Water, Wastewater and Irrigation Impact Fee Update

Cape Coral, Florida

duncan associates

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EXECUTIVE SUMMARY

This study calculates maximum impact fees that the City of Cape Coral can charge based on the existing levels of service for its major potable water, wastewater and irrigation water facilities. The City's current impact fee schedules for water, wastewater and irrigation were last updated in April 2007 based on an impact fee analysis conducted in 2006.[1]

The maximum potential fees calculated in this report for the water and irrigation facilities for the two residential types and by nonresidential meter size are shown in Table 1. The City can charge less than 100 percent of the full amount, as long as the fees are reduced proportionately for all land uses and meter sizes. Note that the potable water impact fees for non-irrigation customers are higher than the combined potable water/irrigation water impact fee for irrigation customers.

Table 1
POTENTIAL WATER AND IRRIGATION IMPACT FEE SUMMARY

Land Use Type	Water Customers Only	Water & Irrigation Customers		
		Water	Irrigation	Both
Single-Family Detached	$3,808	$2,558	$955	$3,513
Multi-Family	$2,437	$1,637	$611	$2,248
Nonresidential, 5/8"x3/4" Meter	$3,808	$2,558	$955	$3,513
Nonresidential, 1" Meter	$9,520	$6,395	$2,388	$8,783
Nonresidential, 1-1/2" Meter	$19,040	$12,790	$4,775	$17,565
Nonresidential, 2" Meter	$30,464	$20,464	$7,640	$28,104
Nonresidential, 3" Meter	$60,928	$40,928	$15,280	$56,208
Nonresidential, 4" Meter	$95,200	$63,950	$23,875	$87,825
Nonresidential, 6" Meter	$190,400	$127,900	$47,750	$175,650
Nonresidential, 8" Meter	$304,640	$204,640	$76,400	$281,040
Nonresidential, 10" Meter	$437,920	$294,170	$109,825	$403,995
Nonresidential, 12' Meter	$590,240	$396,490	$148,025	$544,515

Source: Potential fees for water and irrigation facilities from Tables 22 and 36.

The maximum potential fees calculated in this report for wastewater facilities are shown in Table 2. The fees in District 2 include the costs for local facilities. In the event that developers in District 2 install local facilities, defined as force mains less than 10 inches in diameter and associated lift stations, they would receive credit for the cost of the improvements.

[1]Duncan Associates, *City of Cape Coral, Water, Wastewater and Irrigation Impact Fee Study*, October 2006

Table 2
POTENTIAL WASTEWATER IMPACT FEE SUMMARY

Land Use Type	District 1 (Major Facilities Only)	District 2		
		Major	Local	Total
Single-Family Detached	$2,549	$2,549	$991	$3,540
Multi-Family	$1,631	$1,631	$634	$2,265
Nonresidential, 5/8"x3/4" Meter	$2,549	$2,549	$991	$3,540
Nonresidential, 1" Meter	$6,372	$6,372	$2,478	$8,850
Nonresidential, 1-1/2" Meter	$12,743	$12,743	$4,957	$17,700
Nonresidential, 2" Meter	$20,389	$20,389	$7,931	$28,320
Nonresidential, 3" Meter	$40,778	$40,778	$15,861	$56,639
Nonresidential, 4" Meter	$63,715	$63,715	$24,783	$88,498
Nonresidential, 6" Meter	$127,430	$127,430	$49,566	$176,996
Nonresidential, 8" Meter	$203,888	$203,888	$79,306	$283,194
Nonresidential, 10" Meter	$293,090	$293,090	$114,002	$407,092
Nonresidential, 12' Meter	$378,895	$395,034	$153,655	$548,689

Source: Potential fees from Table 46.

The potential changes to Cape Coral's water, wastewater and irrigation impact fees are summarized in Table 3 for single-family units (the changes for nonresidential customers would be proportional). Water impact fees are going up by about 13 percent, irrigation fees are declining 15 percent, wastewater fees for major facilities are increasing 44 percent, and wastewater fees for local facilities are declining by 39 percent. In general, these changes can be explained by the fact that treatment plant costs have increased significantly since the 2006 study (wastewater treatment costs, for example, increased from $6.33 to $15.86 per gallon per day), while at the same time line costs have declined significantly (the cost for a 10-inch wastewater force main, for example, declined from $51 to $27 per linear foot). Consequently, irrigation fees and local wastewater facility fees will decline because they are comprised primarily of line costs, while water and major wastewater facility fees are increasing due to increasing treatment plant costs. The water treatment plant costs in this study reflect actual construction costs, while the plant costs used in the 2006 study were based on planning estimates. The wastewater plant costs represent the most recent cost estimates for the North Cape facility.

Overall, total utility impact fees for new irrigation customers would increase by 18 percent in District 1 and by 4 percent in District 2, as shown in Table 3. The increase for non-irrigation customers would be slightly higher in each district.

Table 3
POTENTIAL CHANGE IN SINGLE-FAMILY UTILITY IMPACT FEES

	Current Fee	Potential Fee	Potential Increase	Percent Increase
Water Fee for Non-Irrigation Customer	$3,361	$3,808	$447	13%
Water Fee for Irrigation Customer	$2,241	$2,558	$317	14%
Irrigation Fee	$1,120	$955	($165)	-15%
Combined Water and Irrigation Fee	$3,361	$3,513	$152	5%
Wastewater Fee, Major Facilities (Dist. 1 & 2)	$1,775	$2,549	$774	44%
Wastewater Fee, Local Facilities (Dist. 2 only)	$1,614	$991	($623)	-39%
Total Wastewater Fee, District 2	$3,389	$3,540	$151	4%
Total Utility Fee, District 1 (Irrigation Customer)	$5,136	$6,062	$926	18%
Total Utility Fee, District 2 (Irrigation Customer)	$6,750	$7,053	$303	4%
Total Utility Fee, District 1 (Non-Irrigation Customer)	$5,136	$6,357	$1,221	24%
Total Utility Fee, District 2 (Non-Irrigation Customer)	$6,750	$7,348	$598	9%

Source: Potential fees for water, wastewater and irrigation facilities from Tables 1 and 2; current fees from Cape Coral City Code, Article II, Division 2, Utility Capital Expansion Fee.

The potential fees for a single-family unit shown above are compared with average water and wastewater impact fees for single-family units adopted by other communities across the nation in Table 4. The City's combined potential utility fees are similar to the national average. These fees do not include local wastewater facility costs, which are typically installed by developers in other communities.

Table 4
COMPARATIVE FEES PER SINGLE-FAMILY UNIT

Facility	City of Cape Coral	US Average
Potable Water*	$2,558	$3,267
Irrigation Water	$955	n/a
Wastewater**	$2,549	$2,895
Total	$6,062	$6,162

* for irrigation water customer
** District 1, since comparison communities don't charge for local facilities
Source: Potential fees for City of Cape Coral from Table 3; national average fees from Duncan Associates survey of 284 communities, June 2008.

INTRODUCTION

The purpose of this project is to assist the City of Cape Coral in updating its existing impact fees for potable water, wastewater and irrigation water facilities.

Background

The purpose of this study is to update the City of Cape Coral's water, wastewater and irrigation impact fees. These impact fees were last updated in 2007 based on the 2006 impact fee study. At the time of the 2006 study, the potable water fee for a single-family unit using irrigation water was $1,714 ($2,571 without irrigation), the irrigation fee was $857 and the wastewater fee was $1,738. The study calculated a maximum single-family fee of $2,241 for water customers with irrigation ($3,361 without irrigation) and an irrigation fee of $1,120. For wastewater, the City established two separate service areas, District 1 and District 2. The study calculated a base wastewater fee for both districts of $1,775 with an additional $1,614 charged in District 2, which encompasses the new utility expansion areas where impact fees replaced assessments for local wastewater lines. The current fee schedule has been in effect since April, 2007.

Cape Coral is located on the Gulf of Mexico in southwest Florida. At 119 square miles, Cape Coral is the third largest city geographically in the state of Florida, and, based on 2006 population estimates, is the ninth largest city in population. The City of Cape Coral is unique in that it was virtually entirely platted prior to incorporation in 1970. The vast majority of the City was pre-platted into 5,000 square foot lots (10,000 square foot standard building sites) for residential development by the Gulf American Corporation, the original developers of Cape Coral. Today, the City is approximately half built-out, with the most extensive development in the southeastern part of the city.

Impact fees are most appropriate for communities experiencing growth. The City of Cape Coral has been one of the fastest growing cities in the country in recent years, according to the U.S. Census Bureau. The Cape grew 8.1 percent in the 12-month period ending July 1, 2006. This made Cape Coral the fourth fastest-growing city in the nation with more than 100,000 people during this time period.

Table 5
CITY AND COUNTY POPULATION GROWTH, 1990-2006

	Population				
Jurisdiction	1990	2000	2006	% of 2006 Population	Annual Growth
Cape Coral	74,991	102,286	151,389	26.5%	4.49%
Rest of Lee County	260,122	338,602	419,955	73.5%	3.04%
Total Lee County	335,113	440,888	571,344	100.0%	3.39%

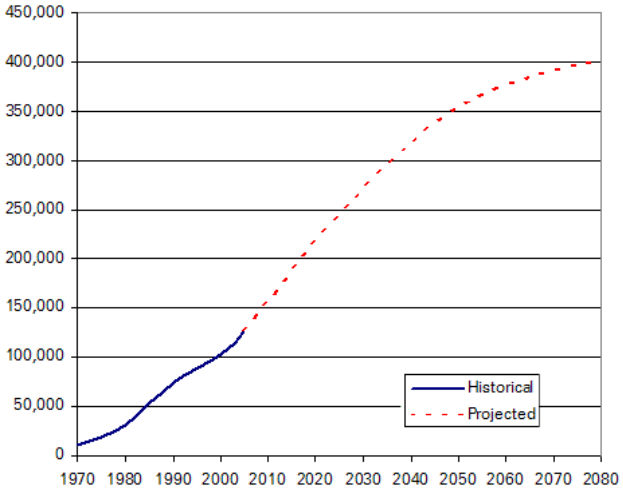
Source: 1990 and 2000 U.S. Census; 2006 data based on U.S. Census annual population estimate.

Cape Coral is likely to experience lower population growth in the short-term due to the real-estate and economic downturn. However, over the long-term the City is expected to grow to approximately 413,713 by 2080 according to the City's growth model (the City's anticipated build out year). Future

growth will not be linear, and the most rapid growth period will likely occur during the next 30 years, with a doubling of the current population by 2030 (see Figure 1 below).

When the City of Cape Coral was incorporated in 1970, the City did not own a water and wastewater system. At the time, water and wastewater services were provided through a privately owned system and through individual wells and holding tanks. The City purchased the water and wastewater system in 1975, and major water treatment plant and transmission line expansions were undertaken in 1980 and 1985. Currently, less than half of the City's land area and approximately three-quarters of the population are served with potable water, irrigation water and wastewater collection. Most of the area north of Pine Island road is currently not served by City-owned utilities.

Figure 1
CITY POPULATION GROWTH, 1970-2080



In recognition of the existing unmet demand for utility services and the City's rapid population growth, the City initiated a series of 5-year utility expansion programs. The first expansion program was completed in 2005. The current expansion program was developed to provide utility services to most of the areas south of Pine Island Road, and was originally scheduled to be completed in 2010.[2] Future expansion plans may be implemented to provide service to areas north of Pine Island Road. A detailed listing of utility projects included in the current five-year Capital Improvements Program (CIP) are shown in Table 47 of the Appendix. The need for additional capacity-expanding improvements to the water, wastewater and irrigation systems is demonstrated by the fact that the City plans to spend over $400 million dollars on capital projects over the next five years. The current utility expansion plan and existing service areas are shown in Figure 2.

As shown in Table 6, the City's water and wastewater impact fee revenue increased between 2001 and 2006. The irrigation fee was implemented in January 2005 and the local wastewater impact fee was implemented in April 2007. The revenue decline in 2007 reflects the deterioration of the residential real estate market and the subsequent decline in new construction.

[2]The current utility expansion program is based on MWH, *Facilities Planning Report for Cape Coral Water, Wastewater and Irrigation Facilities*, 2004.

Figure 2
UTILITY EXPANSION PLAN

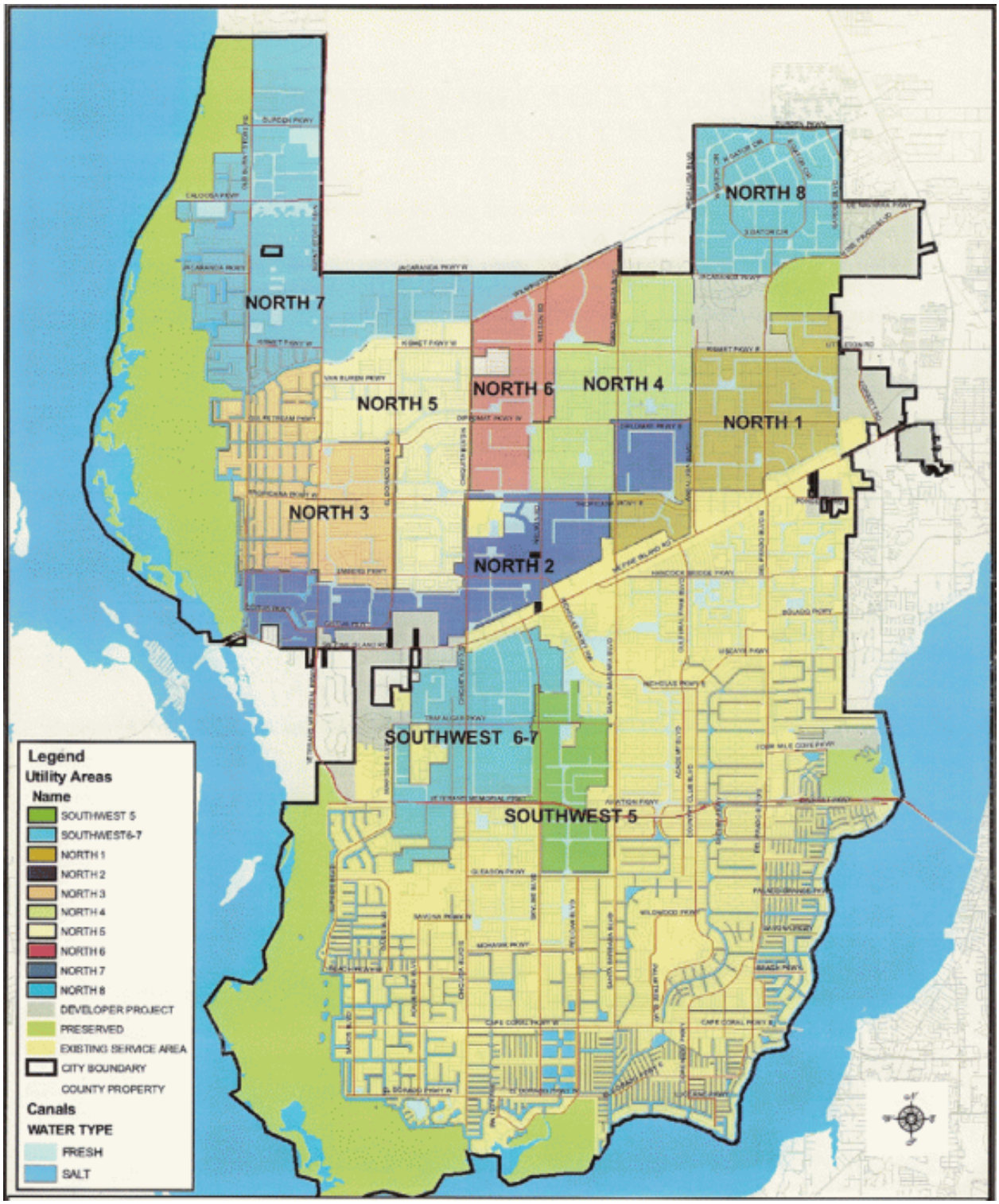


Table 6
WATER, WASTEWATER AND IRRIGATION IMPACT FEE REVENUE

FY Ending 9/30:	Water	Wastewater	Local Wastewater	Irrigation	Total Revenue
2001	$999,278	$2,525,568	n/a	n/a	$3,524,846
2002	$1,597,094	$2,799,110	n/a	n/a	$4,396,204
2003	$2,734,444	$4,837,036	n/a	n/a	$7,571,480
2004	$3,167,818	$5,432,123	n/a	n/a	$8,599,941
2005	$6,291,693	$7,355,034	n/a	$464,251	$14,110,978
2006	$5,979,666	$6,769,980	n/a	$1,356,913	$14,106,559
2007	$3,399,021	$5,868,177	$678,489	$1,115,207	$11,060,894

Source: City of Cape Coral Finance Department, July 7, 2008; total revenue adjusted to reflect refunds.

Legal Framework

Impact fees are charges that are assessed on new development to help pay for the capital facility costs they impose on the community. Unlike other types of developer exactions, impact fees are based on a standard formula and a pre-determined fee schedule. Essentially, impact fees require that each new residential or commercial project pay its pro-rata share of the cost of new facilities required to serve that development.

Since impact fees were pioneered in states like Florida that lacked specific enabling legislation, such fees have generally been legally defended as an exercise of local government's broad "police power" to protect the health, safety and welfare of the community. The courts have gradually developed guidelines for constitutionally valid impact fees, based on a "rational nexus" that must exist between the regulatory fee or exaction and the development activity that is being regulated.[3] The standards set by court cases generally require that an impact fee meet a two-part test:

1) The need for new facilities must be created by new development; and

2) The expenditure of impact fee revenues must provide benefit to the fee-paying development.

One of the most fundamental principles of impact fees, rooted in both case law and norms of equity, is that impact fees should not charge new development for a higher level of service than is provided to existing development. While impact fees can be based on a higher level of service than the one existing at the time of the adoption of the fees, two things are required if this is done. First, another source of funding other than impact fees must be identified and committed to fund the capacity deficiency created by the higher level of service. Second, the impact fees must generally be reduced to ensure that new development does not pay twice for the same level of service, once through impact fees and again

[3]There are six Florida cases that have guided the development of impact fees in the state: Contractors and Builders Association of Pinellas County v. City of Dunedin, 329 So.2d 314 (Fla. 1976); Hollywood, Inc. v. Broward County, 431 So.2d 606 (Fla. 1976); Home Builders and Contractors Association of Palm Beach County, Inc. v. Board of County Commissioners of Palm Beach County, 446 So.2d 140 (Fla. 4th DCA 1983); Seminole County v. City of Casselberry, 541 So.2d 666 (Fla. 5th DCA 1989); City of Ormond Beach v. County of Volusia, 535 So.2d 302 (Fla. 5th DCA 1988); and St. Johns County v. Northeast Florida Builders Association, 16 FLW S264 (April 18, 1991).

through general taxes that are used to remedy the capacity deficiency for existing development. In order to avoid these complications, our general practice is to base the impact fees on the existing level of service.

A corollary principle is that new development should not have to pay more than its proportionate share when multiple sources of payment are considered (this is often referred to as "paying twice"). As noted above, if impact fees are based on a higher-than-existing level of service, the fees should be reduced by a credit that accounts for the contribution of new development toward remedying the existing deficiencies. A similar situation arises when the existing level of service has not been fully paid by the municipality. Outstanding debt on existing facilities that are counted in the existing level of service will be retired, in part, by revenues generated from new development. Given that new development will pay impact fees to provide the existing level of service for itself, the fact that new development will also be paying for the facilities that provide that level of service for existing development amounts to paying more than its proportionate share. Consequently, impact fees should be reduced to account for future tax payments that will retire outstanding debt on existing facilities; however, the City's utility-related general obligation debt was retired in 2005.

The issue is less clear-cut when it comes to other types of revenue that may be used to make capacity-expanding capital improvements of the same type being funded by impact fees. Arguably, no credit is warranted, since, while new development may contribute toward such funding, so does existing development, and both existing and new development benefit from the higher level of service that the additional funding makes possible. For the facilities under consideration in this study, the only other significant source of revenue available to fund capacity-expanding improvements is utility rate revenue. The impact fees calculated in this report are sufficient to provide new development with the same level of service that existing development has already fully paid for. Any additional rate revenue spent on capacity-expanding improvements will increase the level of service for both existing and new development. Most of this rate revenue will come from existing customers, but some will come from new customers. However, both existing and new customers will benefit from the enhanced level of service. Consequently, no revenue credits are warranted for utility rate revenue, other than that used to retire outstanding debt for facilities included in the impact fee calculation.

The 2006 Florida Legislature passed Senate Bill 1194, which establishes certain requirements for impact fees in Florida, which became effective on June 14, 2006. For the most part, the new law established administrative and procedural requirements. The only substantive requirement that has a bearing on this study is that the impact fee must "be based on the most recent and localized data." A variety of recent, local data have been gathered to be used in the impact fee calculations. The three major inputs into the formula are the number of Equivalent Residential Units (ERUs) associated with the new customer, the cost per ERU and the revenue credit per ERU. The number of ERUs associated with a dwelling unit or nonresidential meter has been based on 2007 water consumption patterns derived from City billing records. The facility cost per ERU has been based on recent and planned project costs from current local planning documents (the City of Cape Coral's adopted *2008-2012 Capital Improvements Program* and draft *2009-2013 Capital Improvements Program*) with inventory and usage information derived from the most recent annual customer billing reports and the annual water and wastewater reports. The revenue credit per ERU has been based on current outstanding debt related to the utilized portion of existing facilities and a credit for past general obligation debt based on historic data. In sum, this report complies with the substantive requirements of the *Florida Impact Fee Act*.

WATER

The City's water facilities include 33 raw water supply wells, 24 miles of raw transmission mains, the Southwest Reverse Osmosis Water Treatment Plant with a capacity of 18.1 million gallons per day (mgd), a brine disposal system, two storage and re-pump stations, and 732 miles of potable water mains.[4] The water treatment plant is located in the southwest part of the city, and currently serves the entire city. The City recently brought online seven new water supply wells and completed the expansion of the Southwest Treatment Plant, which expanded the plant's capacity by 3.1 mgd to 18.1 mgd. The City is also constructing a new 12-mgd water treatment plant and wellfield in the north part of the city that is scheduled to be completed in 2009. Most of the future growth in demand for potable water will be met by the North Cape Reverse Osmosis Water Treatment Plant, which is planned for an ultimate capacity of 36 mgd.

The City of Cape Coral experiences its heaviest potable water use during the winter months, when the City's seasonal population reaches its peak and its driest weather occurs, resulting in increased water demand for landscape watering from non-irrigation customers. The City currently charges new water customers a water impact fee that is based on the replacement cost of the existing system as calculated in the 2006 impact fee update. In this update, the water impact fees will be based on the most recent replacement cost data from the draft 2009-13 Capital Improvement Plan and the most recent costs for water projects in the facility expansion program.

Service Area and Benefit District

An impact fee service area is a geographic area subject to a single, uniform impact fee schedule. A benefit district is a geographic area, often a subarea of a service area, in which fees collected are earmarked to be spent. Water impact fees will be assessed only on existing or new development that connects to the City's potable water system. The potable water system is an integrated, pressurized system that provides a relatively uniform level of service from centralized facilities. It is recommended that the City's entire jurisdiction should continue to be treated as a single impact fee service area and benefit district.

Service Unit

To calculate water impact fees, the water demand associated with different types of customers must be expressed in a common unit of measurement, called a "service unit." This can be accomplished by developing factors that convert customer rate codes and daily consumption per rate code into multiples of an equivalent single-family residential unit. An Equivalent Residential Unit, or ERU, is a common denominator that converts all classes of customers into a common unit of expression. An ERU is the water demand associated with a typical single-family residence.

[4] Tetra Tech, *City of Cape Coral Water and Wastewater Annual Report Fiscal Year 2006*, August 2007.

Water impact fees for new residential customers will be charged on a per dwelling unit basis, with the fee based on the anticipated water demand compared to a typical single-family home. For nonresidential uses, water and wastewater impact fees are almost universally charged based on the size of the water meter, irrespective of land use. Table 7 is the recommended equivalency table, showing the capacity of water meters of various sizes and the equivalency factors. This is the same equivalency table used in the City's current utility impact fees.

Table 7
METER EQUIVALENCY FACTORS

Meter Size	Capacity (gpm)	ERUs/ Meter
5/8" x 3/4" Meter	10	1.0
1" Meter	25	2.5
1-1/2" Meter	50	5.0
2" Meter	80	8.0
3" Meter	160	16.0
4" Meter	250	25.0
6" Meter	500	50.0
8" Meter	800	80.0
10" Meter	1,150	115.0
12" Meter	1,550	155.0

Source: Midrange of normal operating flow rates in gallons per minute for simple (less than 3"), compound (3-8") and turbine (10-12") meters from American Water Works Association, AWWA Standards C700-95, C702-01, C701-88.

Customarily, the number of existing water ERUs is based on the number of water customers by meter size. However, the City does not have data on water customers by water meter size. The data that are available are the total number of water customers by account type (residential, residential/commercial, duplex, multi-family, commercial and municipal accounts). Consequently, the number of existing water service units can be estimated by (1) determining average daily consumption (gallons per day or gpd) for each customer type, (2) establishing the ratio of daily consumption for other customers to single-family customers, and (3) multiplying the ratios by total customer accounts for each category to determine the ERUs for water.

The average annual daily consumption for major customer types from customer billing data will be utilized in this study to determine the ratio of use between different customer classes. Based on production and customer data, the *2006 Annual Report* found that customer billing accounts for about 86 percent of the production, with 14 percent un-billed water. Over the past few years the City has greatly reduced the share of water that was unaccounted for through a program that replaces service lateral piping, tracking water mains and service line leaks, monthly reporting of water consumption and the purchase of leak detection equipment. The current level of un-billed water is within the American Water Works Association acceptable standards.[5]

[5]Tetra Tech, *City of Cape Coral Water and Wastewater Annual Report Fiscal Year 2006*, August 2007, p. 3-13.

As shown in Table 8, the average annual billable consumption for single-family customers is 154 gpd, which equates to a per-capita consumption of approximately 64 gpd based on average single-family household size of 2.42 for Cape Coral in the 2000 Census. The average water consumption rate per household reflects the City's water conservation efforts through its use of a separate irrigation water source. Based on customer billing information, approximately 77 percent of water customers utilize the City's separate irrigation water system.

Table 8
AVERAGE WATER CONSUMPTION

	Single-Family	Multi-Family	Commercial
Gallons Billed, January-December 2007	2,327,344,700	524,221,100	439,812,500
Average Res. Units/Non-Resid. Meters, 2007	41,517	14,656	2,022
Average Daily Demand (gpd)	154	98	596

Source: Cape Coral Utilities, "End of Month Report for Assessment, Lot Mowing, Stormwater, Solid Waste Management, and Utilities, January 2007 to December 2007."

The ratio of daily consumption for other customer classes to single-family customers is based on the average daily consumption for each customer type. As shown in Table 9, the City currently serves approximately 58,907 water ERUs.

Table 9
EXISTING WATER SERVICE UNITS

Customer Type	Utility Customers 12/2007	Gallons per Day (gpd)	Ratio to Single-Family	Equivalent Residential Units
Single Family	41,757	154	1.00	41,757
Multi-Family Units	14,267	98	0.64	9,131
Commercial	2,072	596	3.87	8,019
Total	58,096			58,907

Source: December 2007 utility accounts (dwelling units for residential and meters for commercial) from Cape Coral Utilities, "End of Month Report for Assessment, Lot Mowing, Stormwater, Solid Waste Management, and Utilities, January 2007 to December 2007;" gallons per day from Table 8.

Cost per Service Unit

As discussed in the introduction, the method utilized in determining the impact fee assumes that the existing system of facilities will need to be expanded proportional to growth in the customer base. Since growth cannot be served with older, depreciated facilities, but instead will require new facilities, it is appropriate to base the fees on the replacement cost of existing facilities, adjusted to reflect existing debt.

The City plans to complete construction of a new 12-mgd water treatment plant in northern Cape Coral in 2009. This project includes a new well-field in the northern part of the city with 22 wells and 11 miles of pipeline for raw water transmission. Similar to the existing plant, the new facility is designed to accommodate future expansion and utilizes the reverse osmosis water treatment process.

As shown in Table 10, the cost of the North Cape Coral water treatment facility provides the basis for determining the cost per gallon for the existing water treatment plant. The new plant costs include design, engineering, testing and construction. The property acquisition cost for the site was $25 million, which is split evenly between the water treatment plant and the wastewater plant since both facilities will occupy the site. Based on the new plant cost of $8.86 per gallon and the existing water treatment capacity, the current treatment plant replacement value is an estimated $160.4 million.

Table 10
WATER TREATMENT PLANT COST

North Cape Water Treatment Plant Cost	$90,204,241
North Cape Water Treatment Design Cost	$3,566,654
North Cape Water Treatment Plant Land Cost	$12,500,000
Total North Cape Water Treatment Plant Cost	$106,270,895
Capacity (mgd)	12,000,000
Cost per Gallon	$8.86
Existing SW Water Treatment Plant Capacity (mgd)	18,100,000
Existing SW Water Treatment Plant Replacement Cost	$160,366,000

Source: Water treatment plant cost from City of Cape Coral Finance Department, July 7, 2008; land cost from City of Cape Coral Finance Department, April 25, 2006; existing and new treatment plant planned capacity based on MWH, *Facilities Planning Report for Cape Coral Water, Wastewater and Irrigation Facilities,* 2004.

As part of the current expansion, the City has undertaken the construction of additional raw water wells. The new wells have a design capacity of 600 gallons per minute (gpm), which is slightly higher than the average capacity of 550 gpm of the City's existing wells. The current CIP includes the design and construction of a new well-field with 22 wells and transmission piping to provide raw water to the new North Cape Coral water treatment plant. Based on the cost of new wells and supporting infrastructure such as land, electrical supply and associated transmission lines for raw water, as well as the capacity of the wells, the value of the existing wells is an estimated $53.1 million as shown in Table 11.

Table 11
WATER WELL COST

Wellfield, Generators and Transmission	$28,550,953
Deep Injection Well	$10,100,000
Planned North Cape Coral Well-Field Cost	$38,650,953
Capacity of Planned Wells (22 x 600 gpm)	13,200
Cost per gpm	$2,928
Capacity of Existing Wells (33 x 550 gpm)	18,150
Existing Well Replacement Cost	$53,143,200

Source: Well-field cost from City of Cape Coral Finance Department, July 12, 2008; existing and new well inventory based on data from Tetra Tech, *Water and Wastewater Annual Report, Fiscal Year 2006*, 2007 and City of Cape Coral Finance Department.

In addition to the water treatment plant and wells, the City's existing water system includes a significant investment in transmission lines. The per-foot costs exclude water meters and hydrants, which are typically funded through a separate assessment charged to developers and existing land owners. The line costs include aerial crossings and raw water crossings. The City is primarily responsible for installation of water lines that are 10 inches in diameter or larger. If a developer is required to provide a 10-inch or larger water line, a credit would need to be provided for those improvements. The replacement cost of the City's share of the water transmission system is about $58 million, as shown in Table 12.

Table 12
WATER TRANSMISSION COST

Transmission Facility	Unit	Quantity	Replacement Cost/Unit	Replacement Cost
10" Pipe	Linear Feet	200,696	$30.69	$6,159,360
12" Pipe	Linear Feet	439,486	$41.27	$18,137,587
16" Pipe	Linear Feet	108,991	$65.00	$7,084,415
18" Pipe	Linear Feet	13,982	$69.00	$964,758
20" Pipe	Linear Feet	75,855	$77.00	$5,840,835
24" Pipe	Linear Feet	56,057	$92.00	$5,157,244
30" Pipe	Linear Feet	48,336	$124.84	$6,034,266
36" Pipe	Linear Feet	21,059	$166.17	$3,499,374
Subtotal, Water Lines				$52,877,839
Aerial Crossing	Each	56	$75,946	$4,252,976
Raw Water Crossing	Each	4	$136,548	$546,192
Total Transmission Cost				$57,677,007

Source: Water transmission facilities and replacement cost per unit from City of Cape Coral, July 11, 2008; replacement cost based on recent project bids and City Engineer's estimates.

The water distribution network includes a number of valves to control water flow. As shown in Table 13, the total value of the City's water valves is $3.1 million.

Table 13
WATER VALVE COST

Valve Size (inches)	Quantity	Replacement Cost/Unit	Replacement Cost
10" Gate	266	$1,658	$441,028
12" Gate	504	$2,381	$1,200,024
12" Butterfly	105	$1,670	$175,350
16" Butterfly	107	$3,000	$321,000
18" Butterfly	9	$4,410	$39,690
20" Butterfly	48	$5,820	$279,360
24" Butterfly	35	$6,440	$225,400
30" Butterfly	23	$8,904	$204,792
36" Butterfly	14	$13,130	$183,820
Total			$3,070,464

Source: Valve quantity and replacement cost from City of Cape Coral, July 8, 2008; replacement cost based on recent project bids and City Engineer's estimates.

Finally, the City maintains two storage and re-pump stations for water. The total capacity of the pumps at these two sites are 8,000 gpm, and the sites also have a combined three million gallons (mg) of tank storage capacity. The pumps are provided emergency backup power by an onsite gas or diesel backup generator. As shown in Table 14, the value of the land and equipment related to these facilities is $4.6 million.

Table 14
WATER STORAGE AND REPUMP COST

Palm Tree Storage and Repump Facility	$2,136,482
Land	$675,000
Subtotal, Palm Tree Facility	$2,811,482
Van Loon Storage and Repump Facility	$1,068,241
Land	$675,000
Subtotal, Van Loon Facility	$1,743,241
Total, Storage and Repump Facilities	$4,554,723

Source: City of Cape Coral Finance Department and City of Cape Coral Engineer, April 25, 2006; construction cost adjusted by *Engineering News Record* (ENR) Construction Cost Index (CCI) for July 2008.

Since the existing treatment plant and water wells do not currently operate at full capacity, the capital cost to serve existing customers is somewhat less than the full cost of the facility. To take this into account, the value of the water treatment plant and well system is adjusted to reflect the utilized capacity. The utilized capacity is based on actual water production, since water production data includes all water demand components such as line flushing and fire department use.

The ratio of maximum day to average day demand is a critical component of water utility planning. Water facilities must be designed to accommodate peak day (and in some cases peak hour) demand. The City's utility master plan uses a peaking factor of 1.20, based on recent demand trends. Based on the annual average daily demand for 2007 from the draft *2007 Water and Wastewater Annual Report*, current maximum day demand is estimated to be 13.22 mgd. This indicates that existing customers utilize 73 percent of the 18.1 mgd capacity of the Southwest Reverse Osmosis Water Treatment Plant, as shown in Table 15. This utilization ratio will be used for other types of water facilities as well.

Table 15
WATER TREATMENT DEMAND AND CAPACITY

Year	Avg. Day Demand (mgd)	Peaking Factor	Max. Day Demand (mgd)
2001	8.40	1.20	10.08
2002	8.70	1.20	10.44
2003	9.20	1.20	11.04
2004	10.03	1.20	12.04
2005	11.30	1.20	13.56
2006	11.48	1.20	13.78
2007	11.02	1.20	13.22
SW Water Treatment Plant Capacity (mgd)			18.10
Utilization Ratio, 2007			73%

Source: Average day water production from 2001 to 2005 and peaking factor from MWH, *Facilities Planning Report for Cape Coral Water, Wastewater and Irrigation Facilities*, 2004, Appendix Tables 1.2 and 1.3; 2006 data from 2006 annual report; 2007 data from Tetra Tech, *Draft 2007 Water and Wastewater Annual Report*, 2008.

As shown in Table 16, the portion of the water treatment facilities that serves existing customer demand has a replacement value of about $204 million.

Table 16
ADJUSTED WATER TREATMENT FACILITY COST

Facility Type	Replacement Cost	Utilization Ratio	Utilized Cost
Treatment Plant	$160,366,000	73%	$117,067,180
Wells	$53,143,200	73%	$38,794,536
Water Line	$57,677,007	73%	$42,104,215
Water Valves	$3,070,464	73%	$2,241,439
Water Storage and Re-pump	$4,554,723	73%	$3,324,948
Total Utilized Cost			$203,532,318

Source: Treatment plant replacement cost from Table 10; well replacement cost from Table 11; water line replacement cost from Table 12; water valve cost from Table 13; storage tank and re-pump cost from Table 14; utilization ratio from Table 15.

The water system cost per service unit is determined based on the system's utilized replacement cost and the current estimated service units. As shown in Table 17, dividing the replacement cost of existing utilized water facilities by existing service units results in a water cost of $3,455 per ERU.

Table 17
WATER COST PER SERVICE UNIT

Water System Utilized Replacement Cost	$203,532,318
Water Equivalent Residential Units (ERUs)	58,907
Cost per Equivalent Residential Unit (ERU)	$3,455

Source: Water system replacement cost from Table 16; water ERUs from Table 9.

Net Cost per Service Unit

A reduction of impact fees to provide a credit for future funding to be generated by new development is required for outstanding debt on existing water facilities that have been counted in the existing level of service. The City has utilized revenue bonds and State of Florida revolving loan fund notes payable for water system expansion and capital facilities. The water system debt includes four outstanding revenue bond issues and two notes.

Based on an analysis of the original debt issues, only one of the outstanding revenue bond issues is related to the utilized water facility capacity utilized in calculating the water cost per service unit. The Series 2003 bond was issued to refund a 1993 refunding bond that was issued to refund the 1986 bond issue that was originally utilized to fund the construction of the water treatment plant expansion in 1985.

The Series 2006 bond was issued to fund water, wastewater and irrigation system expansion, including the expansion of the Southwest treatment plant and wellheads. The expansion of the plant and additional wellheads increased the City's capacity to provide water, which resulted in a decrease in the utilization ratio from 95 percent utilized in the 2006 impact fee update to 73 percent used in this update. Since the additional capacity related to the portion of the expansion of the Southwest plant and water wells, a credit for the water plant's $11.2 million share of the of the outstanding $186.0 million loan balance is not necessary in this update.

As shown in Table 18, the total outstanding debt on the existing water treatment facilities is approximately $11.0 million, which results in a debt credit of $186 per ERU.

Table 18
WATER FACILITY DEBT CREDIT

Series 2003 Water Revenue Bond	$10,970,000
Water Equivalent Residential Units (ERUs)	58,907
Debt Credit per ERU	$186

Source: Outstanding debt based on principal balance for FY 2008 from the City of Cape Coral, *FY 2007-08 Annual Operating Budget*; water ERUs from Table 9.

Normally, debt credit is provided only for outstanding debt at the time of calculation of water impact fees. However, water impact fees for Cape Coral are somewhat unique for two reasons. First, the debt that the City issued for the original purchase of the water system in 1975 was general obligation (GO)

bond debt that was retired with property taxes, meaning that all property owners contributed toward the purchase of the system, regardless of whether they were water customers and regardless of whether their property was developed or not. Second, many of the new customers to the City's water system are not occupying newly-constructed buildings, but existing homes or businesses that are only now being connected to the utility system. These existing developments have been paying substantial property taxes used for the purchase of the water system, and these past payments should be taken into consideration in calculating an appropriate impact fee.

In calculating a credit for past debt service payments, credit will be provided only for payments used to retire principal, not for interest payments. This is done to be consistent with the cost analysis, which does not include any interest costs associated with debt financing.

Because of the time that has elapsed, it is not possible to determine the precise amount of the original $23.1 million GO bond issue that was used to purchase the water and wastewater systems that was attributable to each facility. However, it is estimated, based on the relative sizes of the treatment plants (2 mgd water plant and 1.3 mgd wastewater plant) that 60.6 percent of the bond issue was used to purchase the water system and the remainder was used to purchase the wastewater system.

The original GO bond issue was refunded in 1978, 1984 and 1988. The last refunding issue was retired in fiscal year 2005. While most buildings connecting to the City's water system were not in existence when the GO debt payments began in 1976, some were. More were in existence since 1994, when the bulk of the principal began to be repaid. Newer units would have paid less, but the credit is calculated for the worst case, which is units that were in existence when the debt was incurred. Consequently, the past property tax credit is larger than it needs to be for most units.

The past property tax credit is calculated by dividing the amount of the principal payment made in each year by the total assessed property value to determine the equivalent millage rate (dollar payment per $1,000 of assessed value). This is then multiplied by the average assessed value of a single-family detached dwelling unit for that year to determine the payment per unit. Finally, the original payment amount is multiplied by an inflation factor to determine the annual payment in current dollars. The annual current value of the payments are summed to yield the total past payment in current dollars. The result is a past property tax credit of $427 per service unit, as shown in Table 19.

Table 19
WATER PAST PROPERTY TAX CREDIT

Year	Principal Payment	Total Assessed Property Value	Millage Rate	Avg. Unit Value	Original Payment	CPI Index	Current Value
1976	$90,900	$450,087,800	0.202	$19,426	$3.92	3.807	$15
1977	$121,200	$493,191,360	0.246	$21,369	$5.26	3.575	$19
1978	$121,200	$624,768,650	0.194	$23,505	$4.56	3.323	$15
1979	$0	$663,812,070	0.000	$25,856	$0.00	2.984	$0
1980	$0	$854,563,660	0.000	$28,442	$0.00	2.629	$0
1981	$0	$1,406,192,215	0.000	$31,286	$0.00	2.383	$0
1982	$0	$1,417,002,770	0.000	$34,414	$0.00	2.245	$0
1983	$0	$1,388,802,680	0.000	$38,856	$0.00	2.175	$0
1984	$0	$1,449,805,390	0.000	$38,613	$0.00	2.085	$0
1985	$0	$1,768,771,700	0.000	$39,385	$0.00	2.013	$0
1986	$0	$1,776,412,210	0.000	$40,173	$0.00	1.977	$0
1987	$0	$1,854,114,670	0.000	$40,977	$0.00	1.907	$0
1988	$0	$1,985,559,150	0.000	$41,796	$0.00	1.831	$0
1989	$0	$2,167,011,280	0.000	$44,928	$0.00	1.747	$0
1990	$0	$2,524,729,550	0.000	$48,295	$0.00	1.657	$0
1991	$0	$3,115,727,790	0.000	$51,914	$0.00	1.591	$0
1992	$0	$3,538,357,790	0.000	$55,805	$0.00	1.544	$0
1993	$0	$3,535,576,040	0.000	$59,987	$0.00	1.499	$0
1994	$821,045	$3,561,885,230	0.231	$64,483	$14.90	1.462	$22
1995	$1,185,853	$3,601,126,430	0.329	$69,316	$22.80	1.421	$32
1996	$1,271,328	$3,648,079,090	0.348	$74,511	$25.93	1.381	$36
1997	$1,368,508	$3,632,010,230	0.377	$80,095	$30.20	1.350	$41
1998	$1,497,454	$3,638,777,570	0.412	$86,098	$35.47	1.329	$47
1999	$1,623,370	$3,742,215,220	0.434	$92,551	$40.17	1.300	$52
2000	$1,784,082	$3,932,332,640	0.454	$99,487	$45.17	1.258	$57
2001	$796,980	$4,237,777,910	0.188	$106,943	$20.11	1.223	$25
2002	$822,710	$4,714,588,660	0.175	$114,958	$20.12	1.204	$24
2003	$781,159	$5,608,534,540	0.139	$123,574	$17.18	1.177	$20
2004	$814,517	$7,300,200,110	0.112	$132,835	$14.88	1.147	$17
2005	$308,822	$9,428,023,860	0.033	$142,791	$4.71	1.109	$5
2006	$22,211	$14,165,306,480	0.002	$153,492	$0.31	1.075	$0
Total	$13,431,339						$427

Source: "Principal Payment" is portion of debt service payments that is attributable to retiring principal associated with 60.6% of the 1975 General Obligation Water and Sewer Bonds, including the 1978, 1984 and 1988 refunding issues; total assessed property value from City of Cape Coral Management/Budget Administrator, June 22, 2006; "Millage Rate" is principal payment per $1000 of assessed value; "Avg Unit Value" is the average assessed value of a single-family detached unit (1976-1988 from Camp Dresser & McKee Inc., July 25, 1988 letter to City Attorney William M. Powell; 1989-2006 based on 7.49% annual growth from 1988-2005 and 2005 value from Management/Budget Administrator, June 22, 2006; "CPI Index" is inflation factor based on US Bureau of Labor Statistics, Consumer Price Index, All Items, All Urban Customers, May 2008.

Reducing the cost per service unit by the amounts of the credits for outstanding revenue bond debt and past payments of general obligation bond debt principal results in a net cost of $2,842 per ERU, as shown in Table 20.

Table 20
WATER NET COST PER SERVICE UNIT

Utilized Water Facility Cost per ERU	$3,455
Outstanding Debt Credit per ERU	$186
Past Property Tax Credit per ERU	$427
Net Cost per Equivalent Residential Unit (ERU)	$2,842

Source: Adjusted water treatment facility cost from Table 17; debt credit from Table 18; past property tax credit from Table 19.

Maximum Fee Schedule

The City's current water impact fee is structured to account for lower potable water demand per service unit as the result of the City's irrigation water service. For new customers who do not connect to the irrigation system, the fee is fifty percent higher. The basis for the increased fee for non-irrigation customers is a 2004 water use study that found non-irrigation customers in Cape Coral utilize an estimated fifty percent more potable water than irrigation customers, because they use potable water for landscape watering.

The net cost per ERU calculated in Table 20 above is based on the average consumption of 154 gpd per single-family equivalent customer. Water utility customer billing records from December 2007 show that 77 percent of water customers also utilize irrigation water. The 23 percent of customers that do not utilize irrigation water distort the total water use per ERU. As a result, the net cost per ERU needs to be adjusted for both irrigation and non-irrigation water users to reflect their relative potable water use.

The water demand related to irrigation and non-irrigation customers can be determined from the average overall water consumption per ERU based on the systemwide share of irrigation and non-irrigation customers. As shown in Table 21, the adjusted demand of 207 gpd for non-irrigation customers is 50 percent higher than the adjusted demand of 138 gpd for irrigation customers. When the adjusted demand is compared with average system-wide consumption of 154 gpd per single-family equivalent customer, irrigation water customers utilize 90 percent of the overall average water consumption per ERU, while non-irrigation water customers utilize 134 percent. Based on the adjusted average demand, the adjusted net cost per ERU is $2,558 for irrigation water customers and $3,808 for non-irrigation water customers.

Table 21
WATER NET COST ADJUSTMENT

Customer Type	Avg. Demand per ERU (gpd)	Adjusted Demand (gpd)	% of Avg. Demand/ERU	Net Cost per ERU	Adj. Net Cost per ERU
Irrigation	154	138	90%	$2,842	$2,558
Non-irrigation	154	207	134%	$2,842	$3,808

Source: Total demand per ERU from Table 1; adjusted average demand based on 77% of customers utilizing irrigation water from December 2007 customer billing data and the fact that non-irrigation water users consume 50% more potable water than irrigation water customers from Tetra Tech/Hartman & Associates, Inc., *City of Cape Coral, Water and Wastewater Impact Fee Study*, September 2004; net cost per ERU from Table 20.

The maximum water impact fees that may be charged by the City of Cape Coral for potable water service, with and without irrigation water service, are shown in Table 22.

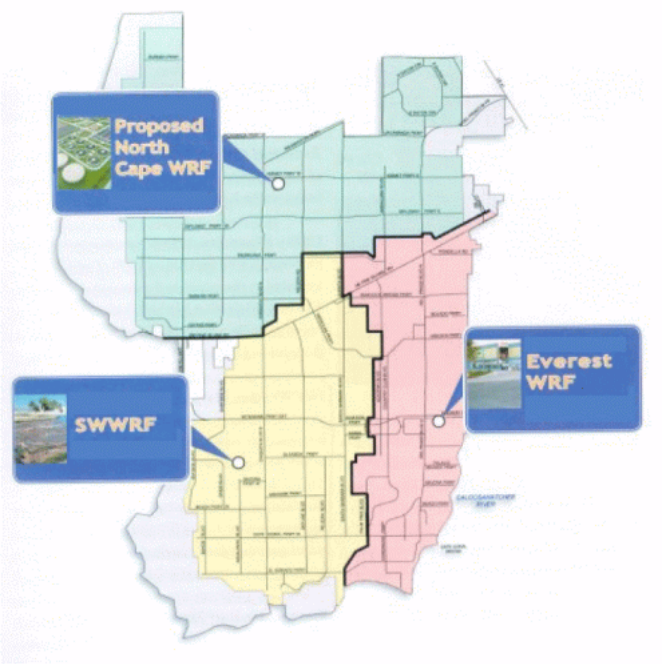
Table 22
WATER NET COST SCHEDULE

		Irrigation Customers		Non-Irrigation Customers	
Housing Type/Meter Size	ERUs/Unit or Meter	Net Cost/ ERU	Net Cost/ Unit or Meter	Net Cost/ ERU	Net Cost/ Unit or Meter
Single-Family Detached	1.00	$2,558	$2,558	$3,808	$3,808
Multi-Family	0.64	$2,558	$1,637	$3,808	$2,437
Nonresidential, 5/8" x 3/4" Meter	1.00	$2,558	$2,558	$3,808	$3,808
Nonresidential, 1" Meter	2.50	$2,558	$6,395	$3,808	$9,520
Nonresidential, 1-1/2" Meter	5.00	$2,558	$12,790	$3,808	$19,040
Nonresidential, 2" Meter	8.00	$2,558	$20,464	$3,808	$30,464
Nonresidential, 3" Meter	16.00	$2,558	$40,928	$3,808	$60,928
Nonresidential, 4" Meter	25.00	$2,558	$63,950	$3,808	$95,200
Nonresidential, 6" Meter	50.00	$2,558	$127,900	$3,808	$190,400
Nonresidential, 8" Meter	80.00	$2,558	$204,640	$3,808	$304,640
Nonresidential, 10" Meter	115.00	$2,558	$294,170	$3,808	$437,920
Nonresidential, 12' Meter	155.00	$2,558	$396,490	$3,808	$590,240

Source: Residential ERUs per unit from Table 9; nonresidential ERUs per meter from Table 7; net cost per ERU is adjusted net cost from Table 21.

WASTEWATER

The City of Cape Coral's wastewater system consists of gravity sewer mains, wastewater lift stations, force mains and two treatment plants. The treatment facilities consist of the Everest Parkway Facility and Southwest Water Reclamation Facility. The combined total permitted treatment capacity of the two facilities is 20.0 mgd with the recently completed 4.9 mgd expansion at Everest Parkway. Treated effluent from both wastewater treatment facilities is distributed through a reuse system for irrigation water.



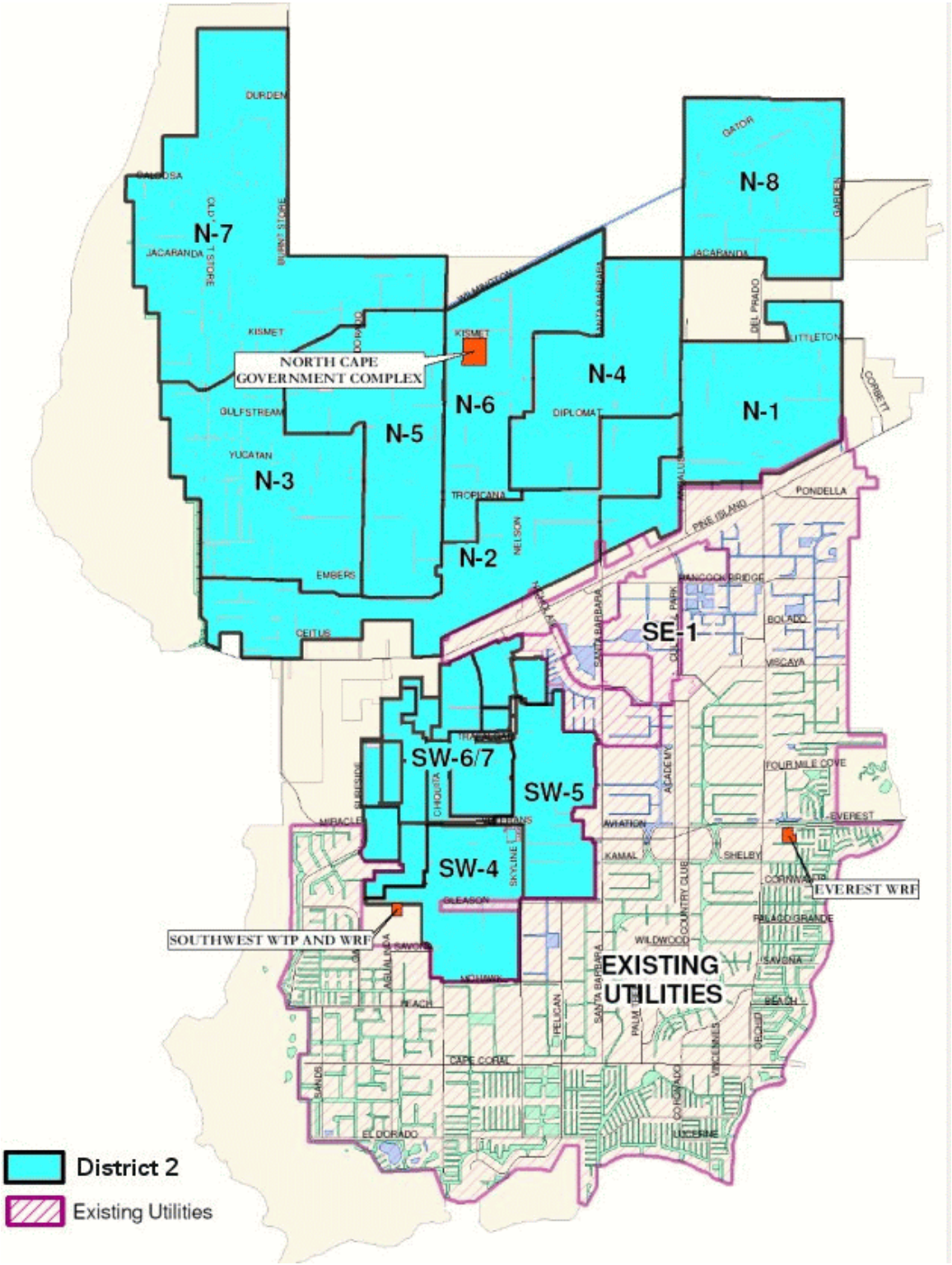
The existing plants generally serve the area south of Pine Island Road. The area currently served by wastewater is less than that served by potable water. As with water, most areas north of Pine Island Road are not yet served by City wastewater collection. However, the City is planning to construct a new North Cape Water Reclamation Facility in the northern part of the city, which will provide wastewater service to most of the area north of Pine Island Road. The City plans to start construction of the North Cape facility in 2015.

Service Areas and Benefit Districts

An impact fee service area is a geographic area subject to a single, uniform impact fee schedule. A benefit district is a geographic area, often a subarea of a service area, in which fees collected are earmarked to be spent. Wastewater impact fees will be assessed only on existing or new development that connects to the City's wastewater system. While the two existing treatment plants primarily serve different areas, wastewater can be transferred between them to take advantage of available capacity. The wastewater system provides a relatively uniform level of service to all its customers. It is recommended that the City's entire jurisdiction should continue to be treated as a single wastewater impact fee service area and benefit district for the purpose of major wastewater facilities.

The local wastewater impact fee is charged in wastewater District 2, which includes the utility expansion areas SW 4, SW 5 and SW 6/7, and all of the utility expansion areas north of Pine Island Road (see Figure 4 on next page). In this area, the City charges a higher wastewater impact fee that includes local facility costs. The local facilities included in the impact fee include pump stations and force mains of less than 10 inches in diameter. Prior to April 2007, local facilities were not included in the impact fee and such facilities were funded through assessments on existing property owners. Some areas not currently served with City wastewater are not included in District 2, in these areas the City will continue to fund the local force mains and lift stations through assessments.

Figure 4
WASTEWATER DISTRICT 2



Service Unit

As with the water impact fee calculation, the wastewater demand associated with different types of customers must be expressed in a common unit of measurement, called a "service unit." This can be accomplished by developing factors that convert customer rate codes and daily consumption per rate code into multiples of an equivalent single-family residential unit or ERU. An ERU is a common denominator that converts all classes of customers into a common unit of expression. An ERU is the wastewater demand associated with a typical single-family residence.

For nonresidential uses, wastewater impact fees are almost universally charged based on the size of the water meter, irrespective of land use. The meter equivalency factors for wastewater are the same as those for water shown in Table 7.

Approximately 95 percent of the City's water customers utilize wastewater services, with the remainder utilizing private wastewater treatment facilities. As a result, the total number of wastewater ERUs is not the same as water ERUs.

Unlike potable water consumption, wastewater generation is not typically metered. Instead, wastewater demand is based on water use under the assumption that most water consumption returns to the wastewater treatment plant; this is particularly true for a city like Cape Coral that has a separate water source for irrigation.

The ratio of daily consumption for other customer classes to single-family customers is based on the average daily water consumption for each customer type. As shown in Table 9, the City currently serves approximately 55,710 wastewater ERUs.

Table 23
EXISTING WASTEWATER SERVICE UNITS

Customer Type	Utility Accounts 12/2007	Ratio to Single-Family	Equivalent Residential Units
Single Family	39,592	1.00	39,592
Multi-Family Units	13,537	0.64	8,664
Commercial	1,926	3.87	7,454
Total	55,055		55,710

Source: December 2007 utility accounts (dwelling units for residential and meters for commercial) from Cape Coral Utilities, "End of Month Report for Assessment, Lot Mowing, Stormwater, Solid Waste Management, and Utilities, January 2007 to December 2007;" single-family ratios from Table 8.

Cost per Service Unit

As discussed, the City's wastewater impact fees include a major facility component charged city-wide on existing or new development that connects to the City's wastewater system and a local facility impact fee in the facility expansion areas. This section updates both the major and local facility impact fees utilizing the most recent data.

Major Facilities

Since growth generally cannot be served with older, depreciated facilities, but instead will require new facilities, it is appropriate to base the wastewater fees on the replacement cost of existing facilities adjusted to reflect existing debt and current capacity level. The wastewater facilities considered in determining the impact fee include wastewater lift stations, force mains and the two water reclamation facilities. The replacement costs for the wastewater reclamation facilities are adjusted to reflect utilized capacity. They are also adjusted to account for the portion of those facilities attributed to irrigation water, since the treated wastewater from the City's two reclamation facilities is distributed to the City's residents and businesses for irrigation purposes.

The City's wastewater collection facilities include gravity mains that feed into wastewater lift stations where the wastewater is transferred to force mains for transport to the reclamation facilities. The City currently maintains approximately 603 miles of gravity sewer mains. The extension of gravity mains is generally funded through assessments or through the local impact fee on new customers in the utility expansion zones (District 2) and, as such, is not included in the major facility impact fee calculation.

The replacement costs for the City's master lift stations and force mains are included in the city-wide impact fee calculation. The City owns and operates master pumps which are equipped with backup power generation and electronic monitoring systems. Finally, the City's force mains transport wastewater from the lift stations to the City's reclamation facilities. The pumping facilities and force mains are assumed to operate at the wastewater system's capacity of 20.0 mgd.

The wastewater collection costs for major facilities include the City's force mains that are 10 inch diameter or larger. The replacement cost of the City's share of the collection costs related to force mains, aerial crossings and gate valves for wastewater transmission is approximately $28 million, as shown in Table 24.

Table 24
WASTEWATER COLLECTION SYSTEM COST

Pipe Diameter	Units	Quantity	Unit Cost	Replacement Cost
10"	Linear Feet	66,987	$27	$1,808,649
12"	Linear Feet	109,377	$32	$3,500,064
16"	Linear Feet	76,420	$55	$4,203,100
18"	Linear Feet	613	$77	$47,201
20"	Linear Feet	31,450	$95	$2,987,750
24"	Linear Feet	32,274	$143	$4,615,182
30"	Linear Feet	10,127	$165	$1,670,955
36"	Linear Feet	10,003	$330	$3,300,990
42"	Linear Feet	5,840	$385	$2,248,400
Subtotal, Force Mains		343,091		$24,382,291
Aerial Crossing	Each	50	$69,516	$3,475,800
10" Gate Valve	Each	11	$2,130	$23,430
12" Gate Valve	Each	22	$2,539	$55,858
16" Gate Valve	Each	5	$3,000	$15,000
Total Cost				$27,952,379

Source: Existing inventory and replacement cost from Cape Coral Finance Department, July 8, 2008.

As part of the wastewater system expansion plan, the City recently completed the construction of additional lift stations to accommodate expansion of gravity mains and transfer wastewater to the force mains. Based on available cost data, the value of the City's pump stations is an estimated $16.0 million, as shown in Table 25. The cost of the lift stations includes land, structure, generators, electrical, pipes and fittings.

Table 25
WASTEWATER PUMP FACILITY REPLACEMENT COST

Facility Type	Existing Quantity	Unit Cost	Replacement Cost
Master Pump Station (Six-Pump)	20	$800,000	$16,000,000
Total			$16,000,000

Source: Existing inventory and replacement cost from Cape Coral Finance Department, July 8, 2008.

The Everest Parkway Water Reclamation Facility was originally constructed in 1976 with a major expansion completed in 2007, and serves the southeastern portion of the City with a capacity of 13.4 mgd. The Southwest Water Reclamation Facility has been in service since 1994, and serves the southwest portion of the City, with a capacity of 6.6 mgd.

The City's expansion plan includes increasing the capacity of the Southwest plant and the construction of a new facility to serve the northern portion of the City. The new North Cape wastewater facility will provide 10 mgd of capacity. The expansions at the Southwest plant, currently underway, will increase capacity to 15 mgd. Similar to the existing plants, the new North Cape facility will be designed to accommodate future expansion and provide treated water for the City's irrigation system.

As shown in Table 26, the planned cost of North Cape Coral wastewater treatment facility provides the basis for determining the cost per gallon for the existing water treatment plants. The new plant costs include design, engineering, property acquisition, testing and construction. Based on the new plant cost of $15.86 per gpd, the current value of the existing treatment plants is estimated to be $317.2 million.

Table 26
WASTEWATER TREATMENT PLANT COST

North Cape Water Reclamation Plant	$140,435,070
North Cape WRF Land Cost	$12,500,000
North Cape WRF Design and Engineering Cost	$5,652,242
Total North Cape WRF Cost	$158,587,312
Planned Capacity (Gallons per Day)	10,000,000
Cost per Gallon per Day	$15.86
Existing Facilities Capacity (Gallons per Day)	20,000,000
Existing Water Treatment Plant Replacement Cost	$317,200,000

Source: Water reclamation construction, land, design and engineering costs from City of Cape Coral Finance Department, July 7, 2008; existing and new treatment plant capacities from Tetra Tech, *Draft Water & Wastewater Annual Report Fiscal Year 2007*, 2008.

As mentioned in the introduction, the City of Cape Coral currently provides a portion of its non-potable water for irrigation from reclaimed effluent from the Everest and Southwest wastewater plants. The water reuse system avoids the need for the wastewater treatment plants to discharge effluent into the Caloosahatchee River except during wet weather events. Based on available cost data related to the new North Cape facility, it is estimated that the portion of facility costs attributed directly to wastewater treatment is 90 percent with the remaining 10 percent attributed to irrigation water. As shown in Table 27, the net replacement cost of the treatment plant attributable to wastewater is $285 million.

Table 27
WASTEWATER TREATMENT PLANT COST ADJUSTMENT

Wastewater Treatment Plant Replacement Cost	$317,200,000
Percent Attributable to Wastewater	90%
Attributable Replacement Value	$285,480,000

Source: Wastewater treatment plant replacement cost from Table 26; percent attributable to wastewater based on facility cost estimate from City of Cape Coral Finance Department, July 7, 2008.

With the recent expansion of the Everest facility, the wastewater treatment plants currently operate at less than their rated capacity of 20.0 mgd. Over the past few years the City has reduced the average daily demand through efforts to control the level of inflow and infiltration into the plants. This has reduced average daily flow from about 14 mgd to 11.39 mgd in 2007, which is 57 percent of the system's current capacity, as shown in Table 28.

Table 28
WASTEWATER TREATMENT DEMAND AND CAPACITY

	Annual Average Day Demand (mgd)		
	Everest WRF	Southwest WRF	Total
2007 Demand	6.65	4.74	11.39
Capacity (mgd)	13.40	6.60	20.00
Utilization Ratio			57%

Source: 2007 demand and capacity from Tetra Tech, Draft Fiscal Year 2007 City of Cape Coral Water and Wastewater Annual Report, 2007, Tables 3-6 and 3-8.

Since the existing wastewater facilities do not currently operate at full capacity, the capital cost to serve existing customers is somewhat less than the full cost of the facilities. To take this into account, the replacement cost of the wastewater facilities is adjusted to reflect the utilized capacity. As shown in Table 29, the wastewater system cost utilized by existing customers is divided by existing wastewater service units to determine the wastewater cost of $3,371 per equivalent residential unit.

Table 29
WASTEWATER COST PER SERVICE UNIT

Wastewater Collection System	$27,952,379
Wastewater Pumps	$16,000,000
Wastewater Treatment*	$285,480,000
Wastewater System Replacement Cost	$329,432,379
Utilization Ratio	57%
Wastewater System Utilized Cost	$187,776,456
Existing Wastewater ERUs	55,710
Cost per Equivalent Residential Unit (ERU)	$3,371

* excluding 10% allocated to irrigation
Source: Wastewater collection system replacement from Table 24; wastewater pump replacement value from Table 25; treatment plant cost from Table 27; utilization ratio from Table 28; wastewater ERUs from Table 23.

Local Facilities

The City charges a higher impact fee in Wastewater District 2 to fund local facilities (pump stations and gravity and force mains less that 10 inches in diameter) as an alternative to property assessments. This section updates the cost per service unit calculation for these local facilities.

The prior study provided two alternative methodologies for calculating the impact fee related to local facilities. The methodologies included one based on the replacement cost of existing local facilities, similar to the methodology used for the city-wide wastewater fees, and an improvement based methodology based on the cost of planned improvements. The current fee is based on the cost of the planned improvements and the projected ERUs for the expansion areas at build-out.

Over the past few years the City has installed much of the local wastewater infrastructure in SW 5. However, the City's current expansion plan beyond SW 5 has been put on hold. As a result, there are no scheduled improvements in SW 6/7 or areas north of Pine Island Road, and the methodology used for this update of the local facility fee is based on the replacement cost of existing local facilities. The replacement cost of the City's local force mains is approximately $15 million, as shown in Table 30.

Table 30
WASTEWATER LOCAL FORCE MAIN COST

Pipe Diameter	Units	Quantity	Unit Cost	Replacement Cost
4"	Linear Feet	77,497	$16	$1,239,952
6"	Linear Feet	347,486	$24	$8,339,664
8"	Linear Feet	154,273	$35	$5,399,555
Total Cost				$14,979,171

Source: Cape Coral Finance Department, July 18, 2008.

Based on the most recent cost data and existing facilities, the replacement value of the City's existing local pump stations is an estimated $42.0 million, as shown in Table 31. The cost of the pump stations includes land, structures, generators, electrical wiring, pipes and fittings.

Table 31
WASTEWATER LOCAL PUMP FACILITY REPLACEMENT COST

Facility Type	Existing Quantity	Unit Cost	Replacement Cost
Local Pump Station	282	$148,778	$41,955,396
Total			$41,955,396

Source: Cape Coral Finance Department, July 18, 2008.

Since the existing wastewater facilities do not currently operate at full capacity, the capital cost to serve existing customers is somewhat less than the full cost of the facilities. However, most of the existing excess capacity is in major facilities, rather than in local facilities. For this reason, the utilization rate for local facilities will be the 97 percent figure used in the 2006 update, rather than the 57 percent figure used in this update for the major facilities. As shown in Table 32, the wastewater system cost utilized by existing customers is divided by existing wastewater service units to determine the wastewater local facilities cost of $991 per equivalent residential unit.

Table 32
WASTEWATER LOCAL COST PER SERVICE UNIT

Wastewater Local Collection System	$14,979,171
Wastewater Local Pumps	$41,955,396
Wastewater Local System Replacement Cost	$56,934,567
Utilization Ratio	97%
Wastewater Local System Utilized Cost	$55,226,530
Existing Wastewater ERUs	55,710
Local Cost per Equivalent Residential Unit (ERU)	$991

Source: Wastewater collection system replacement from Table 24; wastewater pump replacement value from Table 25; treatment plant cost from Table 27; utilization ratio from Duncan Associates, *Water, Wastewater and Irrigation Impact Fee Study*, October 2006, Table 32; wastewater ERUs from Table 23.

Net Cost per Service Unit

As with the water facility impact fee calculation, a reduction of impact fees to provide a credit for future funding to be generated by new development is required for outstanding debt on wastewater facilities that have been counted in the existing level of service.

Based on an analysis of the original debt issues, the Series 1991 and Series 2000 outstanding revenue bond issues and State Revolving Loan Fund notes #090 and #100 are related to wastewater treatment or transmission facilities. The Series 1991 Bonds were issued for expansion of the Everest facility and extension of the wastewater outfall line. A portion of the 1991 Series bond has been retired; however, the remaining bond balance accretes to a value of $5,680,000 due between 2008 and 2012. Approximately $6.4 million of the $12.6 million Series 2000 bond was issued to refund a 1986 bond that

had originally been utilized to expand the Everest wastewater treatment facility from 4 mgd to 7.3 mgd (the plant was subsequently re-rated to 8.5 mgd). The remaining balance of the Series 2000 bond was utilized to refund a 1992 bond funded through assessments. Note #090 was issued in 1991 to fund the construction of the Southwest Area Water Reclamation Plant, and Note #100 was issued in 1992 to construct the utility transmission facilities associated with the "Orange Area" collection system.

The Series 2006 bond was issued to fund water, wastewater and irrigation system expansion, including the expansion of the Everest plant. The expansion of the plant increased the overall wastewater capacity, which resulted in a decrease in the wastewater facility utilization ratio used in this update. Since the additional capacity related to the portion of the Everest plant funded with the debt is not included in the fee, a credit for the wastewater plant's $49.8 million share of the of the outstanding $186.0 million loan balance is not necessary in this update.

As shown in Table 33, the total outstanding debt on the utilized capacity of the existing wastewater treatment facilities is approximately $30.3 million. Dividing this by existing wastewater service units results in a debt credit of $545 per equivalent residential unit.

Table 33
WASTEWATER FACILITY DEBT CREDIT

Series 1991 Revenue Bond	$5,680,000
Series 2000 Revenue Bond	$6,035,000
Revolving Loan Fund Note #090	$9,105,842
Revolving Loan Fund Note #110	$9,525,672
Total Outstanding Debt	$30,346,514
Wastewater ERUs	55,710
Debt Credit per Equivalent Residential Unit (ERU)	$545

Source: Outstanding debt based on principal balance for FY 2008 from the City of Cape Coral, *FY 2007-08 Annual Operating Budget*; wastewater ERUs from Table 23.

As noted in the water section, debt credit is normally provided only for outstanding debt at the time of calculation of utility impact fees. However, wastewater impact fees for Cape Coral are somewhat unique for two reasons. First, the debt that the City issued for the original purchase of the wastewater system in 1975 was general obligation (GO) bond debt that was retired with property taxes, meaning that all property owners contributed toward the purchase of the system, regardless of whether they were wastewater customers and regardless of whether their property was developed or not. Second, many of the new customers to the City's wastewater system are not occupying newly-constructed buildings, but existing homes or businesses that are only now being connected to the utility system. These existing developments have been paying substantial property taxes used for the purchase of the wastewater system, and these past payments should be taken into consideration in calculating an appropriate impact fee.

In calculating a credit for past debt service payments, credit will be provided only for payments used to retire principal, not for interest payments. This is done to be consistent with the cost analysis, which does not include any interest costs associated with debt financing.

Because of the time that has elapsed, it is not possible to determine the precise amount of the original $23.1 million GO bond issue that was used to purchase the water and wastewater systems that was attributable to each facility. However, based on the relative sizes of the treatment plants (2 mgd water plant and 1.3 mgd wastewater plant), it is estimated that 39.4 percent of the bond issue was used to purchase the wastewater system and the remainder was used to purchase the water system.

The original GO bond issue was refunded in 1978, 1984 and 1988. The last refunding issue was retired in fiscal year 2005. While most buildings connecting to the City's wastewater system were not in existence when the GO debt payments began in 1976, some were. More have been in existence since 1994, when the bulk of the principal began to be repaid. Newer units would have paid less, but the credit is calculated for the worst case, which is units that were in existence when the debt was incurred. Consequently, the past property tax credit is larger than it needs to be for most units.

The past property tax credit is calculated by dividing the amount of the principal payment made in each year by the total assessed property value to determine the equivalent millage rate (dollar payment per $1,000 of assessed value). This is then multiplied by the average assessed value of a single-family detached dwelling unit for that year to determine the payment per unit. Finally, the original payment amount is multiplied by an inflation factor to determine the annual payment in current dollars. The annual current value payments are summed to yield the total past payment in current dollars. The result is a past property tax credit of $277 per service unit, as shown in Table 34.

Table 34
WASTEWATER PAST PROPERTY TAX CREDIT

Year	Principal Payment	Total Assessed Property Value	Millage Rate	Avg. Unit Value	Original Payment	CPI Index	Current Value
1976	$59,100	$450,087,800	0.131	$19,426	$2.54	3.807	$10
1977	$78,800	$493,191,360	0.160	$21,369	$3.42	3.575	$12
1978	$78,800	$624,768,650	0.126	$23,505	$2.96	3.323	$10
1979	$0	$663,812,070	0.000	$25,856	$0.00	2.984	$0
1980	$0	$854,563,660	0.000	$28,442	$0.00	2.629	$0
1981	$0	$1,406,192,215	0.000	$31,286	$0.00	2.383	$0
1982	$0	$1,417,002,770	0.000	$34,414	$0.00	2.245	$0
1983	$0	$1,388,802,680	0.000	$38,856	$0.00	2.175	$0
1984	$0	$1,449,805,390	0.000	$38,613	$0.00	2.085	$0
1985	$0	$1,768,771,700	0.000	$39,385	$0.00	2.013	$0
1986	$0	$1,776,412,210	0.000	$40,173	$0.00	1.977	$0
1987	$0	$1,854,114,670	0.000	$40,977	$0.00	1.907	$0
1988	$0	$1,985,559,150	0.000	$41,796	$0.00	1.831	$0
1989	$0	$2,167,011,280	0.000	$44,928	$0.00	1.747	$0
1990	$0	$2,524,729,550	0.000	$48,295	$0.00	1.657	$0
1991	$0	$3,115,727,790	0.000	$51,914	$0.00	1.591	$0
1992	$0	$3,538,357,790	0.000	$55,805	$0.00	1.544	$0
1993	$0	$3,535,576,040	0.000	$59,987	$0.00	1.499	$0
1994	$533,814	$3,561,885,230	0.150	$64,483	$9.67	1.462	$14
1995	$771,000	$3,601,126,430	0.214	$69,316	$14.83	1.421	$21
1996	$826,573	$3,648,079,090	0.227	$74,511	$16.91	1.381	$23
1997	$889,756	$3,632,010,230	0.245	$80,095	$19.62	1.350	$26
1998	$973,592	$3,638,777,570	0.268	$86,098	$23.07	1.329	$31
1999	$1,055,458	$3,742,215,220	0.282	$92,551	$26.10	1.300	$34
2000	$1,159,947	$3,932,332,640	0.295	$99,487	$29.35	1.258	$37
2001	$518,168	$4,237,777,910	0.122	$106,943	$13.05	1.223	$16
2002	$534,898	$4,714,588,660	0.113	$114,958	$12.99	1.204	$16
2003	$507,883	$5,608,534,540	0.091	$123,574	$11.25	1.177	$13
2004	$529,570	$7,300,200,110	0.073	$132,835	$9.70	1.147	$11
2005	$200,785	$9,428,023,860	0.021	$142,791	$3.00	1.109	$3
2006	$14,441	$14,165,306,480	0.001	$153,492	$0.15	1.075	$0
Total	$13,431,339						$277

Source: "Principal Payment" is portion of debt service payments that is attributable to retiring principal associated with 39.4% of the 1975 General Obligation Water and Sewer Bonds, including the 1978, 1984 and 1988 refunding issues; total assessed property value from City of Cape Coral Management/Budget Administrator, June 22, 2006; "Millage Rate" is principal payment per $1000 of assessed value; "Avg Unit Value" is the average assessed value of a single-family detached unit (1976-1988 from Camp Dresser & McKee, Inc., July 25, 1988 letter to City Attorney William M. Powell; 1989-2006 based on 7.49% annual growth from 1988-2005 and 2005 value from Management/Budget Administrator, June 22, 2006; "CPI Index" is inflation factor based on US Bureau of Labor Statistics, Consumer Price Index, All Items, All Urban Customers, May 2008.

Reducing the cost per service unit for major facilities by the amounts of the credits for outstanding revenue bond debt and past payments of general obligation bond debt principal results in a net cost of

$2,549 per ERU, as shown in Table 35. No credits are applicable for local facilities that will be included in the impact fee for District 2, since these facilities have been funded by assessments in the rest of the city.

Table 35
WASTEWATER NET COST PER SERVICE UNIT

	Major Facilities	Local Facilities
Facility Cost per Equivalent Residential Unit (ERU)	$3,371	$991
Outstanding Debt Credit per ERU	$545	$0
Past Property Tax Credit per ERU	$277	$0
Net Cost per Equivalent Residential Unit (ERU)	$2,549	$991

Source: Wastewater facility cost per ERU from Table 29; outstanding debt credit from Table 33; past property tax credit from Table 34.

Maximum Fee Schedule

The maximum wastewater impact fees that may be charged by the City of Cape Coral, based on the methodology, data and assumptions used in this report, are shown in Table 36. The local facility impact fee will continue to be charged only in District 2, while the impact fee for major facilities will continue to be charged city-wide.

Table 36
WASTEWATER NET COST SCHEDULE

Housing Type/Meter Size	ERUs/ Unit or Meter	Net Cost/ERU		Net Cost/Unit or Meter	
		Major	Local	Major	Local
Single-Family Detached	1.00	$2,549	$991	$2,549	$991
Multi-Family	0.64	$2,549	$991	$1,631	$634
Nonresidential, 5/8" x 3/4" Meter	1.00	$2,549	$991	$2,549	$991
Nonresidential, 1" Meter	2.50	$2,549	$991	$6,372	$2,478
Nonresidential, 1-1/2" Meter	5.00	$2,549	$991	$12,743	$4,957
Nonresidential, 2" Meter	8.00	$2,549	$991	$20,389	$7,931
Nonresidential, 3" Meter	16.00	$2,549	$991	$40,778	$15,861
Nonresidential, 4" Meter	25.00	$2,549	$991	$63,715	$24,783
Nonresidential, 6" Meter	50.00	$2,549	$991	$127,430	$49,566
Nonresidential, 8" Meter	80.00	$2,549	$991	$203,888	$79,306
Nonresidential, 10" Meter	115.00	$2,549	$991	$293,090	$114,002
Nonresidential, 12" Meter	155.00	$2,549	$991	$395,034	$153,655

Source: Residential ERUs per unit from Table 9; nonresidential ERUs per meter from Table 7; net cost per ERU from Table 35.

IRRIGATION

Effluent from both the Everest Parkway and Southwest wastewater treatment plants are used as sources of supply for irrigation and supplemented with canal water during the dry winter months. The City of Cape Coral reclaims approximately 95 percent of its treated wastewater for irrigation. The irrigation system includes five million gallon prestressed concrete ground storage tanks used for effluent storage at each of the wastewater plants and pumps to cycle reclaimed water through the irrigation system. The demand for the reuse irrigation system exceeds the reclaimed water produced in winter, and the City utilizes five canal pump stations that draw and process irrigation water from the city's fresh water canals.

The City's irrigation water system primarily serves areas south of Pine Island Road. Current expansion plans will extend the irrigation transmission system to remaining areas south of Pine Island Road, as well as north of Pine Island upon completion of new wastewater facilities in that area.

Service Area and Benefit District

An impact fee service area is a geographic area subject to a single, uniform impact fee schedule. A benefit district is a geographic area, often a subarea of a service area, in which fees collected are earmarked to be spent. Irrigation impact fees will be assessed only on existing or new development that connects to the City's irrigation water system. The irrigation water system provides a relatively uniform level of service to all its customers. It is recommended that the City's entire jurisdiction should continue to be treated as a single service area and benefit district for irrigation impact fees.

Service Unit

The demand associated with different types of customers must be expressed in a common unit of measurement, called a "service unit," which is expressed as a multiple of the irrigation water demand associated with a typical single-family residence.

For nonresidential uses, irrigation impact fees will be charged based on the size of the water meter, irrespective of land use. The meter equivalency factors for irrigation are the same as those for water and wastewater shown in Table 7.

The City does not meter most irrigation customers. Since demand for irrigation is related to lot size, the demand per irrigation ERU in this study is based on the irrigation demand for an average single-family lot of 10,000 square feet (four units per acre). The irrigation water demand for multi-family customers is based on the relative ratio of daily water consumption for multi-family units to single-family units from water utility customer billing data shown in Table 9.

The 2004 and 2006 impact fee studies utilized an assumed average consumption of 500 gpd for irrigation users. The 500 gpd irrigation demand assumption corresponds with the average annual daily watering needs for a standard quarter-acre residential lot of one-half inch per week and will be utilized in the calculation of the irrigation impact fee in this study. The relative irrigation demand and ERUs per unit associated with both single-family and multi-family units are shown in Table 37.

Table 37
IRRIGATION SERVICE UNIT MULTIPLIERS

Land Use	gpd/ Unit	ERUs/ Unit
Single-Family Detached	500	1.00
Multi-Family	320	0.64

Source: Single-family gallons per day based on irrigation water consumed for standard 10,000 sq. ft. lot at ½" per week annually; multi-family gpd based on relative ERUs per unit for multi-family units from Table 9.

Cost Per Service Unit

As with water and wastewater facilities, the irrigation impact fees are based on the replacement cost of existing facilities, adjusted to reflect existing debt. The irrigation facilities considered in determining the impact fee include a share of the wastewater treatment facilities, two 5.0 mg prestressed concrete ground storage tanks located at the Everest wastewater treatment facility, three new 5.0 mg storage tanks at the Southwest wastewater treatment facility, canal pump stations, high service pumps that pump the irrigation water into the distribution system, and reuse mains for distribution of irrigation water.

As mentioned in the introduction, the City of Cape Coral currently provides a portion of its non-potable water for irrigation from reclaimed effluent from the Everest and Southwest wastewater plants. The water reuse system avoids the need for the wastewater treatment plants to discharge effluent into the Caloosahatchee River except during wet weather events. Each wastewater treatment plant has concrete tanks that provides temporary storage for 5 mg of treated irrigation water and high service pumps to cycle the reclaimed water into the irrigation water distribution system. The value of the additional irrigation water processing, pump equipment and storage tanks at the wastewater treatment plants is an estimated 10 percent based on cost estimates for the North Cape wastewater treatment plant. As a result, this analysis allocates 10 percent of the wastewater treatment plant facilities replacement cost to irrigation. As shown in Table 38, the net replacement cost of the treatment plant attributable to wastewater is $1.59 per gallon per day.

Table 38
IRRIGATION SHARE OF WASTEWATER TREATMENT PLANT

Wastewater Treatment Plant Replacement Cost	$317,200,000
Percent Attributable to Irrigation	10%
Irrigation Share of Net Replacement Value	$31,720,000
Capacity (Gallons per Day)	20,000,000
Net Replacement Value per Gallon per Day	$1.59

Source: Treatment plant cost from Table 26; percent attributable to irrigation from City of Cape Coral Finance Department, July 7, 2008; existing treatment plant capacities from Tetra Tech, *Draft Water & Wastewater Annual Report Fiscal Year 2007*, 2008.

During the relatively dry winter months, irrigation water demand exceeds the daily output of treated irrigation water from the City's wastewater treatment plants. The City owns and operates five canal pump stations that augment the irrigation water supply during the dry months. The pumps draw water

from the City's fresh water canals and pump it into the reuse distribution system after filtering and disinfecting the water.

The canal pump stations are designed to look like residential single-family homes and provide up to 85.2 mgd of irrigation and fire protection water for current and future needs. Based on FY 2006 canal pump rate data from the *Fiscal Year 2006 Water and Wastewater Annual Report*, the average pump rate was 9.4 mgd with a peak month rate of 19.6 mgd and low month of 2.8 mgd. As shown in Table 39, the total replacement cost for the canal and irrigation pump stations is approximately $2.1 million.

Table 39
CANAL PUMP STATION COST

Facility Type	Equipment Cost	Land Cost	Replacement Cost
Canal Pump Station #2	$324,282	$100,000	$424,282
Canal Pump Station #3	$446,520	$100,000	$546,520
Canal Pump Station #4	$429,926	$100,000	$529,926
Canal Pump Station #5	$182,125	$100,000	$282,125
Canal Pump Station #8	$266,434	$100,000	$366,434
Total			$2,149,287

Source: Replacement cost for canal pump based on original 1993, 2000 and 2003 construction costs and 2008 land cost from City of Cape Coral Finance Department, July 7, 2008; construction costs adjusted by *Engineering News Record* (ENR), Construction Cost Index (CCI), May 2008.

Canal water pumping during the dry season has put a strain on the capacity levels of the fresh water canals and the City has started to raise canal weirs (facilities that divert water flow) and install transfer pumps to provide sufficient irrigation water in the canals. The construction to raise eight of the weirs was completed in FY 2006. The City has also constructed aquifer storage facilities and recovery wells to store additional water for dry season use. As shown in Table 40, the estimated value of canal weirs and transfer pumps are $2.7 million based on recently completed project costs.

Table 40
CANAL WEIR AND TRANSFER PUMP COST

Facility	Year	Original Cost	CCI Adj.	Replacement Cost
Pine Island Pump	2001	$225,000	1.307	$294,075
Chiquita Blvd Pump	2002	$176,000	1.268	$223,168
Santa Barbara Pump	2006	$239,741	1.070	$256,523
Gator Slough Phase IV	2005	$916,292	1.114	$1,020,749
Gator Slough Phase V	2006	$566,535	1.070	$606,192
Gator Slough Phase II	2000	$74,476	1.333	$99,277
Interconnect Basin	2002	$172,160	1.268	$218,299
Total				$2,718,283

Source: Replacement cost based on original installation and material cost from City of Cape Coral, July 7, 2008; construction costs adjusted by the *Engineering News-Record* Construction Cost Index (CCI), May 2008.

As shown in Table 41, the total cost of City's canal water facilities for irrigation are an estimated $4.9 million. Based on the canal water pumping capacity of 85.2 mgd, the total canal cost is $0.06 per gallon per day.

Table 41
CANAL WATER COST

Irrigation Canal Pumps	$2,149,287
Canal Weirs	$2,718,283
Total Canal Facility Cost	$4,867,570
Pump Capacity (Gallons per Day)	85,200,000
Canal Cost per Gallon per Day	$0.06

Source: Replacement cost for irrigation canal pumps from Table 39 and replacement cost for canal weirs from Table 40; existing canal irrigation capacity based on high service canal pump capacity from *Draft Fiscal Year 2007 City of Cape Coral Water and Wastewater Annual Report*, p. 3-31.

Since the City utilizes two sources for irrigation water, it is necessary to allocate the cost for each source based on the average share of production from each source in order to determine an overall average cost per gallon per day for irrigation water production. Based on historical irrigation data, the wastewater facilities provide 45 percent of the annual irrigation water and canal water provides the remaining 55 percent. Based on this analysis, the weighted average production cost per gallon per day is $0.75, as shown in Table 42.

Table 42
IRRIGATION WATER PRODUCTION COST

Facility Type	Cost/ Gallon per Day	Annual Share	Wtd. Cost/ Gallon per Day
Wastewater Reuse	$1.59	45%	$0.72
Canal Water	$0.06	55%	$0.03
Weighted Average Cost per Gallon per Day			$0.75

Source: Wastewater reuse cost from Table 42; canal water cost from Table 41; annual share based on historical irrigation water use from *Fiscal Year 2004 City of Cape Coral Water and Wastewater Annual Report*.

The City distributes irrigation water to its customers through more than 135 miles of irrigation water mains that range in size from 10 inches through 42 inches in diameter. The reuse main system includes aerial crossings that transport the water over the City's canals. The replacement cost of the irrigation mains and aerial crossings is about $52 million, and, based on the maximum daily irrigation water flow, the cost per gallon per day is $1.10 as shown in Table 43.

Table 43
IRRIGATION MAIN COST

Pipe Diameter	Unit	Quantity	Replacement Cost/Foot	Replacement Cost
10"	Linear Ft.	110,383	$29.50	$3,256,299
12"	Linear Ft.	302,071	$33.73	$10,188,855
16"	Linear Ft.	149,919	$58.63	$8,789,751
20"	Linear Ft.	69,639	$85.73	$5,970,151
24"	Linear Ft.	58,986	$130.00	$7,668,180
30"	Linear Ft.	75,843	$150.00	$11,376,450
36"	Linear Ft.	18,457	$200.00	$3,691,400
42"	Linear Ft.	2,772	$300.00	$831,600
48"	Linear Ft.	279	$400.00	$111,600
Subtotal, Irrigation Mains		788,349		$51,884,286
Aerial Crossing	Each	50	$60,895.00	$3,044,750
Total				$54,929,036
Irrigation Main Capacity (gpd)				50,000,000
Irrigation Main Cost Per Gallon per Day				$1.10

Source: Linear feet and replacement cost per foot from City of Cape Coral, April 14, 2006; capacity based on maximum day irrigation flow from City of Cape Coral Utility Division, August 8, 2008.

The City's distribution of irrigation water includes irrigation valves to control the water flow. These valves are sized to fit the irrigation lines and their cost varies by size and type. The replacement cost of the irrigation main gate and butterfly valves is about $3.0 million. Based on the maximum daily irrigation water flow, the cost per gallon per day is $0.06, as shown in Table 44.

Table 44
IRRIGATION VALVE COST

Valve Size and Type	Quantity	Replacement Cost/Unit	Replacement Cost
10" Gate	144	$2,320	$334,080
12" Gate	296	$2,359	$698,264
16" Gate	1	$3,000	$3,000
12" Butterfly	4	$1,670	$6,680
16" Butterfly	161	$3,197	$514,717
20" Butterfly	55	$4,400	$242,000
24" Butterfly	47	$6,500	$305,500
30" Butterfly	64	$8,904	$569,856
36" Butterfly	19	$13,800	$262,200
42" Butterfly	3	$19,500	$58,500
Total Valve Costs			$2,994,797
Irrigation Valve Capacity (gpd)			50,000,000
Irrigation Valve Cost Per Gallon per Day			$0.06

Source: Linear feet and replacement cost per foot from City of Cape Coral, July 7, 2008; capacity based on maximum day irrigation flow from City of Cape Coral Utility Division, August 8, 2008.

The water and wastewater debt credit accounted for all of the outstanding debt associated with utility facilities counted in the existing level of service. The City may have utilized a portion of the debt included in the water and wastewater analysis for irrigation facilities; however, these cannot be identified based on the available bond data. As a result, the irrigation system net cost per service unit is determined based on the system's replacement cost per gallon per day and the demand per service unit. As shown in Table 45, multiplying the replacement cost per gallon per day for existing irrigation facilities by the irrigation demand per ERU results in an irrigation water cost of $955 per ERU.

Table 45
IRRIGATION FACILITY COST PER SERVICE UNIT

Irrigation Production Cost per Gallon per Day	$0.75
Irrigation Main Cost per Gallon per Day	$1.10
Irrigation Valve Cost per Gallon per Day	$0.06
Irrigation System Cost per Gallon per Day	$1.91
Gallons per Day per Equivalent Residential Unit (ERU)	500
Cost per Equivalent Residential Unit (ERU)	$955

Source: Irrigation water production cost per gpd from Table 42; main cost per gpd from Table 43; valve cost per gpd from Table 44; gpd per ERU from Table 37.

Maximum Fee Schedule

The maximum irrigation impact fees that may be charged by the City of Cape Coral, based on the methodology, data and assumptions used in this report, are shown in Table 46.

Table 46
IRRIGATION NET COST SCHEDULE

Housing Type/Meter Size	ERUs per Unit or Meter	Net Cost per ERU	Net Cost per Unit or Meter
Single-Family Detached	1.00	$955	$955
Multi-Family	0.64	$955	$611
Nonresidential, 5/8" x 3/4" Meter	1.00	$955	$955
Nonresidential, 1" Meter	2.50	$955	$2,388
Nonresidential, 1-1/2" Meter	5.00	$955	$4,775
Nonresidential, 2" Meter	8.00	$955	$7,640
Nonresidential, 3" Meter	16.00	$955	$15,280
Nonresidential, 4" Meter	25.00	$955	$23,875
Nonresidential, 6" Meter	50.00	$955	$47,750
Nonresidential, 8" Meter	80.00	$955	$76,400
Nonresidential, 10" Meter	115.00	$955	$109,825
Nonresidential, 12" Meter	155.00	$955	$148,025

Source: Residential ERUs per unit from Table 37; nonresidential ERUs per meter from Table 7; net cost per ERU is cost per ERU from Table 45.

APPENDIX

Table 47
UTILITY CAPITAL IMPROVEMENT PROGRAM, 2008 to 2012

Project	2008	2009	2010	2011	2012	Total
North RO Plant	$48,601,749	$48,747,600				$97,349,349
North RO Wellfield	$10,874,605	$16,874,605				$27,749,210
North RO Wellsites	$8,270,400					$8,270,400
North Deep Injection Well	$4,499,146	$746,716				$5,245,862
Everest WRF Expansion	$16,787,920	$7,771,166				$24,559,086
Infiltration/Inflow Testing	$1,500,000					$1,500,000
South RO Wellfield	$5,510,091	$2,439,555				$7,949,646
South Wellheads	$3,631,878					$3,631,878
SW Wellfield Portable Generators	$2,880,000					$2,880,000
SW Wellfield Well Plugs	$612,000					$612,000
SW WRF Expansion	$20,694,618	$20,569,966				$41,264,584
Sludge Transport Pipe/Storage	$188,370	$1,785,094				$1,973,464
SW & Everest Deep Injection Well	$8,578,242	$8,578,242				$17,156,484
Aquifer Storage and Recovery	$5,467,856					$5,467,856
Gator Slough Ph. VI	$1,525,757					$1,525,757
Wireless Communications	$3,100,000					$3,100,000
Viscaya Pump Station	$686,899					$686,899
SW 4 Utility Work	$173,263					$173,263
SW 5 Utility Work	$192,604					$192,604
Surfside Utility Work	$13,781					$13,781
Palm Tree Blvd Water Main Ext.		$1,102,000				$1,102,000
Master Pump Station 540	$5,325,970					$5,325,970
Hancock/Grinders					$747,500	$747,500
Sewage Lift Station Rehab	$1,700,738	$550,000	$656,250	$280,500		$3,187,488
Sewage Lift Station Wetwell				$990,000	345000	$1,335,000
Rehab Bio Solids Facility SWWRF	$232,410					$232,410
Irrigation/ASR Master Plan	$230,159					$230,159
North WRF	$2,894,308					$2,894,308
Bio Solids Facility	$4,500,000	$12,998,420	$13,648,341	$11,185,262		$42,332,023
RO Maint Shop Design	$50,000					$50,000
RO Maint Shop Construction	$633,557					$633,557
Security at Van Loon	$200,000					$200,000
Renovation of Office/Storage	$10,000					$10,000
Plant 2 Drop Ceiling	$150,000					$150,000
Replace Walls	$379,528					$379,528
Drop Ceiling at Canal Pumps	$60,000					$60,000
RO WTP No 2 Upgrade Design	$71,125					$71,125
Reconstruct Equip. Storage	$180,000					$180,000
Lake Kennedy Irrigation Pump					$7,475,000	$7,475,000
Plant 1 Raw Water Pipe Replace			$682,500			$682,500

Project	2008	2009	2010	2011	2012	Total
Plant 2 Line Upgrade			$1,050,000	$1,100,000		$2,150,000
Coating for Clear Wells			$147,000			$147,000
Replace Membranes, Plant 1		$420,000				$420,000
Replace Membranes, Plant 2				$554,400		$554,400
Land, Utility Extension		$400,000	$840,000	$968,000	$1,113,200	$3,321,200
Land, Assessment Payments		$141,000	$148,050	$310,200	$324,300	$923,550
Irrigation Trans. & Canal Design		$563,000				$563,000
Irrigation Trans. & Canal Const.		$6,500,000				$6,500,000
Potable Water Trans. Lines	$13,287,581	$6,003,541	$2,520,000	$2,112,000	$2,944,000	$26,867,122
Irrigation Water Transmission Lines	$1,881,082	$1,420,391	$2,520,000	$2,112,000	$2,944,000	$10,877,473
Wastewater Transmission Lines	$9,032,588	$4,232,082	$7,602,000	$6,336,000	$8,832,000	$36,034,670
ERD & OPS Construction	$5,097,500	$5,097,500				$10,195,000
Wells 5 & 6	$600,000					$600,000
Monitor Wells	$300,000					$300,000
G-7C Effluent Brine Disposal	$200,000					$200,000
MPS to Support N2			$5,565,000			$5,565,000
Total	$190,805,725	$146,940,878	$35,379,141	$25,948,362	$24,725,000	$423,799,106

Source: City of Cape Coral Finance Department, July 7, 2008.