stormwater management facilities and identifying capital improvement needs and operation and maintenance needs.

Objective 14

To achieve and maintain adopted level of service standards for stormwater management.

Policy 14.1: The following level-of-service standards shall be adopted:

- 1) The main District Drainage System shall convey the 50-year, 3-day storm event as determined by the RCID stormwater model.
- 2) The discharge at S-40 shall be limited to 3,282 cubic feet per second during a 10-year, 3-day storm event.
- 3) Arterial roadways shall remain above the 50-year, 3-day storm event elevation as determined by a stormwater model acceptable to the District.
- 4) The first floor of all habitable structures and public facilities shall be a minimum of one foot above the 100-year, 3-day storm event elevation, as determined by a stormwater model acceptable to the District.

- 5) In accordance with the SFWMD permit, all project sites shall retain the first one inch of runoff, or 2.5 times the site acreage times the percentage of impervious surface, whichever is greater, before discharge to the District's system.

- Policy 14.2: In order to ensure that the level-of-service standards described in Policy 14.1 are maintained as new development occurs, the District shall annually assess the need for facility improvements and shall program capital improvements as required to maintain adopted level of service standards.
- Policy 14.3: When new development is proposed, the District shall require an evaluation of the need for drainage improvements. These improvements may include, but shall not be limited to, construction of on-site detention ponds and modifications to canals and water control structures.
- Policy 14.4: Any canal realignment or water control facility relocation proposed in conjunction with new development shall ensure that the adopted levels of service are maintained.
- Policy 14.5: The District shall ensure that no development occurs within the 100-year floodplain, unless compensating storage is provided within the sub-basin, and the flood carrying capacity of the floodway is maintained.
- Policy 14.6: In order to ensure that the level of service standards described in Policy 14.1 are achieved, all stormwater management permit applications proposing to use the benefits of the RCID Conceptual Stormwater Permit shall be approved by the District prior to submission to the South Florida Water Management District. The District shall require stormwater permit applications to include sufficient data and exhibits to ensure that the level of service standards are not exceeded. (Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)
- Policy 14.7: All stormwater discharges from sources outside the District shall limit their drainage contributions into the District to the amount contributed prior to development occurring on the parcel.
- Policy 14.8: All stormwater discharges from sources outside the District shall meet the standards found in Chapter 62, Florida Administrative Code.
- Policy 14.9: The District shall require a Drainage Agreement and collection of a use fee for any drainage entering the District in accordance with Circuit Court Order #66-1061, Section IV in Osceola County or Circuit Order #66-1061, Section V in Orange County, as is appropriate. In those cases where a SFWMD analysis is required a copy of the SFWMD permit shall be delivered to the District upon issuance by SFWMD, and in those cases where the SFWMD analysis is not required, the District shall require a report similar to that prepared by the SFWMD prior to executing a drainage agreement. (Amended by Ordinance/Resolution No. 510 adopted 07/28/2010 and Ordinance Nos. 128 and 125 adopted 07/14/2010)
- Policy 14.10: All drainage within the District or contributing to the District's Drainage system shall be required to be consistent with the schedule of improvements in the *RCID Comprehensive*

Plan Capital Improvements Element; or meet pre-development stormwater discharge standards; or include total funding for the required improvements. The geographic area covered by Policies 14.7 through 14.11 is shown in Figure 5-5.

Policy 14.11: All requests for modifications to the SFWMD Surface Water Management Permit shall be submitted to the District for review and approval and shall be accompanied by appropriate text and drawings signed and sealed by a civil engineer registered in Florida.

Policy 14.12: The District's drainage model shall include a maximum area within District boundaries that may be covered by impervious surfaces. All new development shall be reviewed to ensure that it does not cause this maximum to be exceeded. The maximum may be modified in conjunction with the annual update of the District's drainage model.

Objective 15

To continue a maintenance and inspection program which ensures that existing stormwater management facilities are maintained.

Policy 15.1: Bridges over the RCID's waterways shall be inspected at least biennially to ensure that their structural integrity is maintained.

Policy 15.2: Drainage structures and levees shall be inspected at least semi-annually to guarantee proper maintenance and ensure that their structural integrity is maintained.

Policy 15.3: Any improvements necessitated by the inspections described in Policies 15.1 and 15.2 shall be included in the annual Capital Improvements Element, unless such improvements are regular maintenance or repair expenses.

Policy 15.4: The District shall conduct periodic major cleanouts of its canal system. Where warranted by the scale of the cleanout, these projects may be scheduled as capital improvements.

Objective 16

To retain the unimproved portion of Reedy Creek in its natural condition.

Policy 16.1: Except as required at roadway bridge crossings, there shall be no structural improvements made to the portion of Reedy Creek south of the L-410 Canal.

Policy 16.2: Any future crossings of Reedy Creek south of the L-410 canal, and any improvements to existing crossings in this area, shall be designed to minimize impacts to the creek and adjoining wetlands and shall not reduce the carrying capacity of the floodway.

(See Conservation Element Policy 7.2 for discussion of the wetland buffer zone along Reedy Creek)

Objective 17

To maintain stormwater pollution control measures which ensure compliance with state and federal pollution control standards.

Policy 17.1: The District shall ensure that Best Management Practices are used during construction to preclude degradation of the stormwater management system.

Policy 17.2: Any stormwater quality standards to be adopted by the RCID shall be at least as stringent as those identified in its National Pollution Discharge Elimination System (NPDES) permit, or the successor to this permit.



Reedy Creek Improvement District
Comprehensive Plan

**INFRASTRUCTURE
ELEMENT**

**Part B:
Supporting Data and Analysis**

PURPOSE

The Infrastructure Element of the Reedy Creek Improvement District Comprehensive Plan addresses the provision of potable water, wastewater, solid waste, and stormwater management services in the RCID.¹ This element is divided into four subelements, corresponding to the topic headings listed above. Each subelement includes an analysis of existing conditions, a projection of future conditions based on the development scenario described in the Future Land Use Element, and a description of needed capital improvements.

The data and analysis in this element focus on five-year (2015) and ten-year (2020) timeframes. The five-year timeframe coincides with the Capital Improvement Program (CIP) years (FY 2011 - FY 2015) for consistency. Future updates of the District's CIP may result in amendments to the Capital Improvements Element. In such cases, the Infrastructure Element will be updated for internal consistency, but the most current and comprehensive data on capital improvements will be found in the Capital Improvements Element.

POTABLE WATER

OVERVIEW

Note: In accordance with Section 119.071(3), Florida Statutes, maps of the RCID water supply and distribution system are not provided herein due to the sensitive nature of these facilities and the security thereof.

Reedy Creek Improvement District is the sole provider of water services for the District. All of the District's water facilities are located within its boundaries and all development is connected to the central water system. As of 2008, the service area was contiguous with the District boundary, with the exception of the CrossRoads retail, dining, and entertainment center and the Vista Apartments, which were formerly within the District and then de-annexed. Some of the more remote and undeveloped portions of the District lack direct access to potable water infrastructure at this time.

The area receiving services contains two separate subdistricts. In general, Subdistrict I serves the City of Bay Lake and Subdistrict II serves the City of Lake Buena Vista. The central water system accounts for more than 99 percent of the pumping capacity in the RCID; the independent wells account for less than one percent. Additional water is provided for non-potable purposes through a reclaimed water system originating at the wastewater treatment plant. This system is described later in this element (see "Reclaimed Water System").

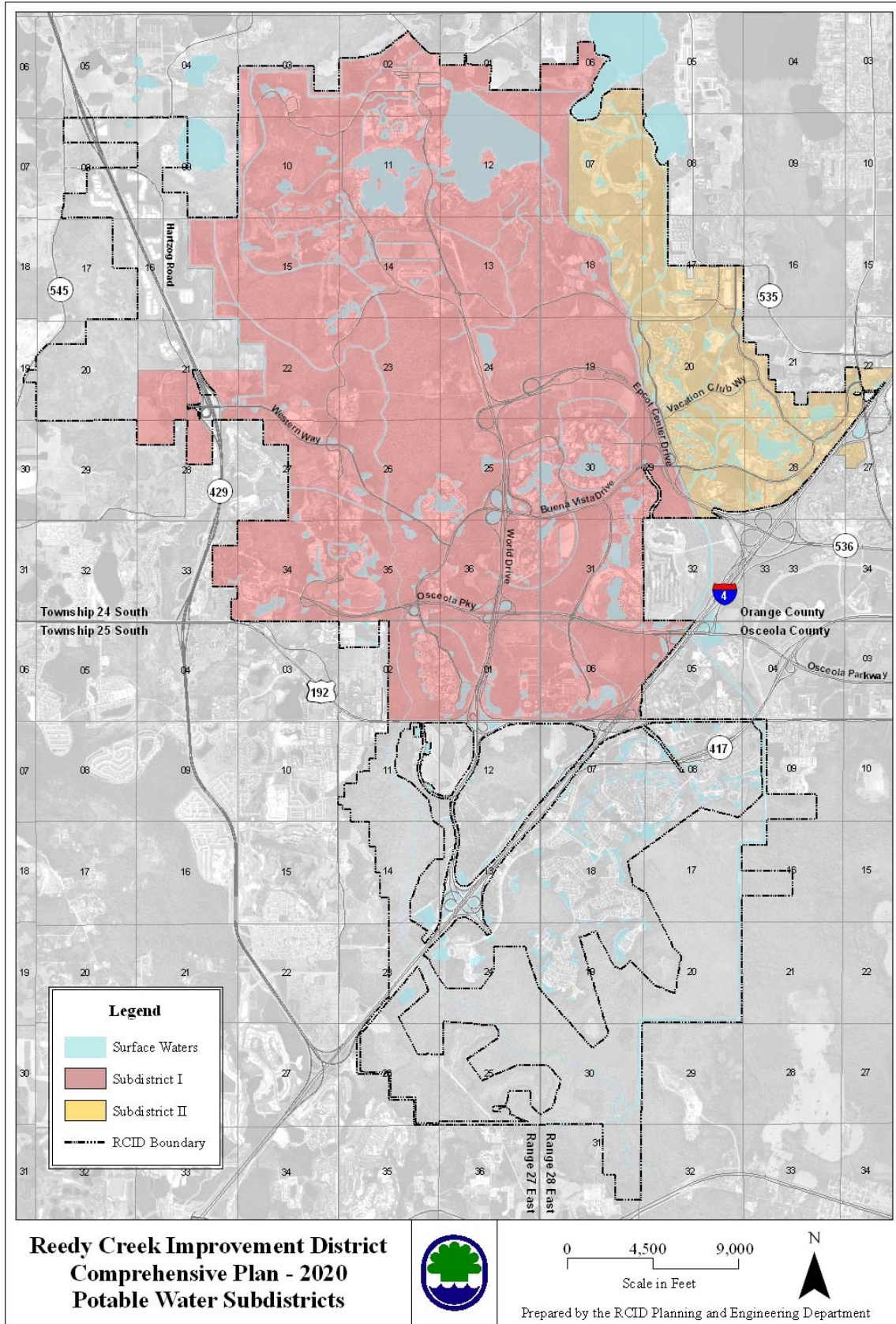
The predominant land uses served by potable water are similar in both subdistricts. These uses are characterized by large-scale resort and entertainment complexes and support service areas. There are no major residential, industrial or agricultural water users. Each subdistrict contains several areas of concentrated development, other areas that have yet to be developed, and areas reserved for long-term open space. Most of the service demand in Subdistrict I is associated with the four major theme parks and related

¹ *The Groundwater Recharge Subelement is contained within the Conservation Element.*

resorts. Water from the Subdistrict I system is also used at the service area north of the Magic Kingdom, the Fort Wilderness Resort and Campground, Disney's Wide World of Sports Complex, and Blizzard Beach Water Park.

Subdistrict II is about half as large as Subdistrict I and comprises fewer acres of developed land. It includes the Hotel Plaza Boulevard resorts, the Downtown Disney retail, dining, and entertainment complexes, office uses, the Administration Area, the Typhoon Lagoon Water Park, Old Key West Vacation Club, and the Saratoga Springs Vacation Club. Irrigation systems at the Lake Buena Vista golf courses have been converted from independent groundwater wells to the reclaimed water system. About 145,000 gallons a day from the Subdistrict II system are provided to Vista Way Apartments, an employee housing complex just outside District boundaries, and about 60,000 gpd to the CrossRoads, a retail, dining, and entertainment area just outside the District boundaries. All other Subdistrict II water users are within District boundaries. The boundaries of Subdistricts I and II are shown in Figure 5-2.

Figure 5-1: RCID Potable Water Subdistricts



REGULATORY FRAMEWORK

The federal Safe Drinking Water Act (Public Law 93-523) directed the U.S. Environmental Protection Agency (EPA) to establish minimum standards for potable water. These standards are divided into "primary" (required for public health) and "secondary" (recommended for aesthetic quality). Florida subsequently adopted the Florida Safe Drinking Water Act (403.850, Florida Statutes); the Florida Department of Environmental Protection (FDEP) is responsible for implementing this act. FDEP has promulgated rules classifying and regulating public water systems (Chapter 62-550, Florida Administrative Code). The South Florida Water Management District is responsible for managing water supplies to meet existing and future demands and issuing permits for consumptive use.

WATER SOURCES

Both subdistricts receive their water supply from the Upper Floridan aquifer. Groundwater is pumped to the central system by 11 wells, with depths varying from 200 to 900 feet. Water quality is excellent and requires only chlorination to meet state and federal drinking water standards. Extracted potable water is replenished principally by rainfall and by groundwater flow from recharge areas south and west of the District.

Subdistrict I

Subdistrict I is divided into northern and southern regions. Water is provided by Pump Station A in the north and by Pump Stations B and D in the south. The characteristics of the Subdistrict I wells are listed in Table 5-1.

Pump Station A, north of the Magic Kingdom, is fed by Wells 9 and 10. The wells have been operational since 1970. The two active wells have a combined capacity of 8,000 gallons per minute (gpm), while the pump station has a firm capacity of 12,000 gpm.

Table 5-1: Characteristics of Subdistrict I Potable Wells, 2008

Subdistrict I		
Well Number	2008 Capacity (gpm)	Pump Station Served
2	1,500	B
2A	3,000	B
9	4,000	A
10	4,000	A
17	3,500	B
18	4,000	D
19	4,000	D
21	4,000	D
<i>Independent wells</i>		
11	40	<i>Irrigation for Bay Court</i>
14	(*) 2000	N/A
13	(*) 3000	N/A
20	(**) 500	N/A

Notes:

(*) indicates reclaimed water augmentation well – back-up to reuse system only

(**) indicates irrigation well

Pump Stations B and D are located in the vicinity of Disney’s Hollywood Studios and the All Star Resorts respectively. Pump Station B is fed by Wells 2, 2A, and 17 and has a firm capacity of 15,000 gpm. Wells 2 and 2A have been operational since 1982, and Well 17 became operational during 1989. Water is chlorinated at an adjacent ground storage reservoir and is boosted to system pressure (90+ psi) by high service pumps.

Wells 18 and 19 are located on the south side of Osceola Parkway west of World Drive. Well 19 feeds Pump Station D, and Well 18 can be routed to either Station B or D, depending on a valve choice. Well 21, serves Pump Station D exclusively.

With emergency and inactive wells excluded, the Subdistrict I wells have a combined pumping capacity of about 28,000gpm. Wells 13 and 14 serve as backup supplies to the reclaimed water system and cannot provide water to the potable system with the current piping arrangement.

Two independent wells (11 and 20) in Subdistrict I serve small areas not linked to the central water system. Well 11 provides irrigation for the mobile homes on the north shore of Bay Lake. Well 20 provides irrigation water to support facilities in the Bear Island Road area, including the tree farm, and is used as an indirect augmentation source to the reclaimed water system should demands exceed supplies. Well 20 is typically inactive since the area is serviced with reclaimed water.

Subdistrict II

Wells 5, 6, and 16 provide the major source of water in Subdistrict II. Wells 6 and 16, with a cumulative pumping capacity of 7,500 gpm, pump groundwater to Pump Station C. The Pump Station has a firm capacity of 10,200 gpm and is located on the east side of Buena Vista Drive near the Disney Institute. Well 5, with a capacity of 1,100 gpm, is located in the Administration Area. Well Number 7 was removed from the system in the 1980s and is now used for monitoring purposes associated with the District's water use permit.

With emergency and inactive wells excluded, wells in the Subdistrict II system have a cumulative pumping capacity of 8,600 gpm. Water is provided at a pressure of 65+ psi.

In addition to the wells listed above, irrigation water can be pumped from two independent wells (Wells 1 and 3) within this subdistrict; both serve as indirect back-up to the reclaimed water system for the golf course adjacent to the Disney Institute. These wells have remained inactive for the past fifteen years due to the reliability of the reclaimed water system. The characteristics of the Subdistrict I wells are listed in Table 5-2.

Table 5-2: Characteristics of Subdistrict II Potable Wells, 2008

Subdistrict II		
Well Number	2008 Capacity (gpm)	Pump Station Served
5	1,100	5
6	3,500	C
7	<i>Removed From System. For Monitoring Only.</i>	N/A
16	4,000	C
<i>Independent wells</i>		
1	(**) 600	N/A
3	(**) 600	N/A

Notes:

(*) indicates reclaimed water augmentation well

(**) indicates irrigation well

Surface Water Withdrawal

Until the mid 1990s, the District relied heavily on surface water to irrigate golf courses in the Magic Kingdom vicinity. The District's SFWMD permit allowed 5,500 gpm of surface water to be withdrawn via pumps on the L-405 canal. Approximately 389 million gallons of surface water were used during 1989. With the provision of reclaimed water service to this area, surface water use declined dramatically. In 1997, 50 million gallons were withdrawn for this purpose, less than one percent of total consumption. Since 1998, no surface water has been used for golf course irrigation and all irrigation needs have been met with reclaimed water.

STORAGE AND PRESSURE SYSTEMS

To augment the water production facilities during peak periods, there are five storage reservoirs (three in Subdistrict 1 and two in Subdistrict II) with a combined capacity of 7.75 million gallons. Subdistrict I has approximately 75 percent of the storage capacity, with the balance in Subdistrict II. Each reservoir is accompanied by pumping and booster stations for pressurization. With the exception of Pump Station "A" which is fed from two independent power sources, the pumps are equipped with emergency diesel-powered generators for system reliability.

Subdistrict I

Wells 2, 2A, and 17 (and sometimes 18) pump directly into a 2.0 million gallon concrete reservoir located adjacent to Pump Station "B." The pump station pressurizes the distribution system via six 3,000 gpm booster pumps. Wells 9 and 10 pump water to a 2.5 million gallon concrete reservoir located adjacent to Pump Station "A." The pump station provides pressure to the distribution system using five 3000 gpm high service pumps. Water from Wells 18, 19 and 21 is stored in a 1.25 million gallon reservoir at Pump Station "D."

Subdistrict II

There are two reservoirs adjacent to Pump Station "C" (which is adjacent to Well 6), each with a capacity of one million gallons. Six booster pumps with a combined capacity of 10,200 gpm withdraw water from the reservoir and provide the operating pressure for the distribution system. These booster pumps provide the primary water supply for Subdistrict II.

DISTRIBUTION SYSTEMS

The distribution system consists of a looped network comprised predominantly of polyvinyl chloride (pvc), and ductile iron pipes ranging in size from 4 to 24 inches. The water system is equipped with valves that permit segments of the system to be isolated for repairs without disrupting service.

The northern and southern areas of Subdistrict I are connected by a 20-inch main along World Drive. In the northern area, Pump Station "A" delivers water through one loop serving the Magic Kingdom and another serving the surrounding resorts. The Fort Wilderness area is served by lines that branch off the second loop. In the southern area, Pump Stations B and D also deliver water to looped systems serving various activity areas. Subdistrict II uses two main loops to serve development in the Lake Buena Vista area.

The two subdistricts are interconnected at two points via 16-inch water mains and pressure regulating valves. Importation of water can occur from Subdistrict I to Subdistrict II under set loss-of-pressure conditions. The present water distribution system is sufficiently looped and pressurized to accommodate the level of projected development and fire protection needs during the next ten years. Extensions of both systems will be required to serve new development areas.

FIRE FLOWS

A major service provided by the distribution system is water for fire protection. In many cases, the demand imposed by fire protection dictates the design parameters for the system. A required fire flow of 3,500 gpm has been established for the RCID, based on Insurance Service Office (ISO) guidelines. The minimum acceptable system pressure during highest flow conditions has been established at 30 psi. Requirements for water storage are also related to fire flow needs. A four-hour duration for the needed fire flow plus net system demand has been established for each pump station. Most of the wells have emergency power supplies. Fire hydrants are located throughout the distribution network, providing sufficient coverage for fire protection.²

CAPACITY AND DEMAND

As previously noted, the data and analysis in this element utilize the planning horizons of 2015 and 2020 and Capital Improvement Program years (FY 2011 - FY2015). The CIP should be consulted for the most up-to-date and specific information about potable water projects planned within the District.

If all the wells connected to the central system were to operate concurrently at their maximum capacity, the system would produce 40,000 gpm, or 57.6 million gallons per day.³ It is extremely unlikely that all wells and pump stations would ever operate at their design capacity simultaneously. However, even with several wells and a pump station out of service the system is capable of pumping a larger amount of water than what is permitted for withdrawal by the District's Consumptive Use Permit (CUP). The South Florida Water Management District (SFWMD) issued a renewed CUP to the District in June 2007, allowing a peak month withdrawal of 933.9 million gallons. The SFWMD further allows an annual withdrawal of 8.552 billion gallons of water, or 22.2 million gpd on an average day. Average-day withdrawal in 2009 was 16.23 mgd, up from 15.55 mgd for 2008.

Table 5-3 indicates the amount of water consumed on a yearly basis from 1990 through 2007. Table 5-3 also indicates the peak-month water demand during this time. Average daily water withdrawal actually declined slightly between 1990 and 1994 (although peak-day volumes increased). Increases occurred between 1994 and 1997, with a 27 percent increase in average-day use during this time. Consumption steadily increased from 1998 to 2000, then declined sharply in 2001. The decline is attributed to changes in the economy following 9/11, imposition of water restrictions due to drought, and conversion of additional areas to reclaimed water. Throughout most of the 2001-2007 timeframe, demand has been fairly constant, in the 14-16 MGD range. This is attributed to conservation measures and additional conversions to reclaimed water. During calendar year 2007, total consumptive use was 5.787 billion gallons, or about 71 percent of the amount permitted by SFWMD. Water use in the District exhibits significant seasonal variations. During 2007, the daily amount pumped during May was 37 percent greater than the daily amount pumped during February.

"Peaking factors" have been developed by the District to estimate water needs during periods of maximum

² Wells 2, 2A, 6, 9, 10, 16, 17, 18, 19, and 21 have emergency power provisions

³ The combined capacity of Pump Stations A, B, C, and D is about 43,000 gpm. The pump stations are designed for maximum fire flow needs, while the wells are designed for peak-day needs.

demand. These factors reflect the ratio of water use during a peak day (or peak hour) to average day (or average hour) demand and are used for more detailed design studies of water infrastructure needs. Peak-day peaking factors range from 1.3 to 1.8, depending on land use; peak-hour peaking factors are as high as 6.0 for the water parks and are in the range of 2.0 to 3.0 for most uses.

Table 5-3: Annual Potable Water Use Characteristics: 1990 through 2007

Year	Average Daily Withdrawal (mgd)	Average Day in Peak Month (mgd)
1990	13.71	15.95
1991	13.33	14.05
1992	13.36	15.83
1993	13.17	15.72
1994	12.92	15.26
1995	14.16	16.84
1996	15.14	17.98
1997	16.48	18.40
1998	18.64	23.69
1999	19.18	22.10
2000	19.95	25.07
2001	14.61	16.56
2002	14.32	18.11
2003	13.47	14.89
2004	14.83	16.67
2005	15.39	17.87
2006	16.48	18.71
2007	15.85	17.53

Source: RCES, 2008

OPERATION AND MAINTENANCE

All water facilities in the District are maintained in excellent condition. Water quality is monitored regularly in accordance with state and federal procedures (the Conservation Element may be consulted for additional information on water quality). The District regulates land uses and activities in the vicinity of its wells to ensure that the potable water supply remains reliable. Conservation Element Policy 4.2 identifies basic use restrictions within a 200-foot radius, a 300-foot radius, and 400-foot radius of each potable water well.

WATER CONSERVATION MEASURES AND RECLAIMED WATER SYSTEM

Overview

Recognizing that groundwater is a limited resource, and one that is shared by other jurisdictions in Central Florida, the District has instituted a number of measures to reduce per capita water consumption. While the total volume of water consumed is projected to increase by the year 2013, the rate of increase is likely to drop as per capita use declines. The installation of water-saving plumbing fixtures, required by the RCID building and plumbing codes, will make an important contribution to conservation. Implementation of a drought management plan, continued development of the reclaimed water system, and increased emphasis on native vegetation in landscaping will also help mitigate future demands.

The District's 2006 application for renewal of its water use permit outlined the following conservation measures:

- Limitation of turf and ornamental irrigation hours (to night, when evaporation is lower).
- Use of Xeriscape principles (adopted in the District's Land Development Regulations).
- Requiring ultra-low volume plumbing in new construction.
- A preventative maintenance program that ensures leaks are detected and fixed.
- Requirements for rain-sensor overrides for new turf grass sprinkler systems.
- The use of reclaimed water for landscape irrigation, and for theme park wash-down.

The most significant conservation measure implemented during recent years is the development of a reclaimed water system, discussed below.

Reclaimed Water System

Construction of a reclaimed water system began in the early 1990s. Tertiary-quality effluent from the wastewater plant is distributed through a network of mains to irrigate turf grass, golf courses, and highway medians throughout the District. Reclaimed water in 2007 averaged 6.5 mgd; and has met almost 30% of the District's water resource needs for the past 10 years. Reclaimed water has completely eliminated the use of surface water withdrawn from canals for irrigation and has reduced potable water requirements for the resorts and theme parks constructed since 1995. The District expects to continue to rely on its reclaimed water system and anticipates it will provide over one-third of the District's future water resource needs.

The reclaimed water system consists of pumps and a network of distribution mains. Components of the system are illustrated in Figure 5-5. Storage is provided by three 5.0 million gallon tanks adjacent to the wastewater plant and by a privately-owned pond at the Bonnet Creek golf course. Additional storage capacity is planned. A pump station at the storage tanks delivers water to the distribution system and to the storage pond. A 42-inch line extends from the wastewater plant area east to World Drive, where it branches into several lines serving development areas.

The District has determined that existing demand for reclaimed water exceeds 7.0 mgd (annual average), and could potentially be as high as 11.0+ mgd upon "buildout" of future development areas. Extension of the system to established development areas will be required to realize this potential.

Reclaimed water use exhibits much greater seasonal variations than potable water use, since much more

irrigation water is required during hot and dry periods than during cool or wet periods. During periods of drought, less effluent is directed to the rapid infiltration basins and more is directed to the reuse system; conversely, during periods of wet weather, the rapid infiltration basins receive the larger share of water.

Potential Future Conservation Measures

The District continues to explore other methods of water reuse and conservation. These include the use of membrane treatment technologies at the treatment plant or within the distribution system to generate effluent of sufficient quality for higher end uses, such as cooling water for industrial processes, lake augmentation, wetlands augmentation, and possibly aquifer storage and recovery. Such improvements could further mitigate the impacts of groundwater withdrawals.

WATER DEMAND PROJECTIONS and the 10-YEAR WATER SUPPLY FACILITIES WORK PLAN

Introduction

In accordance with the requirements of Section 163.3177(6)(c), Florida Statutes, the Reedy Creek Improvement District (RCID) must include within the Infrastructure Element of its Comprehensive Plan a water supply facilities work plan for at least a 10-year planning period for constructing the necessary public, private, and regional water supply facilities to serve existing and new development. This plan must be coordinated with the Upper Kissimmee Basin Water Supply Plan (as prepared by South Florida Water Management District [SFWMD]).

This plan is intended to be one of many that will be generated by RCID over the coming decades and it is intended to provide flexibility and adaptability to the constantly changing water supply situation in the Central Florida area.

Background

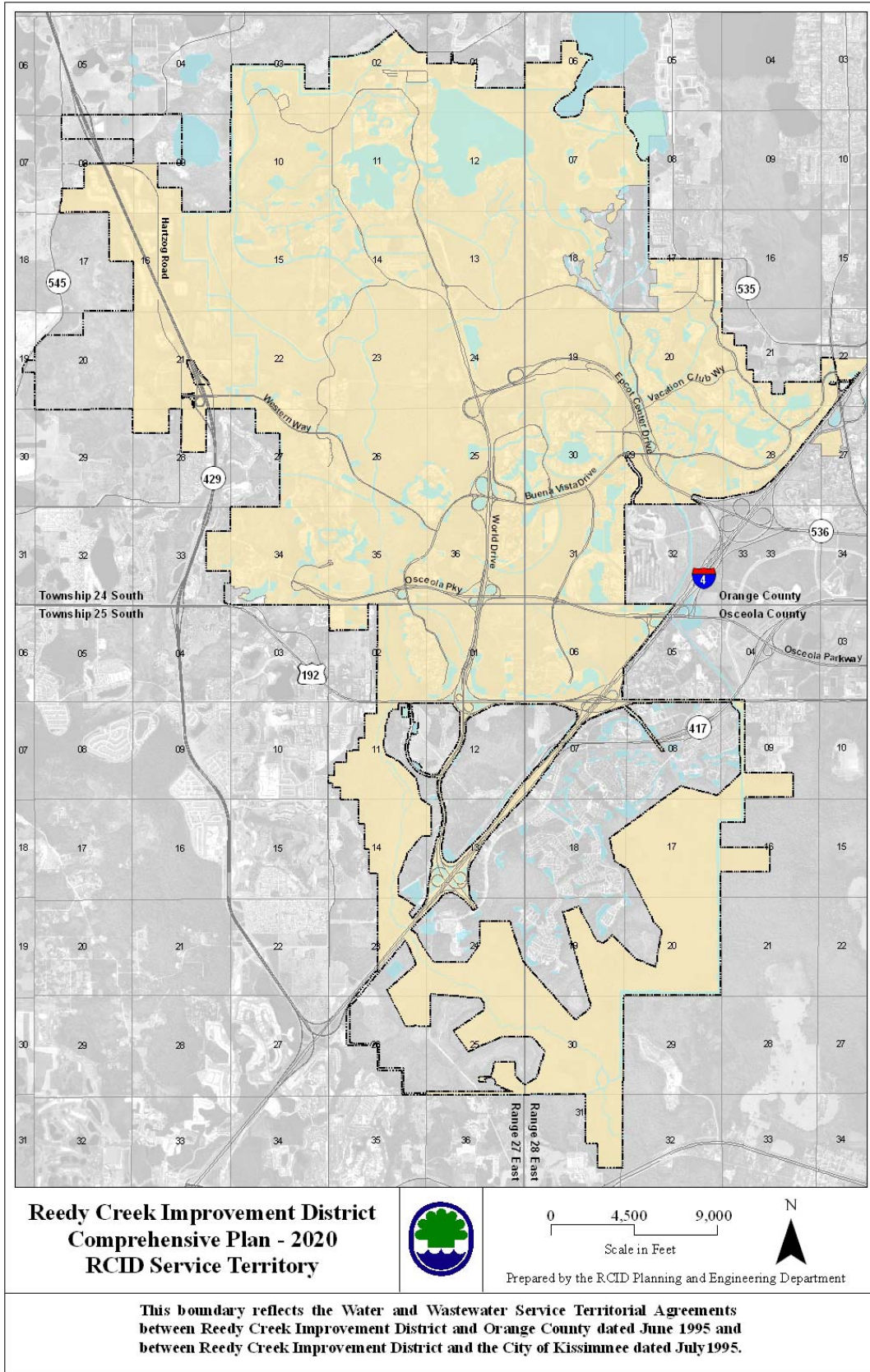
Potable Water

RCID was issued Water Use Permit, Number 48-00009-W, by the SFWMD in June 2007, which expires in May 2027. That permit has an annual allocation of 8,103 million gallons (MG) – which equates to an average day use of 22.2 MGD – and maximum monthly allocation of 933.888 MG (about 31 MGD average day flow for the maximum month). The permit contains a number of limiting conditions; one that specifically applies to water supply planning is Condition No. 25:

Should the Permittee determine that the groundwater allocations in this permit are insufficient to meet its demands beyond 2013, the Permittee shall also develop, in partnership with other Permittees or by itself, one or more Alternative Water Supply (AWS) source(s) needed to meet all of the Permittee's public supply water demands through 2027 that are not met by the allocations authorized by the District.

RCID does not purchase water from other utilities and is entirely self sufficient in water supply and distribution. With just a few exceptions, RCID serves only those customers within its territorial boundary. Those exceptions are served under a territorial service agreement between RCID and Orange County.

Figure 5-2: RCID Water Service Territory



Reclaimed Water

By the early 1990's, discharge of treated wastewater to surface waters was on the decline in Central Florida due to permitting pressures. RCID was one of many utilities that began construction of zero-discharge types of wastewater reuse systems in response to the permitting constraints. The first of these for RCID was a groundwater recharge system that consisted of 85 Rapid Infiltration Basins (RIBs). These basins allow highly treated wastewater to percolate through surficial sands which overlay the UFA. This practice provides some return of the withdrawn groundwater to its source. Studies by the USGS (O'Reilly et al) demonstrated that approximately 70% of the applied water to the RCID RIBs reached the UFA as recharge. The balance recharges the surficial aquifer.

A second zero-discharge system was employed by RCID in 1993 – the reclaimed water distribution system, which provides water for non-potable purposes, principally irrigation of turf grass and landscaping. This system has grown annually in size and extent since the initial backbone of the piping was installed in the early 1990's. The reuse system, as it is commonly known, provides 25% to 30% of the District's water resource needs and is used by 80% of the irrigated areas throughout the District. The distribution system rivals that of the potable system in extent and line size and is operated at the same pressure. New development within RCID is required to connect to the system. Because of these attributes, the reuse system has become a second water supply source for RCID.

Level of Service Standards

Level of service standards for potable water are shown in Table 5-4. The level of service standards differentiate between the various classes of resort hotels (luxury/deluxe, first class, and moderate/economy), other resorts (interval ownership units and campground accommodations), and between theme parks and water parks. These standards are used when evaluating potable water use for all proposals for future development.

Table 5-4: Level of Service Standards for Potable Water

Land Use	Unit	Gallons per Day
Residential	Dwelling	350
Hotel (general)	Keys	200
	Luxury / Deluxe	250
	First Class	200
	Moderate / Economy	150
Other Resort	Keys	250
Convention Space	Square Foot	0.25
Support / Office	Square Foot	0.25
Retail / General Commercial	Square Foot	0.30
Restaurant	Seat	25
Theme Parks (general)	Guest	50
Theme Parks (water)	Guest	75

Demand Forecast – Potable Water

Means and methods for demand predictions with RCID are atypical. RCID's customer base is almost entirely commercial in nature (99+ %) and grows in response to planned developments by the principal landowners. There is virtually no residential development within RCID and the District has no plans for future residential service. The commercial development consists of guest accommodations (hotels and vacation ownership units), theme parks, water parks, support facilities, employee offices, as well as typical commercial activities such as restaurants, retail outlets and gas stations. Because of the nature of the customer base within RCID the normal methods of predicting demand from population growth by traffic zone does not apply to RCID. Instead, RCID has worked with the landowners to determine the appropriate pace of future development and predicted water supply needs on this basis.

For the recently issued Water Use Permit from SFWMD, RCID predicted a potable water demand of 23.8 MGD for the 2026 timeframe in the permit application. This demand was based on the summation of the planned and existing commercial development. RCID's Water Use Permit was issued based on the demand forecasts for the year 2013 - 22.2 MGD. Therefore it seems logical to assume that the demand for 2018 will be somewhere between these two figures (22.2 MGD and 23.8 MGD).

In the *Kissimmee Basin Water Supply Plan - Update 2005-2006*, groundwater demands for RCID were estimated at 23.4 MGD for the 2025 timeframe.

Table 5-5 below is a summary of the projected demands by development category for RCID for the 2020 timeframe. The demand categories mimic those in the Water Use Permit application and subsequent re-submittal for the 2013 demand projections.

Table 5-5: Projected Maximum Potable Water Demand (million gallons per day)

Year		Average Day	Gallons withdrawn per year (billions)	Peak-month factor	Average day in peak month
January 1, 2010		16.23	5,924	1.25	20.288
	Projects completed in 2009 or under construction in to date	0.117			
	Development (2010-2015)	2.700			
	Attendance Growth (2010-2015)	0.560			
January 1, 2016		19.607	7.157	1.25	24.509
	Development (2016-2020)	3.755			
	Attendance Growth (2016-2020)	0.560			
December 31, 2020		23.922	8.732	1.25	29.903
Permitted Withdrawal (SFWMD)		22.20	8.100		30.125
Projected 2020 Deficit		1.722			

Note

Figures do not reflect potential reduced withdrawal due to implementation of the Districts 10-Year Water Supply Facilities Work Plan program which is projected to reduce withdrawals by 1.772 MGD by 2018, thus keeping the District in compliance with its permitted withdrawal.

Groundwater demands for RCID averaged 16.23 MGD in 2009. Adding the projected demand from the above table to this figure results in a total projected demand for 2020 of 23.922 MGD as indicated in Table 5-5 above. This value is about 1.722 MGD above the current groundwater allocation of 22.2 MGD and therefore a slight deficit is predicted for 2020 for RCID.

Of course, should development within RCID proceed at a different pace than projected herein, the deficit could shrink or expand. The above is based on a fairly aggressive development plan and therefore RCID believes the prediction of a deficit is conservative, yet prudent for planning purposes.

Demand Forecast – Reclaimed Water

Because reclaimed water plays such a vital role in the water resources of the District, it is prudent that the supply and demand forecast for this resource be included in the analysis.

For more than 10 years, reclaimed water has met over 25% of the total water resource demands of the District, and closer to 30% for the past 7 years. Table 5-6 below indicates the historic consumption of reclaimed water to meet non-potable purposes, and the amount of water discharged to the RIBs. Table 5-6 also indicates the contribution that reclaimed water makes to the total water resource picture for RCID.

The last column of the table indicates the percentage of wastewater generated from the consumed potable water. The overall trend in percent returned wastewater is increasing because of the RCID policy that requires new development to use reclaimed water for non-potable purposes. This trend is expected to continue to increase in the future until a maximum of about 85%-90% of non-potable needs will be met with reclaimed

water.

Table 5-6: Historic Use of Reclaimed Water

Year	Volume to Reuse (MGD AADF)	Volume to RIBs (MGD AADF)	Total Wastewater Volume (MGD AADF)	Total Potable or Groundwater Volume (MGD AADF)	Percent of Total Demand Met by Reuse System	Percent of Wastewater Returned from Potable Water Consumed
1998	4.933	5.781	10.714	18.132	21.4	59.1
1999	5.294	5.614	10.908	19.175	21.6	56.9
2000	6.186	4.577	10.763	20.008	23.6	53.8
2001	5.923	3.973	9.896	14.614	28.8	67.7
2002	5.842	4.307	10.149	14.318	29.0	70.9
2003	5.207	5.101	10.308	13.466	27.9	76.5
2004	5.903	5.575	11.478	14.871	28.4	77.2
2005	5.749	5.417	11.166	15.392	27.2	72.2
2006	6.420	4.716	11.136	16.300	28.3	68.3
2007	6.529	5.891	12.420	15.850	29.2	78.4
Averages	5.799	5.095	10.894	16.213	26.3	67.2

Demand forecasting for reclaimed water within RCID is somewhat like the potable water forecasting and is a function of the planned development and the associated irrigated area. Based on historical development, RCID has typically irrigated 22% of its developed acreage. Average application rates have been 0.75 to 0.80 inches per week. The development outlined in Table 5-5 is estimated to have a total area of roughly 2,688 acres and therefore the irrigation demand is estimated to be about 1.77 MGD, based on 591 irrigated acres (22%) and an application rate of 0.775 inches per week. The development proposed in Table 5-5 will demand an estimated 7.692 MGD of water that has the potential to be returned to the sewer system. If we conservatively assume that 80% of this water will be returned to the sewer system and hence made suitable for reuse purposes, then the proposed development will generate an estimated 6.154 MGD of additional wastewater. Thus new development will generate 4.384 MGD of reclaimed water in excess of what is needed for landscaping irrigation.

By 2020, potable water demand is expected to be 23.9 MGD; wastewater generation is expected to be 18.3 MGD with reclaimed water demands in the 8 to 9 MGD range, depending on weather and other factors. This means that 9.3 to 10.3 MGD of reclaimed water will be available for RIB recharge of the aquifers or for other purposes.

In the RCID Water Use Permit, condition number 28 requires that RCID use at least 30% of its treated wastewater for aquifer recharge via the RIBs. Therefore by 2020, if wastewater volumes are at 18.3 MGD, then at least 5.5 MGD will be required for discharge to the RIBs to meet this condition. The balance of the water destined for RIB recharge could be used for other purposes, including irrigation and other non-potable demands, and the volume should range between 3.8 and 4.8 MGD. This “discretionary” reclaimed water could be used to offset the forecasted water supply deficit for 2020.

Supply Deficit Planning

There are numerous ways for RCID to plan for meeting the forecast supply deficit for 2018. These include:

- Seeking additional groundwater allocation from the UFA
- Seeking additional groundwater from the Lower Floridan Aquifer (LFA)
- Conservation and demand reduction
- Conversion of non-potable uses to reclaimed water
- Development of alternative surface water supplies (Kissimmee River or St. Johns River)
- Brackish and salt water sources
- Purchase water from a neighboring utility

For the past 5+ years, RCID has been evaluating these options and discovered the following:

- It is unlikely that the UFA will be allocated for any additional withdrawals, since modeling results indicate that impacts to wetlands and surface waters will not be acceptable for volumes beyond the 2013 allocations currently permitted.
- The LFA is not well confined within the RCID and therefore withdrawals from this source would likely result in similar wetland and surface water impacts. Permitting this source will therefore be difficult and unlikely.
- Conservation is a viable and easily implemented option and will continue to be a mechanism and practice for RCID. However, RCID has had conservation measures in place for over a decade and believes that most of the gains have been realized. A summary of the key changes are as follows:
 - The RCID *Epcot Plumbing Code*, Section 604.4, requires the use of low water using plumbing fixtures in new construction.
 - Per RCID Resolution 370, irrigation with potable water is not allowed between the hours of 10:00 AM and 4:00 PM. This was subsequently modified by RCID Resolution 479 to also limit irrigation to two (2) days per week in accordance with SFWMD Order 2007-870-DAO-WS.
 - RCID Land Development Regulation 4-50.4 requires all new irrigation systems to use reclaimed water for irrigation if available or use native plant material in accordance with Xeriscaping policy of the SFWMD.
 - As a result of the 2000-2001 drought, the theme parks within RCID stopped using potable water for hardscape wash-down and converted to reclaimed water. Also, all non-recirculating fountains /water features within RCID were converted to re-circulating or were discontinued. These practices have continued since the end of the drought.
 - The bulk of the irrigation within RCID, including reclaimed irrigation, is controlled by a computerized system that only applies that amount of water necessary to meet the plant requirements. This helps ensure that irrigation is as efficient as possible.

Due to the extent of the above measures, it is believed that future additional conservation measures will have minimal impact on new and future development. Future goals to significantly enhance conservation would require the retrofitting of all existing facilities with low water use fixtures and requiring all irrigation to be computer controlled.

- Conversion of non-potable uses of groundwater to reclaimed water has a high potential for RCID and appears to be the easiest and least costly to implement. An estimated 350 to 400 acres of irrigated land exists as candidate sites for conversion; additionally, up to 0.75 MGD of cooling tower makeup water (for evaporative losses) is available for conversion, most of which exists at four large centralized facilities owned by RCID.
- RCID believes that surface water sources, such as the Kissimmee River, may play a role in providing some future water supply. Consequently RCID intends to become a partner in the regional water supply plan for the development of the Kissimmee River. This is expected to be a joint effort between the Water Management Districts and the large local utilities in the Orange, Polk and Osceola County areas. However, the quantity of water available from this source is currently undefined and there is competition for this water from the Lake Okeechobee and Everglades Restoration efforts.
- Brackish and salt water sources are not readily available to RCID and would require large and lengthy transmission mains as well as expensive treatment requirements (even if used only for reclaimed water augmentation). Disposal of the brine from the desalting process will also pose a significant challenge. All of the known groundwater under RCID is non-brackish and the nearest source is at least 40 miles distant. While brackish and salt water sources may be an ultimate answer for RCID and Central Florida, these sources do not appear to be likely candidates within the 10 year planning horizon.
- Purchasing water from the nearby local utilities is a viable option and RCID currently has interconnections with Orange County Utilities and Toho Water Authority. Additional interconnection sites with these utilities are under consideration. However, these utilities face the same water supply challenges as RCID, and perhaps more acutely. Therefore the quantity of water that may be available for purchase from these entities will likely be limited in both volume and duration.

Reclaimed Water Conversions

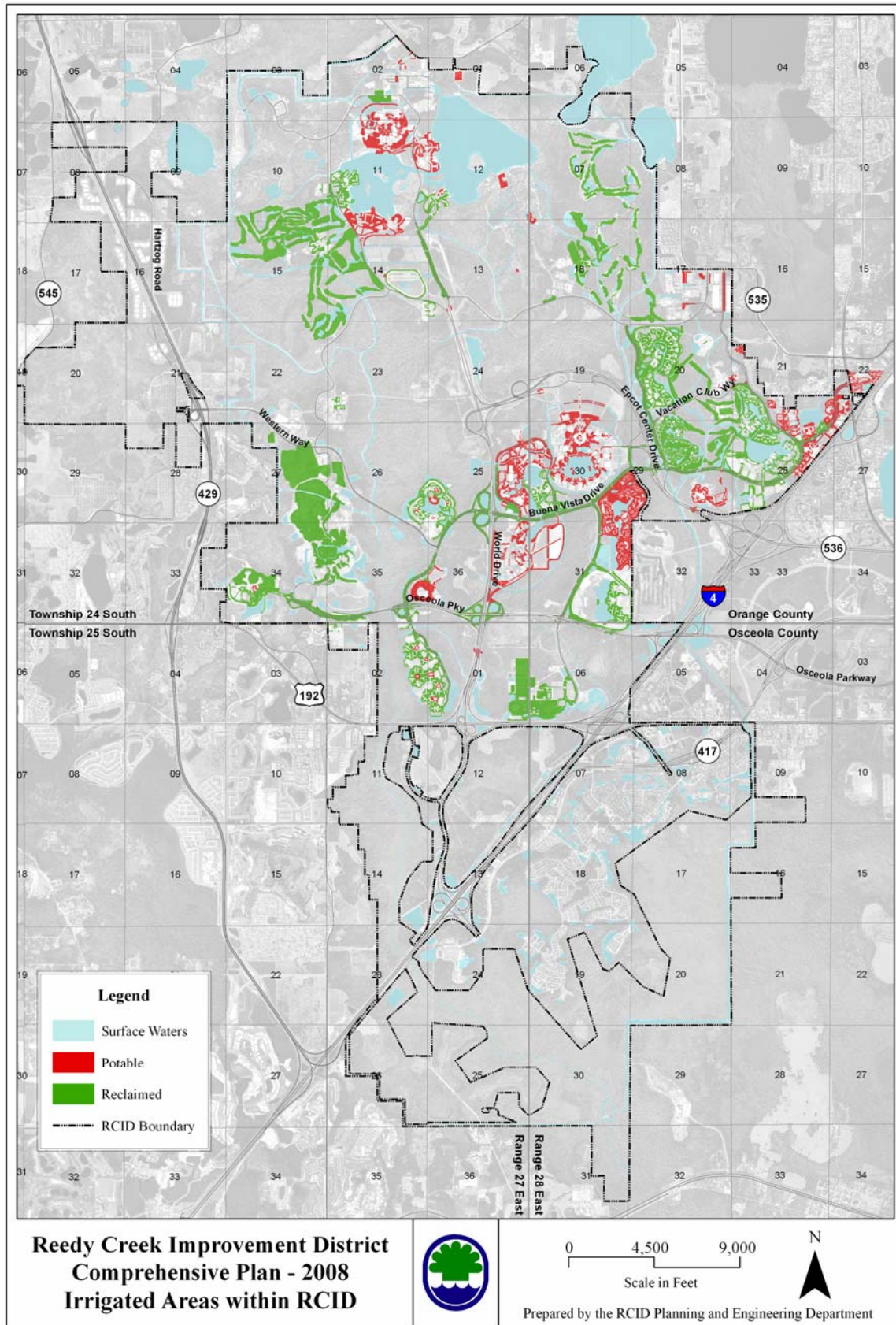
RCID developed a master plan for conversion of the older irrigated portions of the property to reclaimed water in 2002. This plan was reviewed and updated for this analysis. The candidate properties have not changed and the estimated reduction in potable water demand resulting in the conversions has likewise remained about the same.

Table 5-7 below presents the candidate sites, a brief description of the project scope, the estimated irrigated area and the estimated annual average irrigation demand. Table 5-7 is an edited version of all of the parcels within RCID using groundwater for irrigation. Some sites were deemed too small or too remote or a combination of both to warrant extension of reclaimed mains for service. The excluded sites constituted a total of only 16 acres. If RCID is successful in converting all candidate sites listed below, then over 99% of the irrigated areas would be serviced with reclaimed water. Figure 5-4 immediately following is a map that depicts the irrigated areas within RCID and distinguishes those sites irrigated with reclaimed water in purple and those with potable groundwater in blue. Blue colored sites are candidates for conversion to reclaimed water.

Table 5-7: Candidate Irrigation Sites for Conversion to Reclaimed Water

Site Name	Irrigated Acres	Project Description	Estimated Volume (gpd AADF)
Administration Area	12	Extend pipeline from Vista Blvd.	37,200
Buena Vista Palace Hotel	7	6-inch pipeline across Buena Vista Drive	21,700
RCID Fire Station No. 4	1.8	4-inch pipeline up Buena Vista Dr.	5,580
Blizzard Beach Water Park	19.5	On-Site pipeline extensions	60,450
Caribbean Beach Resort	69.8	On-Site pipeline extensions	216,380
Contemporary Hotel	12.6	Main extension down World Drive	39,060
Studio Theme Park	32	Main extensions from World Drive & Buena Vista Drive	99,200
Epcot Theme Park	44	Main extension from World Drive	136,400
Magic Kingdom Theme Park	40	Pipeline extensions on east & west sides	124,000
Magic Kingdom Cast Parking	1.2	Line extensions from Floridian Way	3,720
Magic Kingdom Toll Plaza	0.3	Line extensions from World Drive	930
Magic Kingdom Main Parking Lot	1.8	Line extensions from World Drive	5,580
Polynesian Resort	21.2	Extend 8-inch main along 7 Seas Drive	65,720
Ticket & Transportation Center	5.6	Extend 8-inch main along 7 Seas Drive	17,360
Swan Hotel	8.1	Extend main from World Drive	25,110
Dolphin Hotel	11.1	Extend main from World Drive	34,410
Yacht & Beach Club Resorts	17.5	Concurrent with main for EPCOT west side	54,250
Typhoon Lagoon	7.8	On-site pipeline extensions	24,180
AAU on Hotel Plaza Blvd.	1.9	Extend pipeline up Hotel Plaza Blvd.	5,890
Best Western	2.8	Extend pipeline up Hotel Plaza Blvd.	8,680
DoubleTree Guest Suites	5.1	Extend pipeline up Hotel Plaza Blvd.	15,810
Regal Sun Hotel	4	Extend pipeline up Hotel Plaza Blvd.	12,400
Holiday Inn	1.5	Extend pipeline up Hotel Plaza Blvd.	4,650
Hilton Hotel	5.5	Extend pipeline up Hotel Plaza Blvd.	17,050
Hotel Royal Plaza	1.4	Extend pipeline up Hotel Plaza Blvd.	4,340
Casting Building	2.5	Extend 4" pipe across Buena Vista Dr.	7,750
SunTrust Building	2.1	Extend 4" pipe across Buena Vista Dr.	6,510
WDW & RCID Roadways	8.1	Various line extensions	25,110
Totals	343.6		1,079,420

Figure 5-3: Irrigated Areas within RCID



The irrigated areas listed in Table 5-7 were derived from a review of aerial photography, local knowledge of the irrigation systems and their coverage, and GIS software that was used to determine polygons and calculate areas of each. The estimated annual irrigation volume was based on an average application rate of 0.8 inches per week, which is the historic average rate for irrigation systems at RCID. The above volumetric total was cross-checked against 2007 actual irrigation volumes (metered values) and a good correlation was found.

Nearly all Walt Disney Company and RCID irrigation systems are computer controlled with a weather driven system that takes into account evapotranspiration (calculated using temperature, relative humidity, solar radiation, and wind run), rain fall, vegetation type, soil type, slope, aspect, etc. This system allows the exact amount of irrigation to be applied for the given conditions and ensures the resource is conserved. Both potable and reclaimed water sourced irrigation systems employ the same control mechanism. All Walt Disney Company and RCID developments and road rights-of-way since 1989 utilize a computerized, weather driven irrigation system. All new development within RCID, regardless of ownership, will be required to utilize a weather driven irrigation system as will all existing developments at the time of conversion from potable water irrigation to reclaimed water irrigation.

Many of the irrigation system conversions to reclaimed water proposed herein will require a joint effort between the various landowners/lease holders and RCID for them to become effective.

As Table 5.7 above indicates, conversion of the almost 350 acres of landscape irrigation to reclaimed water will reduce groundwater withdrawals by over 1 MGD on average. Of course, during dry years, the volume will increase and during wet years, it will decrease. But on average, RCID believes that reduction in over 1 MGD of groundwater withdrawal can be realized if the above conversions are accomplished.

The second group of candidate conversions to reclaimed water is the RCID cooling towers. RCID owns and operates centralized cooling facilities at four locations: the North Service Area, Epcot and Studio Theme Parks and a satellite facility located near the Contemporary Hotel. Review of the metered data for the make-up water consumed by these facilities to off-set evaporative losses shows a potential demand reduction of about 0.72 MGD exists if all of the facilities were converted to reclaimed water. Table 5-8 below provides some details.

Table 5-8: RCID Cooling Tower Conversions

Location	Project Description	Makeup Demand (gpd AADF)
North Service Area Central Energy Plant	Install pipe section, manipulate valves	300,000
Contemporary Hotel	New main down World Drive from Floridian Way	50,000
Epcot Central Energy Plant	Install pipe section, manipulate valves	250,000
Studios Central Energy Plant	New main from World Drive to Studios CEP	120,000
Total		720,000

Evaporative losses vary greatly with the seasons and cooling load and will peak in the summer period as much as three times the average, and may be nearly non-existent on cold winter days. The above figures were

derived from metered data and are intended to represent annual average conditions. Cooling tower conversions are mostly the responsibility of RCID, but coordination with the various landowners is expected.

Between the cooling tower conversions and the irrigation system conversions, RCID believes it has the potential to reduce groundwater withdrawals by 1.9 +/- MGD. This exceeds the forecast deficit by about 0.6 MGD and provides some cushion for extreme weather events and to counter any estimating errors. As indicated above, RCID should have between 3.8 and 4.8 MGD of reclaimed water available to meet this additional demand.

Reclaimed Conversions Implementation Plan

The majority of the conversion projects involve extension of the reclaimed water distribution system to the various customer points of connection. Many of these involve a single pipeline. A few will benefit from economies of scale where a single pipeline extension will serve multiple customers. For example, a pipeline extension from World Drive to the west side of the Epcot Theme Park will provide conversion for the Yacht & Beach Resorts and associated vacation ownership units, as well as the Epcot Theme Park. Similarly, a pipeline extension from Floridian Way to the Contemporary Hotel Satellite Chiller facility would provide service to the cooling towers, the Contemporary Hotel and the east side of the Magic Kingdom Theme Park.

With a deficit of about 1.3 MGD AADF to make up in the period 2015 to 2020, the rate of conversion from potable water irrigation to reclaimed water irrigation plus cooling tower conversions needs to, at a minimum, average 0.26 MGD AADF per year for the period 2014 to 2019. This assumes a linear rate of development from 2015 to 2020. It is recommended that the goal be in the range of 0.30 to 0.40 MGD per year as development isn't always linear.

5-96 below provides a proposed implementation plan for the identified conversions. It is the intention of RCID to accomplish these conversions in a steady and consistent pace over the course of the next 8-10 years. With the exception of Caribbean Beach, most of the identified locations have a single point of connection per named entity, which will facilitate connection and minimize the cost of the effort.

Table 5-9: Proposed Implementation Plan for Reclaimed Water Conversions

Project Description	Locations to be Converted	Conversion (mgd AADF)	Cumulative Conversion (mgd AADF)
North Service Area Central Energy Plant	Chilled Water & Co-Gen Cooling Towers	0.300	0.300
1000 LF of 8-inch main on 7 Seas Drive.	Ticket & Transportation Center & Polynesian Resort	0.066	0.366
4-inch & 6-inch mains on Buena Vista Dr.	Buena Vista Palace Hotel & Fire Station No. 4	0.027	0.393
4-inch main extensions on Buena Vista Dr.	SunTrust & Casting Buildings	0.014	0.407
6-inch main extensions from World Dr.	Swan & Dolphin Hotels	0.060	0.467
12-inch main along Epcot Resorts Blvd from World Dr	Epcot, ECEP Cooling Towers, Yacht & Beach Club Resort & DVC	0.431	0.898
4-inch, 6-inch & 8-inch main extensions on Hotel Plaza Blvd.	AAU, Best Western, DoubleTree, Holiday Inn, Regal Sun, Hilton, Royal Plaza	0.069	0.967
8-inch & 10-inch main extensions from World Dr. & Buena Vista Dr.	Studio Theme Park & Studio Cooling Towers	0.219	1.186
4-inch & 6-inch on-site mains	Caribbean Beach Resort	0.216	1.402
12-inch main extension on World Dr. from Floridian Way/Center Dr.	Contemporary Hotel, Magic Kingdom, Contemporary Hotel Cooling Towers	0.213	1.615
2-inch main from World Dr.	Magic Kingdom Toll Plaza	0.001	1.616
2-inch, 4-inch & 6-inch on-site line extensions	Blizzard Beach & Typhoon Lagoon	0.085	1.701
2-inch & 3-inch main extensions from World Dr. and Floridian Way	Magic Kingdom Cast Parking & Magic Kingdom Main Parking Lots	0.009	1.710
6-inch & 8-inch main extension on Vista Blvd.	Administration Area	0.037	1.747
2-inch and 4-inch mains at various locations	RCID and WDW roadways	0.025	1.772

The above plan could be accelerated or delayed depending on circumstances and actual demands experienced during the course of the planning period.

Five-Year Schedule of Capital Improvements

Table 5-10 below provides the Five-Year Schedule of Capital Improvements to be implemented in the 2015 timeframe.

Table 5-10: Capital Improvement Schedule for Reclaimed Water Conversions (in thousands)

Project Description	Source	2011	2012	2013	2014	2015
1000 LF of 8-inch main on 7 Seas Dr 4-inch & 6-inch mains on Buena Vista Dr 4-inch main extensions on Buena Vista Dr 6-inch main extensions from World Dr 12-inch main along Epcot Resorts Blvd from World Dr 12-inch main along Epcot Resorts Blvd from World Dr 4-inch, 6-inch, & 8-inch main extensions on Hotel Plaza Blvd	Bond Funds (On Hand) or Net Revenues	\$370	\$590	\$1,090	\$910	\$0

Notes:

Funding Source: Net Revenues = consist of sewer and reclaimed water sales, investment income, and miscellaneous revenues net of operating and maintenance expenses, reserves and replacements, and debt service.

Estimates reflect 2009 costs and have not been inflated to year of construction

Table 5-11 shows the financial capacity of the Utility Enterprise Fund to fund the programmed capital projects for all concurrency utilities. Sufficient bond proceeds are on hand to fund a portion of the potable and reuse water and sanitary sewer projects detailed in the Capital Improvements Element. Sufficient net revenues are projected to be generated from operations to fund all of the programmed improvements except for the expansion of the wastewater treatment plant and an under consideration biosolids / food waste to energy facility. The District anticipates issuing bonds to finance the expansion of the wastewater treatment plant and the biosolids / food waste to energy facility.. Sufficient bonding capacity is available to fund all capital costs as indicated in Table 5-11. Historically revenue transfers from the non-concurrency utilities have been used to cover any shortfall in revenues for bonding purposes and will be in the future if revenues fall short.

Table 5-11: Capital Costs versus Available Revenues – Utility Enterprise Fund (in thousands)

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Total Revenues	\$42,170	\$43,108	\$46,060	\$47,367	\$48,626	\$48,626
Total Operating Expenditures	23,165	24,656	25,821	27,834	28,842	28,967
Current Debt Service	17,024	17,575	18,961	18,961	18,962	18,962
Balance – Net Revenues	1,981	877	1,278	572	822	697
Prior Year Balance	0	1,981	2,858	4,136	4,708	5,530
Transfer from Other Utilities	0	0	0	0	0	0
Net Revenues Available for New Debt Service or Capital Outlays	\$1,981	\$2,858	\$4,136	\$4,708	\$5,530	\$6,227
Capital Costs – Potable and Reuse Water, Sanitary Sewer, and Solid Waste	\$2,801	\$920	\$5,194	\$8,090	\$15,590	\$3,230
Currently Available Bond Proceeds	8,169	5,368	4,448	0	0	0
(Net Capital Costs Requiring Funding) or Net Currently Available Bond Proceeds	\$5,368	\$4,448	\$(746)	\$(8,836)	\$(24,426)	\$(27,656)
Net Revenues Available for New Debt Service or Capital Outlays	\$1,981	\$2,858	\$4,136	\$4,708	\$5,530	\$6,227
Bonding Capacity	\$23,000	\$34,000	\$47,000	\$46,000	\$40,000	\$45,000

Additional Planning Efforts – Kissimmee Basin Regional Water Supply Plan Update

While it appears that RCID can meet its projected deficit in supply by completing the proposed conversions to reclaimed water, the current groundwater allocation is not guaranteed and therefore some uncertainty exists. Consequently, RCID intends to participate in and become a partner with the other local utilities in pursuing water from the alternative sources identified in the *Kissimmee Basin Regional Water Supply Plan Update* (KBRWSP) and other alternative sources under development by various regional groups. RCID may elect to pursue an allocation of 2 to 3 MGD from these alternative sources (if this quantity is available) as a means to secure its longer term future water supply and as insurance against the possibility of reductions in groundwater allocation.

The CROT group referred to in the KBRWSP has been supplanted by the STOPR group [City of St Cloud, Tohopekaliga Water Authority (TWA), Orange County Utilities (OCU), Polk County Utilities (PCU) and RCID]. This group has been working cooperatively on water supply projects and water use permitting issues for about three years. (The group successfully renewed their collective water use permits in June 2007). It meets at least weekly and has executed a number of agreements and memorandums of understanding to pursue alternative water supplies, conduct coordination with the water management districts, and to ensure water use permit compliance and reporting requirements are met and on schedule. The STOPR Group has also recently developed a set of alternative projects (about 20) to provide for their collective water supply needs beyond the 2013 timeframe. This list of alternatives was developed when the group learned of the results of the work conducted by SFWMD on the Kissimmee River Restoration and the Kissimmee Basin Modeling and

Operational Study (KBMOS). The findings showed that there would be inadequate and unreliable water supply available from the Kissimmee River. This finding was contrary to the KBRWSP direction, which focused much of the alternative water supply effort on obtaining water from the Kissimmee River. Consequently, much of the KBRWSP is in need of revision and updating.

The quantity of water available from the Kissimmee River and the location of the availability are currently unknown. SFWMD is currently evaluating the potential of the source and possible withdrawal locations. RCID is collaborating with the SFWMD and the other local utilities to develop a plan for the use of this resource once the evaluation of quantity and location is complete. If this project moves forward, it is expected that TWA will become the lead agency and that water made available from its source would be transported through the TWA distribution systems. It is currently unknown if the water would be raw, potable, or reclaimed quality.

The water supply alternatives list currently under development by STOPR and SFWMD is shown in Table 5-13. A status report on the projects included in Table 1, Appendix A of the KBRWSP is presented in Table 5-12. As indicated in the status column of Table 5-12, RCID is participating with its neighboring utilities (TWA and OCU) to develop the interconnections of our respective potable and reclaimed water systems, as mentioned in the KBRWSP. The reclaimed water projects involve interconnections between the various utilities' systems and the steps to move forward are just beginning with the negotiation and execution of interlocal agreements. The reclaimed water projects do not produce any additional water; they simply make each utility's existing reclaimed water available to neighboring utilities which may reduce the demands on groundwater sources by augmenting the total water supplies available to each separate utility. For example, during May and June when RCID landscape irrigation demands exceed its supply of reclaimed water, RCID could augment its irrigation demands with reclaimed water from OCU or TWA and not have to augment with groundwater as it does currently assuming OCU and TWA have surplus reclaimed water. Since the STOPR utilities all have a common groundwater source, anything that might reduce the withdrawals from that source is good for the group as well as for each individual utility.

Table 5-12: Kissimmee Basin Regional Water Supply Plan Update – Appendix A, Table 1

County	Utility/Entity	Project	Water Source	Status
Orange	CROT Regional	South Bermuda – Osceola Pkwy Reclaimed Water Transmission Main	Reclaimed	No direct RCID involvement. Toho Water Authority has the lead in this project.
Orange	CROT Regional	Osceola Pkwy Reclaimed Water Transmission Main	Reclaimed	Toho Water Authority has the lead initiative; RCID intends to make an interconnection to this main when it is built.
Orange	CROT Regional	Osceola Pkwy Reclaimed Water Extension (TWA-RCID East)	Reclaimed	Toho Water Authority has the lead initiative; RCID intends to make an interconnection to this main when it is built.
Orange	CROT Regional	Osceola Pkwy Reclaimed Water Extension (TWA-RCID West)	Reclaimed	Toho Water Authority has the lead initiative; RCID intends to make an interconnection to this main when it is built.
Orange	CROT Regional	Buenaventura Lakes Wetland Impoundment	Reclaimed	No RCID involvement; mainly Toho Water Auth. and maybe St Cloud.
Orange	CROT Regional	Reedy Creek Augmentation System	Reclaimed	Initial analysis indicates that there is not enough volume and this is not a reliable source to make it a worthy pursuit for AWS
Orange	CROT Regional	Highway 532 Reclaimed Water Transmission Main	Reclaimed	No direct RCID involvement
Orange	CROT Regional	Vistana – RCID Reclaimed Water Transmission Main	Reclaimed	Under evaluation with OCU. RCID and OCU have finalized an interlocal agreement to allow this project and other similar projects to proceed
Orange	CROT Regional	RCID – Water Conserv II/Horizon West Reclaimed Water Transmission Main	Reclaimed	Under evaluation with OCU. RCID and OCU have finalized an interlocal agreement to allow this project and other similar projects to proceed
Orange	CROT Regional	WEDS – Osceola Pkwy Reclaimed Water Transmission Main	Reclaimed	No direct RCID involvement
Orange	CROT Regional	St Cloud Wholesale	Reclaimed	No direct RCID involvement
Orange	CROT Regional	WEDS Impoundment	Reclaimed	No direct RCID involvement
Orange	CROT Regional	Partin Ranch Impoundment (Kings Hwy)	Surface Supplies	No direct RCID involvement
Orange	CROT Regional	Shingle Creek Augmentation System Expansion	Surface Supplies	No direct RCID involvement; Toho Water Auth. Has implemented first phase for 4.0 MGD of augmentation to their system
Orange	CROT Regional	RCID Surface Water Impoundment # 1	Surface Supplies	Involves the use of Lake Norbow (entirely within RCID) for augmenting reclaimed water supply for RCID. Conceptual stage effort determined that it will require a pumping station. The need for this is not envisioned until 2018 or later.
Orange	CROT Regional	RCID Surface Water Impoundment # 2	Surface Supplies	Involves the use of Reedy Lake or select stormwater retention basins to be used to augment reclaimed water supplies for RCID. The need for this is not envisioned until 2018 or later.
Orange	CROT Regional	St Johns River at State Road 50 Water Supply Project	Surface Supplies	No RCID involvement
Orange	CROT Regional	St Johns River/Taylor Creek Reservoir Water Supply Project	Surface Supplies	No RCID involvement
Osceola	CROT Regional	Bull Creek Nonpotable Groundwater Supply	Brackish	No direct RCID involvement
Osceola	CROT Regional	Lake Tohopekaliga Nonpotable Water Supply	Surface Supplies	RCID working and cooperating with STOPR and WMDs to investigate and evaluate this source.
Osceola	CROT Regional	Lake Tohopekaliga Potable Water Supply	Surface Supplies	RCID working and cooperating with STOPR and WMDs to investigate and evaluate this source

Table 5-13: Alternative Water Supply Projects Currently Under Development by STOPR and SFWMD

Alt No.	Tier Rank	Water Supply Alternative	Source		Intended Use			Storage		Conjunctive Use	Other Comments
			SW	GW	Pot-able	Non Pot	Re-Chrg	Re-ser-voir	ASR/GRD		
1	1	Cypress Lake Wellfield								Yes	Lower Floridan Aquifer source APT Test to be completed October 2008
2	1	Stormwater Capture						Poss-ibly		Yes	Revise state stormwater rule. Mostly new development, although retro possible. Could send to RIBs
3	1	Water Conservation								Yes	Depends on level of conservation. Utilities prefer a goal-based BMP basis. Separate residential and other uses.
4	1	Taylor Creek Reservoir								Yes	Inter-district transfer. Preliminary design phase
5	1	Permit Conversions								Yes	Regulation change needed. Entire region. CFCa component. Policy change similar to SWFWMD
6	2	South Osceola County Wellfield								Yes	CFCa southern boundary amendment needed.
7	2	Polk County S.E. Wellfield								Yes	CFCa southern boundary amended
8	2	Lake Kissimmee Surface Water								Yes	Lower volume may prove uneconomical. Reliability depends on size
9	2	Lake Hatchineha surface Water						Limit-ed		Yes	South to S-65, focus on northern areas
10	2	KBMOS+ (Potable)								Yes	Back-pumping and possibly in conjunction with structural changes in UKCOL. Modeling with SFWMD
11	2	KBMOS+ (Reclaimed & Recharge)								Yes	Back-pumping and possibly in conjunction with structural changes in UKCOL. Modeling with SFWMD
12	2	RIB Groundwater Recharge								Yes	Need certainty that recharge water can be credited to the re-charger. District transfer. WMD rule revision needed.
13	2	Wellfield Optimization								Yes	CFCa rule change needed. Increase pumpage, but keep impact same, or less.
14	2	Backpump South of Kissimmee River Restoration								Yes	Pipe north to Lake Kissimmee or a reservoir. Can pump from the river or a reservoir north of Lake Okeechobee
15	2	Polk County – Lower Floridan Ground Water								Yes	Needs rule modification
16	3	Brackish Aquifer Ground Water								Yes	
17	3	Desalination – Ground Water								Yes	
18	3	Agricultural Optimization								Yes	In conjunction with Permit Conversions
19	4	Desalination – Ocean								Yes	
20	none	Haines City – Sand Mine Conversion								Yes	72-acre reservoir
21	none	Polk County – Scan America								Yes	512 acres of interconnected lakes.

RCID intends to continue to be an active member in the STOPR Group and to collectively seek alternative water supplies through this cooperative effort. In addition to STOPR participation, RCID is working with the Central Florida Water Planning Group, which has a similar but slightly different agenda to develop alternative water supplies. This group includes the STOPR members, Orlando Utilities Commission, and the City of Cocoa. The CFWPG is developing an interlocal agreement and a scope of work from which it will hire consultant(s) to pursue water supply planning tasks.

Due to the infant nature of the CFWPG and the current lack of an executed agreement between STOPR and the water management districts for the attached list of alternative water supply projects, it is premature to identify the specific parties who will be responsible for the funding and construction of the proposed projects. Additionally, the quantity of water that may be available and its timing are also currently unknown. As RCID has indicated in its Ten Year Water Supply Plan, its permitted groundwater supply and its proposed conservation efforts via conversions to reclaimed water will provide it adequate water supply to meet all anticipated growth within the next ten years (thru 2020). In the interim time frame, RCID intends to work cooperatively with the STOPR group, the CFWPG and other organizations as may be developed, to pursue alternative water supplies for the local region to meet the regional needs beyond 2013.

Additional Planning Efforts – RCID

Conservation will continue to play a role in the water resources of RCID and the District will continue to pursue this through building codes, enforcement and periodic updates to the codes. Additional conservation may result in some demand reduction, but since the majority of the customer base is commercial, it is believed that the potential reduction will be minor, probably no greater than 2 to 3%. Because of the uncertainties in forecasting conservation measures, RCID does not intend to rely on conservation measures for significant demand reductions and therefore they have no quantification herein.

Future Goals and Objectives

In looking beyond 2020, it is apparent that any additional water demands beyond 24.1 MGD (22.2 MGD per Water Use Permit plus 1.9 MGD from reclaimed conversions) will have to be met with more strict conservation methods and/or water from an alternative water source. The simplest method to start with would be to adopt the following conservation objectives:

- All existing facilities within RCID shall convert to low water use plumbing fixtures that meet the maximum flow rate and consumption requirements of the RCID *Epcot Plumbing Code* prior to the time that RCID's total water demand reaches 24.1 MGD.
- All irrigation systems within RCID shall be equipped, maintained and operated with a rain sensor device or switch that overrides the irrigation system when adequate rainfall has occurred.

Summary

The most promising option for RCID to meet the demand deficit projected for the 2020 planning horizon is to convert irrigation and cooling tower makeup systems to reclaimed water. All other options have constraints, limitations and uncertainties associated with them that increase their risk. It appears that adequate reclaimed water will be available to meet the additional demand required of the proposed conversions.

RCID will continue to cooperate on a regional planning basis to develop additional alternative water supplies to

ensure its longer term resource needs are met and will continue to practice conservation.

SANITARY SEWER

OVERVIEW

Note: In accordance with Section 119.071(3), Florida Statutes, maps of the RCID wastewater collection and treatment system are not provided herein due to the sensitive nature of these facilities and the security thereof.

The RCID is the primary purveyor of sanitary sewer services within the District boundaries and serves all development within the District except the support service complex south of the Animal Kingdom.⁴ The District also provides wastewater services to an apartment complex in unincorporated Orange County (Vista Way) on a site formerly within District boundaries, to the CrossRoads commercial area (also formerly within District boundaries), and to a portion of Orange County's service area known as Horizon's West. All of the RCID's wastewater treatment and disposal facilities lie within District boundaries.

The predominant land uses in the service area are described in the Potable Water Subelement. Nearly all development is connected to the centralized wastewater system. There are a few exceptions where isolated development operates on septic systems (about four of the golf course comfort stations utilize septic tank systems).

Independent package plants and circulation systems are generally discouraged in the District but may be permitted within animal-related exhibits at the theme parks. This is necessary because the attributes of effluent from such exhibits differs from those for which the District's treatment plant was engineered. One such example serves a petting farm in the Magic Kingdom; another serves the hippo tank at the Animal Kingdom. These independent package plants are not permitted to treat human waste.

The District's initial wastewater treatment needs were met by a 3.3 mgd facility constructed on a 25-acre site in the west-central part of the District off of Bear Island Road. When it opened in 1970, that system served the Magic Kingdom theme park, the Bay Lake resorts, and the Lake Buena Vista hotels. Since that time, wastewater treatment needs have increased dramatically as a result of growth. The treatment plant was expanded to 6.0 mgd in 1981 to accommodate EPCOT Center and again in 1989 to 9.0 mgd to accommodate the Disney's Hollywood Studios and other new development. Capacity was increased to 15.0 mgd in 1993 to accommodate resorts and anticipated theme park and commercial development. The facility will undergo another expansion to 20 mgd within the next three years. A portion of this expansion has already been completed with the addition of new head-works, a third 3mm screen, and the addition of a grit removal process. These improvements were completed in 2007

In addition to capacity expansions, the system has been regularly upgraded in response to state and federal requirements for effluent quality. Several innovative measures have been used to comply with these requirements. During the last fifteen years, effluent disposal has shifted from a system which relied on wetlands for nutrient removal to a system which uses rapid infiltration basins and reclaimed water lines for treated wastewater percolation and irrigation. This system results in complete reuse of the treated effluent.

⁴ *The support service area along Backstage Road south of the Animal Kingdom receives sewer services from the City of Kissimmee.*

REGULATORY FRAMEWORK

The Federal Water Pollution Control Act (PL 92-500) is the primary federal legislation relating to sanitary sewer service. The US Environmental Protection Agency (EPA) has responsibility for implementing this act. Florida has adopted legislation entitled Sewage Disposal Facilities: Advanced and Secondary Waste Treatment (Chapter 403.086) that implements the federal law on the state level. The Florida Department of Environmental Protection (FDEP) has the responsibility for implementing the state legislation and has adopted rules for the regulation of wastewater facilities (Chapter 62-600, Florida Administrative Code). The Florida Department of Health and Rehabilitation Services has adopted rules for septic tank and drainfield installations (Chapter 10D-6, Florida Administrative Code). The SFWMD is charged with implementing the FDEP rules as they apply to stormwater management. Within the RCID, the Planning and Engineering Department is responsible for ensuring compliance with state and federal standards.

WASTEWATER COLLECTION AND TRANSMISSION SYSTEM

The District's wastewater collection and transmission system consists of gravity sewers, lift stations, and force mains. The existing collection system connects the primary development areas with more than 85 principal and secondary lift stations. Each of the major activity areas in the District has a master pump station for pressurization of wastewater and delivery to the wastewater treatment plant via force main. Each station has between two and eight pumps for system reliability. Three major transmission systems convey wastewater to the treatment plant. One system serves the Magic Kingdom area and resorts, the second serves the Epcot/Hollywood Studios area and Lake Buena Vista, and the third serves the Animal Kingdom part and associated resorts.

TREATMENT FACILITIES

Raw sewage enters the wastewater treatment plant and is treated through a series of physical, chemical and biological processes. The products of this process are reclaimed water and biosolids (sludge). The District uses a biological nutrient removal process for the liquid portion of the facility. Effluent (a clear liquid that may be returned to existing water bodies) from the RCID system meets the state's standards for tertiary treatment facilities. Biosolids (sludge) disposal is accomplished through an aerated static pile composting system, which generates a Class AA quality product (highest quality) as defined by FDEP.

Over the past two decades, the District has received numerous awards from the FDEP and the US Environmental Protection Agency for its wastewater plant operation and reuse system. Improvements to the plant during the early 1980s substantially reduced the nitrogen and phosphorus levels in treated effluent. Subsequent improvements during the 1990s allowed the District to switch from a wetlands disposal system to a rapid infiltration disposal system, discussed below. These improvements also facilitated the use of treated effluent for landscape irrigation through a reclaimed water system.

The FDEP issued a permit in 2007 for continued operation and expansion of the plant. The current permit expires on June 18, 2012. Effluent quality standards, as permitted by the FDEP and EPA, are shown in Table 5-14.

Table 5-14: Wastewater Treatment Plant Characteristics

Attributes		Standards
Plant Capacity		15.0
Type		Tertiary (Nutrient Removal)
Effluent Standards		
5-Day CBOD ₅		5 mg/l (*)
Total Suspended Solids		5 mg/l (*)
Total Nitrogen		6 mg/l (*)
Total Phosphorus		1 mg/l (*)
Fecal Coliform		High level disinfection as defined in 62-600 F.A.C.
pH		6.0-8.5

Notes:

Standards are for effluent exiting the treatment plant. Standards for CBOD-5, TSS, and fecal coliform are based on monthly averages

(*) Standards vary depending on the period of record evaluated.

As mentioned above, the District allows septic tanks in remote areas; only four septic tank systems are in service within the District today. All existing septic tanks have been approved by the Orange County Health Department. At the time new permits are issued, the County conducts tests to determine soil suitability and predict drain field functionality. Septic tanks are not allowed in areas of unsuitable soils unless appropriate approved modifications of soils are completed.

EFFLUENT DISPOSAL SYSTEM

Once the physical, biological and chemical processes have been completed, reclaimed water is utilized through two primary methods. On average, about 45 percent of the reclaimed water is directed to a rapid infiltration basin (RIB) system in the northwest part of the District. The RIBs consist of 85 one-acre ponds with lined sides and sandy bottoms. A rotational cycle is used to balance the flow of reclaimed water to each pond and ensure that sufficient time is provided for percolation. The balance of the reclaimed water is utilized in the District's reclaimed water distribution system (or reuse system). As discussed earlier in this element, reclaimed water is directed to a network of distribution mains which irrigates the tree farm, medians and rights of way, golf courses, and landscaping in all new development areas, in most of the developments constructed since 1990, and in many of the older developed areas.

The proportion of wastewater directed to the rapid infiltration basins versus the reclaimed water distribution system varies seasonally. Reclaimed water flows are highest during hot, dry periods, when a large amount of water is needed for irrigation. As of 2009, flows to the basins averaged about 5.684 mgd while flows to the reclaimed system averaged about 5.949 mgd.

The RIBs are permitted to accept 12.5 mgd, but were designed and modeled to accept 17.5 mgd. Actual flows are not expected to reach these volumes since the reuse system will be handling a growing share of the effluent as new development comes on line. The District's operating permit allows the reclaimed water

system to carry an average annual flow of 10.0 mgd. Due to economic and practical considerations, it is unlikely that this quantity will be reached in the foreseeable future.

CAPACITY AND DEMAND

As previously noted, this element focuses on five- and ten-year planning horizons. Future updates of the Capital Improvements Element may result in changes to the descriptions of proposed projects. Although this element will be updated for internal consistency, the Capital Improvements Element should be consulted for the most comprehensive data on future wastewater improvements.

The wastewater treatment plant presently has a capacity of 15.0 mgd, or 5.48 billion gallons per year. Because of projected future flows, modifications to the plant and various components of the collection system (i.e., lift stations) are planned. These modifications will increase plant capacity 20.0 mgd and will be undertaken once demand dictates the need for the additional capacity. The permit from FDEP for these improvements is currently in-hand.

Wastewater flows during the 1990s and 2000s are shown in Table 5-15. The volume treated at the plant grew at a fairly steady rate for the first ten years of this period, averaging about 6 percent a year. Flows during the current decade have been fairly flat. Peak-month flows fluctuated similarly over the period.

Table 5-15: Wastewater Flow Characteristics:

Year	Average Daily Flow (mgd)	Average Day during Peak Month (mgd)
1991	7.335	8.134
1992	7.488	8.408
1993	8.095	8.795
1994	8.425	9.454
1995	9.226	10.555
1996	9.611	10.563
1997	9.873	11.071
1998	10.714	12.028
1999	10.929	12.071
2000	11.078	12.562
2001	9.890	11.436
2002	10.149	11.545
2003	10.308	12.229
2004	11.538	12.728
2005	11.166	12.467
2006	11.067	12.375
2007	12.467	13.904

In 2007, average-day wastewater flows were about 79 percent of potable water flows. This is about the same or slightly lower than the percentage in most cities with separated sewer systems, in part due to the use of potable water for irrigation, but also because of the relatively low incidence of infiltration and inflow on District sewer mains. The gap between potable water and wastewater flow volumes should become narrower as more of the District is connected to the reclaimed water system.

OPERATION AND MAINTENANCE

The wastewater collection, treatment, and disposal system is in good to excellent condition. All components of the system are less than 36 years old. A preventive maintenance program ensures the continued reliability of the collection lines and lift stations. Force mains and lift stations are regularly serviced and operate satisfactorily. The District recently conducted exploratory videotaping of its sewer mains and continues to videotape a percentage of its system annually, with follow-up repairs accomplished as required.

Operations at the treatment plant and disposal facilities are continuously monitored in accordance with state and federal regulations. All testing is done to regulatory standards. Additional sampling, monitoring, and reporting are required at the rapid infiltration basins and on the reclaimed water system.

SANITARY SEWER DEMAND PROJECTIONS

Level of Service Standards

Level of service standards for sanitary sewer are shown in Table 5-16. As with potable water, the level of service standards differentiate between the various classes of resort hotels, other resorts, and between the theme parks and water parks. These standards are used when evaluating sanitary sewer generation for all proposals for future development.

Table 5-16: Level of Service Standards for Sanitary Sewer

Land Use	Unit	Gallons per Day
Residential	Dwelling	300
Hotel (general)	Keys	180
	Luxury / Deluxe	230
	First Class	180
	Moderate/ Economy	130
Other Resort	Keys	230
Convention Space	Square Foot	0.20
Support / Office	Square Foot	0.20
Retail / General Commercial	Square Foot	0.25
Restaurant	Seat	20
Theme Parks (general)	Guest	30
Theme Parks (water)	Guest	50

Current Conditions

Based on the current quantity of development in the District and the amount of wastewater treated, the service levels shown in Table 5-16 are presently being met. The average daily wastewater flow was 11.89 mgd in 2008, a decrease from 12.47 mgd in 2007. As with potable water, the amount of wastewater treated in 2007 is being used as the basis for January 1, 2009 due to the uncertainty of knowing how much of the decrease resulted from conservation or the effects of the recession.

Future Conditions

The approach used to project future sanitary sewer demand taken in this element is similar to that used for potable water. The levels of service for the various uses listed in Table 5-16 have been applied to the quantities of projected development identified in the Future Land Use Element. Wastewater flow projections for 2015 and 2020 have been developed in this manner. The projections are given in Table 5-17.

Table 5-17: Projected Maximum Wastewater Flows

Year	Average Day	Plant Capacity	Surplus (Deficit)	Peak-month factor	Average day in peak month
January 1, 2010	11.641	15.0	3.359	1.121	13.050
	Projects completed in 2009 or under construction in to date	0.104			
	Development (2010-2015)	2.178			
	Attendance Growth (2010-2015)	0.475			
January 1, 2016	14.398	20.0	5.602	1.121	16.140
	Development (2016-2020)	3.390			
	Attendance Growth (2016-2020)	0.475			
December 31, 2020	18.263	20.0	1.737	1.121	20.473

Note

Plant capacity is based on annual average daily flows which accounts for variations above this figure to accommodate peak month and day conditions. Peak month can exceed annual average daily flows by 10 to 15 percent and peak day can exceed annual average daily flows by 20 to 25 percent.

FACILITY NEEDS

Wastewater facilities may be divided into the following categories: (1) collection and transmission facilities, including lift stations; (2) treatment facilities; and (3) reuse facilities. Major facility needs in each category are discussed below. The District has prepared a Master Utilities Plan which provides more specific guidance in the design and engineering criteria for these facilities. The Plan is periodically updated in response to changes in the major landowners' development program.

Collection and Transmission

New sanitary sewer collection lines will be added to accommodate development during upcoming years. These are identified in the District's Master Utilities Plan. Projects planned for the 2011-2015 period are listed in the Capital Improvements Element.

Treatment

Based on the revised wastewater flow projections identified above, expansion of the wastewater treatment plant to 20.0 mgd will be deferred until demand necessitates the plant expansion. The expansion is included in the CIE for FY 2012 and FY 2013. The District has completed plans for the expansion of the facility to 20 mgd and has obtained the permit for the work from FDEP.

Reuse System

The District's future effluent disposal needs will be adequately met through the continued development of the treated effluent reuse system and continued use of the rapid infiltration basins. Based on projected flows, the rapid infiltration basins may never require expansion due to the increasing demands of the reuse system. As mentioned in the Potable Water Subelement, extension of the reclaimed water system into previously developed areas will further increase the demand for reclaimed water and reduce the need for the RIBs.

Problems and Opportunities for Replacing, Expanding or Adding New Facilities

At this time, no major wastewater collection, treatment, or disposal problems exist within the District. The District recently entered into an agreement to extend its collection system outside its boundaries to facilitate housing development in the Horizons West area. An interlocal agreement executed during 1998 allocates 750,000 gpd of wastewater capacity to Horizons West for a 15-year period, and flows averaged about 600,000 gpd in 2007. The first project to use this capacity included about 250 affordable rental housing units geared towards persons employed within the District. This capacity is not currently being utilized.

Operation of sanitary sewer facilities will continue to be monitored regularly to protect public health and safety and ensure the conservation of the natural environment. The District will continue to investigate technologies that improve the quality of treated effluent and facilitate its reuse. At this point, no water quality problems have been reported or are anticipated.

The District's priorities for the coming years are: (1) to maintain adequate wastewater plant capacity to accommodate planned development through 2018, and (2) to expand the reclaimed water system to serve both new development areas and areas that were developed prior to the system's construction.

SOLID WASTE

OVERVIEW

Solid waste in the RCID may be broadly categorized as either Class I, Class III, or hazardous wastes. Class I waste consists primarily of materials disposed by visitors to the major activity centers and is ultimately recycled or directed to landfills. Class III waste consists of inert materials, such as construction debris and yard trimmings. Construction debris is disposed at privately operated landfills, while some yard waste is processed for compost amendment. Hazardous wastes are temporarily held in specially designated areas and are then transported by licensed carriers to disposal sites around the United States. Hazardous wastes are distinguished from other types of solid waste by their propensity for causing health or environmental hazards if improperly managed.

REGULATORY FRAMEWORK

The Federal Resource Conservation and Recovery Act (PL-580) established resource recovery as a national priority. The EPA reviews the impacts of solid waste disposal on air and water quality, while the U.S. Army Corps of Engineers monitors dredge and fill impacts. The Florida Resource Recovery and Management Act (Chapter 403.706, Florida Statutes) required each county to prepare a solid waste management plan. The FDEP has adopted rules dealing with solid waste handling and disposal (Chapter 62-701, Florida Administrative Code (F.A.C.)) and composting (Chapter 62-709, F.A.C.). The SFWMD provides review of water quality and quantity impacts associated with runoff from waste disposal and storage sites. Facility siting also is subject to appeal by the SFWMD. Actual construction and operation of solid waste facilities requires permits and review by the FDEP.

Hazardous wastes also are regulated by the U.S. Resource Conservation and Recovery Act and the Florida Resource Recovery and Management Act. The latter act directed the FDEP to develop and implement a hazardous waste management program. Florida also has passed the Solid Waste Management and Reduction Act (Chapter 403, Part IV, Florida Statutes), which is designed to reduce the amount of solid waste going to landfills. Within the RCID, the Planning and Engineering Department is responsible for ensuring compliance with applicable state and federal standards.

Within District boundaries, the Reedy Creek Improvement District provides solid waste and recycling collection and transfer and recycling services to customers. Orange and Osceola Counties regulate solid waste services through their public utilities divisions. Although the counties operate and maintain the region's principal refuse disposal facilities and ensure their compliance with state and federal regulations, local governments are not obligated to use these facilities. Most of the District's Class I waste is actually hauled to a private landfill in Okeechobee County.

COLLECTION SYSTEM

The RCID Solid Waste Department maintains a fleet of collection trucks, including tilt-frame roll-off trucks, front-end loaders, side loaders, one rear loader, and a service truck. These include the fleet of vehicles that collect recyclable materials. Each facility in the District is equipped with dumpsters and, where warranted, all-

in-one compactors for special handling of wet refuse and collection of recyclable materials. In the Magic Kingdom, collection capabilities are augmented by a privately operated Automated Vacuum Collection system that channels solid waste from 15 collection points via 20-inch vacuum mains.

Solid waste collection services are provided seven days a week, with most customers receiving service once or twice weekly. Collection vehicles operate about 22 hours a day. All areas are served according to need. Frequent collection at the major hotels and attractions prevents the overloading of containers, vandalism, and the negative effects of inclement weather. The permanent residential units receive service twice a week, but generate a very small portion of the total waste.

TRANSFER SYSTEM

The District operates its own transfer station where non-recycled Class I wastes are emptied into a 350 cubic yard collection pit, compacted, and transferred to larger vehicles for landfill hauling. The station is located just north of the Magic Kingdom. The system is in fair operating condition and is planned to be replaced by a privately owned and operated facility in the south central portion of the District by 2011.

The transfer station processed 71,607 tons of solid waste during 2008, down from 74,641 tons of solid waste during 2007. This equates to approximately 196 tons on an average day. The volume increases about 10 percent during the peak month. Yearly tonnage sent to landfills since 1991 is shown in Table 5-18. Solid waste tonnage at the transfer station increased 26 percent between 1998 and 2007, a relatively slow rate of growth considering the large amount of development that occurred during the period. The tonnage would have increased much more rapidly if the District had not initiated an aggressive recycling program in the early 1990s. The total amount of Class I solid waste recycled in the RCID increased from five percent in 1990 to more than 33 percent in 1997. The rate has declined in percentage since, with diminished markets for certain recycled products as a major reason for the decline.

DISPOSAL

In January 2001, the District signed a five-year contract for Class I solid waste disposal with Okeechobee Landfill, a privately operated landfill located about 90 miles south of the District in Okeechobee County.

The 348-acre Okeechobee Landfill has a projected life of 75 years and a permitted average daily capacity of 10,000 tons per day. The District's waste-stream represents about 4 percent of the 6,000 tons per day currently received at the landfill. Whereas the RCID previously used its own fleet to haul waste from its transfer station to the County landfills, this service is now provided by a private franchise and is included in the fee paid to the Okeechobee Landfill.

Most construction materials are hauled to a privately owned and operated Class C & D (Construction and Demolition debris) landfill located about seven miles north of District boundaries. There is also a privately operated 55-acre Class III landfill located within District boundaries in Bay Lake to the west of the Magic Kingdom. This landfill is occasionally used for the disposal and processing of C & D and other Class III debris although its use is minimized to preserve its remaining capacity. Class III materials are delivered to the Bay Lake landfill where recyclable wood, landscape waste, and metals are recovered for recycling; the remaining Class III waste is then loaded into trailers and hauled to an off-site landfill.

The amount of construction waste disposed in landfills varies from year to year depending on the amount of construction taking place in the District and the types of wastes being generated. Some types of construction waste are more conducive to recycling than others. The total tonnage of Class III waste generated in the District has been surpassed by Class I waste during recent years due to the smaller amount of construction occurring with the District and the improvements made in waste reduction at construction projects. Total Class III waste sent to the landfill in 2008 was about 44,455 tons, down from 50,380 tons in 2007.

Table 5-18: Solid Waste Trends

Year	Class I Tons		Class III Tons	
	Landfilled	Recycled (%)	Landfilled	Recycled (%)
1991	43,864	3,567 (7.5%)	98,248	39 (0.04%)
1992	45,274	6,610 (12.7%)	76,836	27,860 (26.6%)
1993	45,104	13,373 (22.9%)	59,557	76,541 (56.2%)
1994	41,555	17,419 (29.5%)	126,864	53,094 (29.5%)
1995	45,909	22,369 (32.8%)	46,266	51,076 (52.5%)
1996	50,392	24,081 (32.3%)	139,851	25,889 (15.6%)
1997	51,068	25,769 (33.5%)	70,618	20,177 (22.2%)
1998	66,555	17,944 (21.2%)	59,190	31,029 (34.4%)
1999	76,891	Unavailable	Unavailable	Unavailable
2000	82,761	Unavailable	Unavailable	Unavailable
2001	Unavailable	Unavailable	Unavailable	Unavailable
2002	60,823	14,915 (19.7%)	47,780	6,754 (12.4%)
2003	59,993	17,003 (22.1%)	57,365	4,758 (7.7%)
2004	68,871	14,918 (17.8%)	62,239	7,728 (11.0%)
2005	72,590	15,860 (17.9%)	50,908	4,210 (7.6%)
2006	79,595	15,893 (16.6%)	43,468	2,505 (5.4%)
2007	83,689	20,361 (14.9%)	50,380	3,619 (6.7%)
2008	72,470	20,361 (21.9%)	44,455	2,728 (5.8%)

SPECIAL PROGRAMS

Resource Recovery

The District has maintained a fleet of collection vehicles for recyclables since the early 1990s and has expanded collection capacity as demand has increased. There are now six vehicles providing daily collection service to more than 80 repositories. A recycled materials recovery facility (RMRF) was established in a portion of the ASP Composting facility in 2003. Aluminum, steel, plastic, newspaper, cardboard, glass, office paper, and other miscellaneous items are transported there on an average day. Materials are stored, loaded and transported from the facility to a centralized material recovery facility owned by Orange County and operated by a private corporation.

In 2002 the composting of food waste was initiated with completion of an in-vessel system constructed at the wastewater treatment plant site. The collection of food waste has been an important part of the District's recycling program and has substantially enhanced recycling efforts. In 2007 more than 12,000 tons of food waste were collected, making food waste the single biggest component of the District's recycling program. In 2007 food waste represented about one-half of the Class I recyclable tonnage.

Hazardous Wastes

Hazardous wastes in the RCID are collected, held, and transported by the private sector in accordance with state and federal regulations. There were approximately 172 tons of hazardous waste generated in the District during 2007, or less than one percent of the Class I solid waste generated that year. Hazardous wastes are held in 32 designated accumulation areas, each engineered for safety and security. Typically the accumulation areas consist of a poured monolithic slab with curbs, a roof, and perimeter fencing; two of the areas are fully enclosed. Each area usually contains two drums, with a capacity of eight to 12 drums. Drums are regularly collected on a weekly basis and transported to a central compound near the wastewater treatment plant. From there all wastes go to EPA-approved sites via licensed haulers. The receiving sites are visited at least once a year by a representative of the Walt Disney World Company to ensure that wastes are being properly disposed of and the facilities are in compliance.

All generators of and persons working with hazardous materials are trained to properly handle these materials. All wastes are labeled, sealed, and separated by type to prevent additional hazards that could result from mixing, in the event of a leak or spill. Paints and solvents are the most common hazardous wastes generated in the District.

OPERATION AND MAINTENANCE

The District's transfer station and recycled materials staging facility are in fair and excellent operating condition, respectively. There are no reported operational or maintenance problems at this time. The fleet of collection vehicles are regularly serviced and maintained, with new vehicles added to the fleet as needed.

CAPACITY AND DEMAND

Class I solid waste tonnage between 1991 and 2007 is shown in Table 5-18 above. Solid waste tonnage at the transfer station has almost doubled during the past 16 years and the current transfer station is handling on average 200 tons per day. The transfer facility has a permitted capacity of 275 tons per day.

Landfill disposal capacity is adequate to handle committed and anticipated future growth. Assuming the District's arrangement with the Okeechobee Landfill continues, the District has a viable long-term location for landfill disposal. The District's recycling facilities have sufficient capacity to accommodate increased volumes of recyclable products. The greater challenge is anticipating market conditions for recyclables and ensuring that recycling certain products remains economically viable. The District also faces the challenge of processing 100 percent of its collected food waste and reaching a 50 percent landfill diversion rate for all solid wastes. This is discussed later in this element.

The quantity of construction debris has been lower in the past seven years than that experienced in the early 1990s. This is most likely due to improved construction and recycling techniques and less aggressive development experienced throughout the District. Based on past trends, Class III debris during the coming years is projected to be between 50,000 and 75,000 tons per year. The percentage recycled will depend on the market for the recycled products (particularly concrete and asphalt), but will probably range from 20 to 50 percent. If current trends continue, the landfills to which construction debris is hauled have the capacity to meet the District's needs for the ten year planning horizon

SOLID WASTE DEMAND PROJECTIONS

Level of Service Standards

Level of service standards for solid waste are shown in Table 5-19. The standards are based on the actual quantities of waste disposed at the residential units, hotels and resorts, theme parks, offices, and commercial uses within the District during 2007. The District tracks solid waste disposal and recycling volumes at each of the major resorts and attractions on a monthly basis. An annual report is published at year's end.

Table 5-19: Level of Service Standards for Solid Waste

Land Use	Unit	Pounds per Day
Residential	Dwelling	11.5
Hotel (general)	Keys	7.5
Luxury / Deluxe	Keys	11.0
	First Class	8.5
	Moderate/ Economy	6.0
	Value	3.5
Other Resort	Keys	6.0
Convention Space	Square Foot	0.0325
Support/Office	Square Foot	0.002
Retail/General Commercial/Restaurant	Square Foot	0.0325
Theme Parks (general)	Park	10 to 20 Tons
Theme Parks (water)	Park	0.5 to 1.0 Tons

Current Conditions

Based on the current quantity of development in the District and the amount of solid waste disposed of, the service levels shown in Table 5-19 are presently being met. On average 196 tons of solid waste were generated per day in 2008, a decrease from 205 tons in 2007.

Future Conditions

The projections in this sub-element have been developed by applying level of service standards to the various land uses in the ten-year development mix shown in the Future Land Use Element. Table 5-20 indicates projected solid waste tonnage for 2015 and 2020. These numbers assume recycling rates remain at current levels.

Table 5-20: Projected Class I Solid Waste Generation to Landfill

Year		Average Day (Tons)
January 1, 2010		177
	Projects completed in 2009 or under construction in 2010	4
	Development (2010-2015)	41
	Attendance Growth (2010-2015)	2
January 1, 2016		224
	Development (2016-2020)	45
	Attendance Growth (2016-2020)	5
December 31, 2020		274

FACILITY NEEDS

Facilities for solid waste disposal may be categorized in the following categories: (1) Transfer stations; (2) Landfill facilities, including construction landfills; (3) Resource Recovery and Recycling Facilities (including composting facilities); and (4) Hazardous waste storage and disposal facilities. The need for each facility type during the next 10 years is discussed below. In addition to the facilities listed below, the District will expand its collection fleet and collection receptacles (dumpsters, etc.) as demand warrants.

Transfer Stations

The need for additional transfer station capacity will depend on how successful the District is in increasing its landfill diversion rate. The District has already attained the 15 to 20 percent diversion rate and has set a Comprehensive Plan objective of increasing landfill diversion to 50. The higher rate would enable the existing transfer station to remain without expansion through 2018. However, at the current diversion rate of 15 to 20 percent a new transfer station will be required between 2016 and 2020. The District has programmed a new transfer station in its CIE in 2011.

Landfill Facilities

The District maintains a service agreement with the Okeechobee Landfill. As mentioned earlier, the facility has ample capacity to meet the District's disposal needs for the next ten years and beyond.

The District will continue to use a private off-site construction landfill for disposal of Class III waste. The existing on-site landfill will continue to be used for specialty and sensitive items only. No new facilities, other than the transfer station, are projected to be required during the next ten years.

Resource Recovery and Recycling Facilities

The existing recovered materials recycling facility (RMRF) has a capacity of about 100 tons per day. The projections indicate that this capacity could be reached by 2018 if the landfill diversion rate is increased to 50 percent.

Hazardous Waste Facilities

No new RCID hazardous waste facilities are proposed at this time. The private sector will continue to operate a centrally located accumulation area near the wastewater treatment plant. Although additional small accumulation areas may be proposed by the private sector in conjunction with new development, no major changes or facilities are anticipated.

Problems and Opportunities

At present there are no significant solid waste service problems in the RCID.

The District is in the process of improving its food waste recycling program by experimenting with a desiccation system and the use of inoculants. The District is also exploring new markets for its recycled products, particularly those which have been historically weak or difficult to capture (plastics, glass, and concrete).

STORMWATER MANAGEMENT

INTRODUCTION

The Stormwater Management Subelement of the RCID Comprehensive Plan describes the regulatory environment, stormwater control facilities, levels of service, and facility needs for stormwater control. The ultimate objective of the subelement is to ensure flood protection for developed areas, water conservation within designated wetland and flood-prone areas, and stormwater quality treatment to meet clean water requirements. Stormwater management has been one of the primary functions of the District since its inception. Since the mid-1960s, the District has constantly made improvements so that the current system is capable of accommodating a 50-year storm.

The District is responsible for approval, operation, and maintenance of all public drainage facilities within its boundaries. The planning, construction, operation, and maintenance of stormwater control facilities in each development project is the responsibility of the owner/developer unless the facilities are dedicated to the District.

REGULATORY FRAMEWORK

The construction and operation of stormwater management facilities within the District is subject to regulation at the federal, state, and local levels. State and federal legislation addresses the management of flood waters, drainage modifications impacting wetlands, and the use of land in flood plain areas. The Federal Water Pollution Control Act (PL 92-500) is the primary law dealing with quality of stormwater runoff. The EPA is responsible for implementing this act. The Florida Water Resources Act (Chapter 403, Florida Statutes) provides the FDEP with the authority to establish water quality guidelines and recognizes stormwater runoff as an important resource. The FDEP has adopted a Stormwater Rule to fulfill part of the state's responsibilities under Section 208 of the federal act.

Stormwater management facilities are also subject to permitting and monitoring requirements by the South Florida Water Management District (SFWMD). The District was issued an SFWMD permit for operation of its stormwater management system in 1979; the permit was revised in 1992. The development parameters established by the permit are discussed later in this chapter.

Presently, the RCID coordinates its stormwater management activities with Orange and Osceola Counties by reviewing development proposals upstream of District boundaries but within the Reedy and Bonnet Creek watersheds. The Counties may withhold development approval until developers and the RCID reach agreement on the mitigation of drainage impacts. The RCID currently reviews outside proposals only for consistency with the South Florida Water Management District permit requirements.

SERVICE AREAS

The District's Reclamation Plan, approved by the State of Florida in 1966, provided for a system of water control that permitted maximum beneficial use of District lands, contributed to the preservation of natural resources, and facilitated the conservation of water. Provisions for the increased drainage requirements to

accommodate new development were included. The Plan of Reclamation incorporated inflows of runoff from tributary lands to the District in Orange and Osceola Counties.

The service area includes all land within the Reedy Creek Improvement District and approximately three times that acreage in contributory peak-lands. A total of 108,000 acres are included. Within the District, the predominant land uses are theme parks, resort hotels, associated support uses, and open space.

EXISTING CONDITIONS

Natural Drainage Features

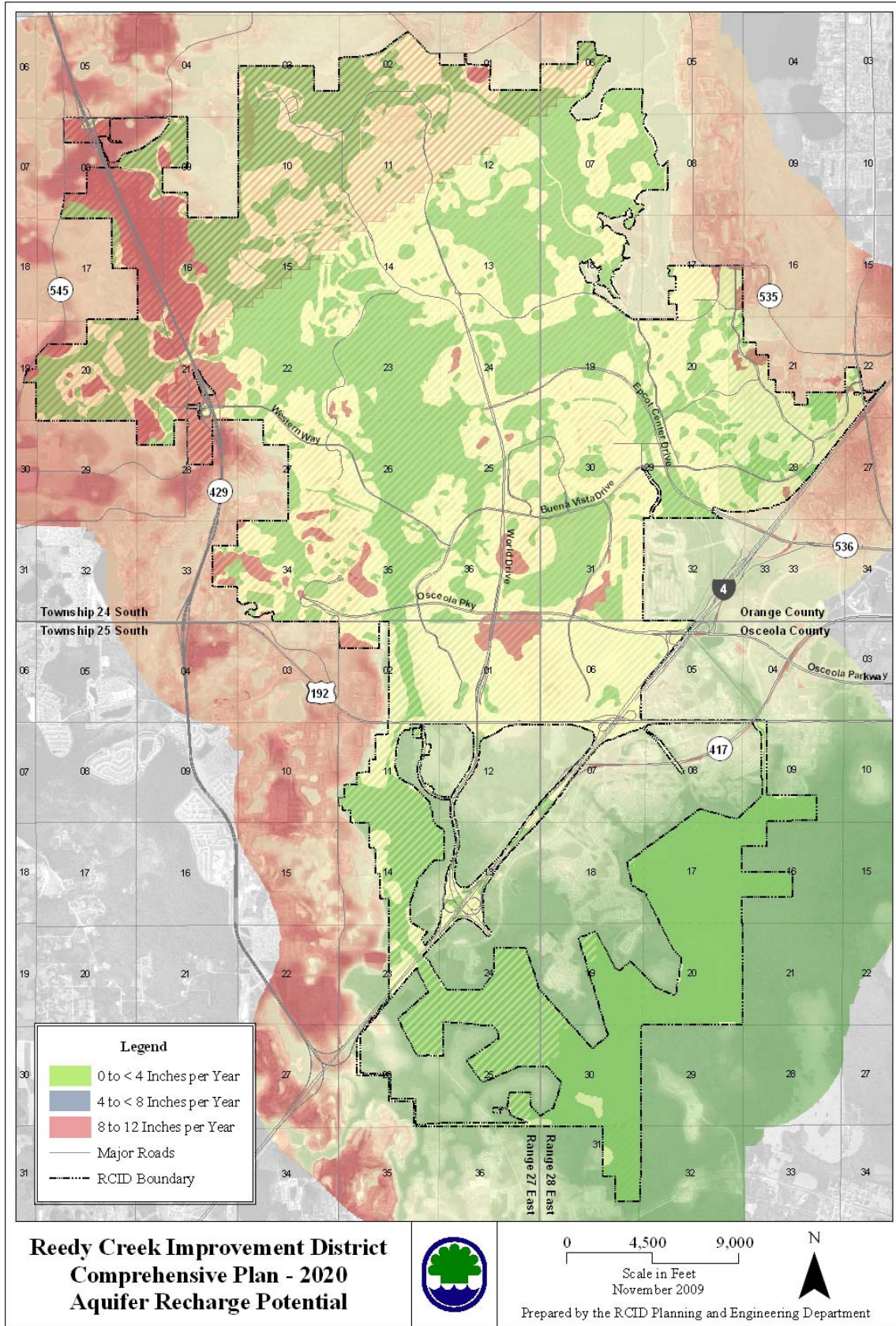
Drainage patterns in the RCID are shaped by topography, soils, and vegetation, as well as buildings and man-made drainage improvements. Topography ranges from about 150 feet elevation in the northwest part of the District to about 70 feet at the point where Reedy Creek leaves the southern boundary. A low ridge extends from Bay Lake southward through the EPCOT Center area, across US 192, and then southeasterly to the District boundary. The ridge provides a natural drainage divide between Reedy and Bonnet Creeks, the District's two main natural drainageways. Runoff from the west side of this ridge and from the rolling areas along Hartzog Road flows to the low-lying areas along Reedy Creek and ultimately to Reedy Creek itself. North of the Bear Island Road bridge, most of Reedy Creek has been channelized with earthen berms. South of this bridge, the creek is in its natural banks and is adjoined by wetlands on either side. South of I-4, the creek is adjoined by a broad flood plain and conservation area that is saturated most of the year.

Drainage from lands lying east of the ridge and in the City of Lake Buena Vista flows to Bonnet Creek. The Creek has been channelized and is now contained within an earthen berm canal (C-1) for most of its length within the District. Through man-made improvements, both the Reedy Creek and Bonnet Creek watersheds have been subdivided into many small sub-basins. The topographic features are shown in Figures 5-4.

Drainage is also a function of soil and vegetative characteristics. As the Conservation Element indicates, the loose sandy soils typical of the District's higher elevations have the ability to absorb more runoff than the lower areas. The saturated soils or clay soils generally found in the Reedy Creek flood plain and in the wetland areas have a much slower rate of absorption and a much higher water table. The higher areas are managed to prevent erosion, while the emphasis in the low-lying areas is on flood protection and conservation.

Most rainfall in the RCID vicinity falls during the summer months; some summer thunderstorms may exceed four inches of precipitation. Because the most extreme storms have the capability to overload the natural drainage system, the District has implemented an extensive stormwater conveyance system to avoid flood hazards.

Figure 5-4: Topography



Man-made Drainage Features

Man-made alterations affecting drainage include canals, storm sewers, culverts, inlets, lakes, basins, and grading changes that affect the topography and direction of runoff. The initial stormwater control plan was developed and implemented between 1966 and 1979. As additional areas within the District have been developed, new stormwater control measures have been implemented and new facilities have been added. Drainage permits are periodically reviewed and modified as land use and hydrologic conditions change.

With current drainage improvements, the District still consists of two major watersheds. The western half of the District still drains to Reedy Creek, while the eastern half drains to Bonnet Creek. There are 66 linear miles of man-made canals and natural creek, and 23 gated control structures. Weir and gate structures are used to maintain surface elevations in the canals and to link some of the canals to nearby lakes. Water storage recorders have been placed at ten separate locations within RCID boundaries and at a number of peak- locations both upstream and downstream.

Both sub-basins discharge stormwater into the designated Conservation Area at the south end of the District. The South Florida Water Management District has limited the discharge from the District to 3,282 cubic feet per second (cfs) in a ten year/three day storm event. The design capacity of the control structure at the discharge point is estimated to be 2,984 cfs, based on the District's drainage model.

Runoff hydrographs were developed using a combination of the Soil Conservation Service Unit Hydrograph Method and the Santa Barbara Urban Hydrograph Method. The hydrographs provide criteria for assessing existing stormwater management facilities and designing new facilities. Channel performance is evaluated based on a computer program that simulates storm conditions throughout the system.

New primary facilities are typically designed to accommodate a three-day storm producing 12.91 inches of rain. Such a storm has a 1 in 50 chance of occurring in any given year (a "50-year return frequency" or "50-year storm event"). Stormwater facilities are also checked for their performance in a three-day storm producing 14.27 inches of rain; such a storm has a return frequency of 100 years. Secondary stormwater management facilities are sized in accordance with a 10-year return frequency, 72-hour duration storm.

The District's drainage model uses runoff coefficients based on the amount of impervious surface that is estimated to be in place when the District is fully built out. The following acreage parameters are used by the model and are included in the District's 1992 SFWMD permit:

	<u>Acres</u>
Water:	1,641 acres
Pavement (roads, parking, walkways, etc.)	6,134 acres
Building Coverage (footprints)	2,629 acres
Preserved Areas (primarily wetlands)	9,215 acres
Other Pervious Areas (golf courses, turf grass, landscaping, medians, etc.)	7,467 acres
Total Acres	27,086 acres

The SFWMD permit includes portions of Celebration, a planned community that was deannexed from the District in 1992. Although land use on the Celebration site is under Osceola County's jurisdiction, its water management areas remain subject to RCID stormwater management jurisdiction.

Approximately 10,800 acres in the District are used for the storage of runoff, either in surface water bodies or wetland areas. The wetlands and lakes retard the flow of surplus waters, thereby reducing the peak flow discharged from the District at the south boundary through the S-40 water control structure.

Tributary lands outside the District have been considered in the design of primary channel and structural improvements. Hydrologic characteristics of the tributary lands were obtained from U.S. Geological Survey (USGS) Quadrangle Maps, Soil Conservation Service soils maps, and U.S. Weather Bureau statistical rainfall data. Runoff from the tributaries enters through 12 inflow points along the District perimeter, shown in Figure 5-1 (see Policies).

Water Quality

In addition to flood protection, the District's stormwater management system provides surface water quality treatment. Stormwater runoff becomes a pollution source when materials such as oil, grease, fertilizer, and heavy metals are washed into the drainage system by rainfall. Provisions to divert or screen runoff prior to its discharge to natural surface waters are an important part of the District's drainage plan. Surface water quality in the District is monitored continuously by the RCID's Environmental Protection Department at various locations in the Reedy Creek and Bonnet Creek watersheds. In accordance with the National Pollution Discharge Elimination System (NPDES) program, the District conducts biosampling of stormwater impact. Sample results from two monitoring stations are reported to the EPA on an annual basis.

OPERATION AND MAINTENANCE

Operation and maintenance of water control works is provided by District personnel. Maintenance is performed on a regularly scheduled basis and includes monthly and semi-annual inspection of water control facilities, periodic water quality monitoring, monthly mowing and erosion control, canal clearing, and structure repair, as required. Surface inspections of the control gates are performed biennially and underwater inspections of the control structures are performed periodically. As needed the District rip-raps control structures to abate bank erosion, repaints control structures, removed earth plugs and vegetation on canals, and rebuilds sections of the levee system. These types of activities ensure that the water control facilities can operate at their design capacities and effectively prevent flooding during extreme rainfall.

Since the water control facilities of the District are essentially in place and have been planned with future development in mind, future improvements will consist primarily of expansion and maintenance of existing facilities. The District reviews the water control facilities annually to prioritize modifications and improvements.

NEEDS ASSESSMENT

Level of Service Standards

Levels of service for stormwater management facilities are based on the level of protection provided during storms of varying intensity. The standards for the Reedy Creek Improvement District are given below:

- development in the 100-year flood plain must provide compensating storage and may not increase the 100-year flood elevation or reduce the base carrying capacity of the floodway;

- the first floor of all habitable structures and public facilities shall be a minimum of one foot above the 100-year, 3-day storm event elevation, as determined by a stormwater model acceptable to the District;
- arterial roadways shall remain above the 50-year, 3-day storm elevation as determined by a stormwater model acceptable to the District;
- the main District Stormwater Management System shall convey the 50-year, 3-day storm event as determined by the RCID stormwater model;
- the secondary District Stormwater Management System shall convey the 10-year, 3-day storm event as determined by the RCID stormwater model;
- the discharge at S-40 shall be limited to 3,282 cfs during a 10-year, 3-day storm event; and
- in accordance with the 1992 SFWMD permit, all project sites shall retain the first one-inch of runoff on-site before discharge to the District's system, or retain 2.5 inches times the percentage of impervious surface area on the site, whichever is greater.

Performance Assessment

The general performance and condition of existing facilities of the District have been favorable because of regular inspections and maintenance. Records of canal water levels in the District, maintained by Reedy Creek Energy Services, are published weekly and indicate that design water surface elevations have not been exceeded. Appreciable *reduction* of water surface levels below those maintained by primary control structures also has not been detected since monitoring was initiated in 1982. Consequently, the water control facilities have helped maintain groundwater levels adjacent to the canal system.

The structural facilities of the District are in good condition. The original culverts were installed in the 1970s and most of the water control gates were installed between 1969 and 1985. With continued proper maintenance, these structures should have an expected life of 50 to 75 years.

In accordance with its SFWMD permit, the District is required to complete an annual analysis of its stormwater management system. The analysis is submitted to the SFWMD prior to March 30th each year and the findings are used as the basis for designing improvements to the system. The drainage analysis also includes mapping of the flood plain, including elevations at various cross-sections. A current flood plain map may be found in the Conservation Element of this Plan.

The District had previously established a three-tiered system of priorities for stormwater management improvements. "Priority One" improvements were those that would prevent the flooding of existing developed areas in a ten-year and 50-year storm event. "Priority Two" improvements were those that would prevent 10-year and 50-year intensity flooding in areas where development was projected during the next five years. "Priority Three" improvements were those that would prevent 10-year and 50-year intensity flooding in areas projected to develop beyond a five year time horizon. *At this point in time, all Priority One improvements have been completed and no Priority Two or Three improvements have been identified.* The District's single priority is to maintain the existing stormwater management system and provide improvements as needed for specific future development areas.

When the District instituted the three-tiered priority system in the early 1990s, the drainage model indicated a 10-year frequency storm could trigger flooding in portions of Fort Wilderness campground, the area northwest of the Magic Kingdom, and the undeveloped area west of the wastewater treatment plant. The model further indicated that a 50-year frequency storm could cause flooding in parts of Walt Disney World Village (now Downtown Disney). The Fort Wilderness and Disney Village flood hazards were identified as □Priority One□ and were programmed for correction. Flood improvements in the area northwest of the Magic Kingdom were considered, but were later determined to be infeasible because of potential wetland impacts. Moreover, a subsequent drainage study determined the L-407 canal had greater storage capacity than the 1991 drainage study had indicated. Consequently, flood hazards in this area were less serious than originally suspected.

Most of the improvements constructed during the early and mid 1990s involved replacement of control structures and widening of culverts. The S-404B, S-404D, and S-404E culverts on the L-404 canal were enlarged and the S-14A was enlarged. At the S-101 control structure, capacity was increased using a bypass pipe and weir system. As a result of these improvements, only the wetland and lakeshore areas at Downtown Disney would be subject to flooding in a 100-year storm. Flooding at the Fort Wilderness campground would be minor and would be due to a secondary, privately-owned drainage system rather than the RCID system.

FACILITY NEEDS

With the completion of several capital improvement projects during the early and mid-1990s, the District has largely corrected flooding problems and constructed the facilities necessary to ensure that existing developed areas are safe from future flood hazards. The priority at this time is to maintain components of the existing system. This requires periodic cleanout of the canals, maintenance of levees, and replacement of storm-water control structures as needed.

Within future development areas, the District will require modeling of drainage impacts and construction of appropriate improvements to mitigate flood hazards on- and off-site. This may require on-site detention ponds in some instances. It may also require specific on-site and peak-period improvements to the canal and weir system. No specific improvements have been identified at this time.