

# SANITARY SEWER ELEMENT

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### LIST OF ACRONYMS

ADF	Average Daily Flow
BCPFM	Broward County Population Forecasting Model
BCWWS	Broward County Water and Wastewater Services
BCPHU	Broward County Public Health Unit
EPGMD	Environmental Protection and Growth Management
FDEP	Florida Department of Environmental Protection
GIS	Geographical Information System
MGD	Millions of Gallons per Day
NIPS	Neighborhood Improvement Projects
NRWWTP	North Regional Wastewater Treatment Plant
TAZ	Traffic Analysis Zone
UAZ	Utility Analysis Zone
USEPA	United States Environmental Protection Agency

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### I. INTRODUCTION

A. Purpose and Organization of the Document. Consistent with Florida Administrative Code section 9J-5.011, the purpose of the Sanitary Sewer Element (SSE) is to assure that necessary public sanitary sewer facilities and services correlate to future land use projections. The SSE support documents provide the data and analysis used as the basis for the goals, objectives and policies included in the SSE.

The Broward County Environmental Protection and Growth Management Department (EPGMD) and Broward County Water and Wastewater Services (WWS) have partnered in the preparation of this document. The role of the EPGMD was to identify the future sanitary sewer needs of unincorporated areas of Broward County, to assess the provider utility's ability to meet those needs, and to partner with provider utilities in plan development. The role of WWS was to accomplish the necessary planning for the County operated retail utility and regional wastewater system.

In order to better understand the information provided herein, the sections of the document are divided into three major subsections:

1. Broward County Operated Retail Utility;
2. Broward County Operated Regional Wastewater System;
3. Unincorporated Areas Served by the Cities of Cooper City, Fort Lauderdale, Hollywood, Plantation, and Sunrise.

B. Planning Horizon. The long term planning horizon for the unincorporated areas is to the year 2015. The long term planning horizon for the Broward County Operated Retail Utility and Broward County Operated Regional Raw Water Supply is to the year 2025. Both planning horizons are consistent or exceed rule 9J-5.013(1) (c). WWS decided to use the year 2025 planning horizon because a) new population projections were available to the year 2025; b) decisions regarding treatment processes and effluent disposal might change when a longer term is considered; and c) given the 40 to 50 year service life of collection/ transmission system piping, sizing of those facilities should be based on long term flow projections.

C. Definitions

**Average Daily Flow.** Total flow for a one year period averaged over a 365 day basis.

**Collection System.** Piping that receives sewage from customers and delivers it to the transmission system. By definition, collection system piping is 12 inches in diameter and smaller.

**Maximum Daily Flow.** The total flow for the one highest flow day of the year averaged over a 24 hour basis.

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**Peak Hour Flow.** The total flow for the one highest flow hour of the year averaged over a 60 minute basis.

**Service Area.** The combination of the geographic area currently served by a utility and the geographic area the utility intends provide service to potential customers.

**Transmission System.** Piping that moves large volumes of sewage from one point in the sanitary sewer piping system to the treatment plant. By definition, transmission system piping is larger than 12 inches in diameter. Usually customers are not permitted to connect directly to the transmission system.

## II. DATA REQUIREMENTS

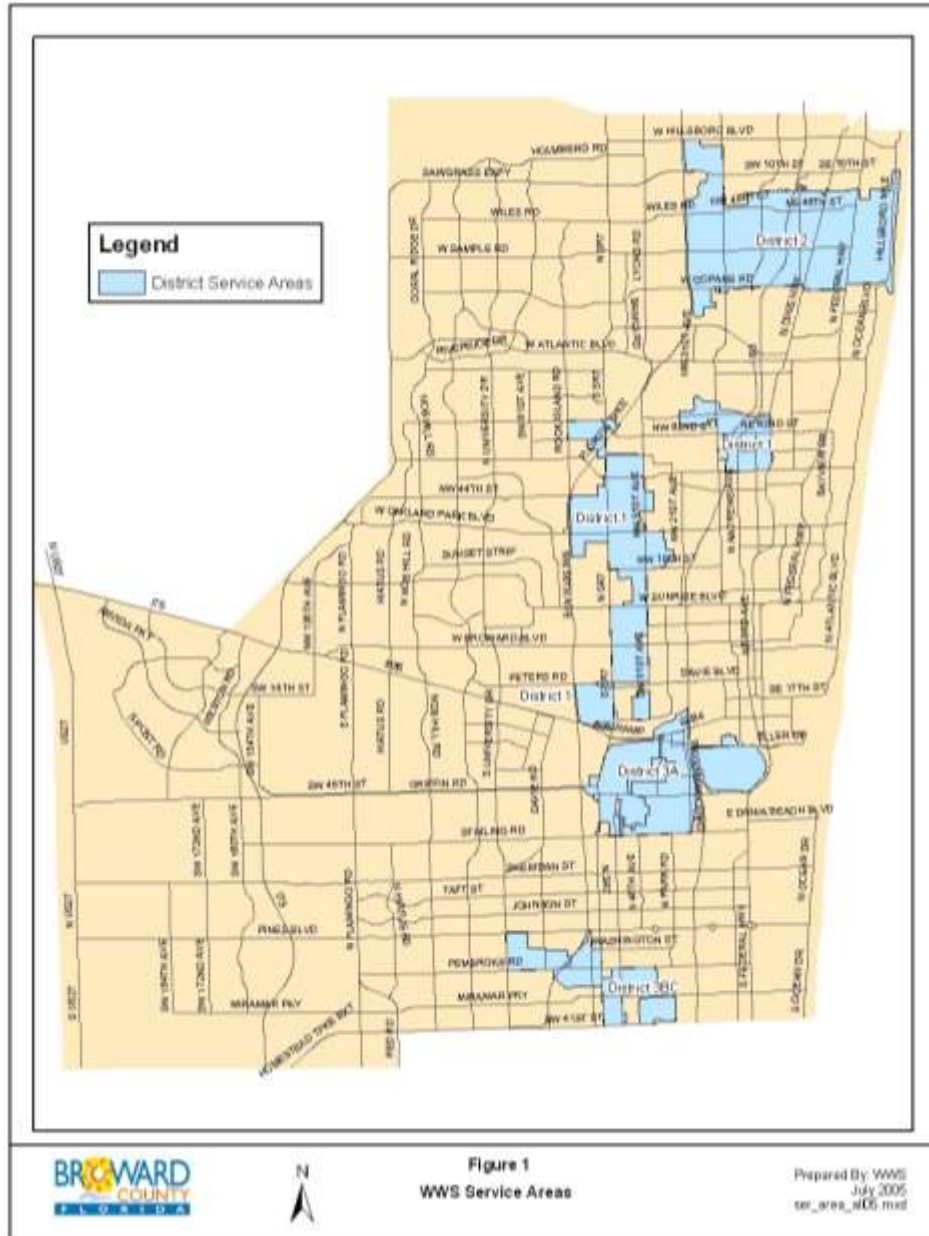
### A. Broward County Operated Retail Utility

1. **Service Area and Customer Base.** The Broward County Operated Retail Utility is one of the many utilities that provide sanitary sewer service within the urbanized area of the County. The Retail Utility was created on January 31, 1962 with the County's purchase of a small, investor-owned water and wastewater utility. Between 1962 and 1975 the County acquired a number of investor-owned systems. Under the County Code of Ordinances, the Broward County Board of County Commissioners exercises exclusive jurisdiction, control and supervision of the Utility system. The WWS is the County organizational unit directly responsible for the Retail Utility.

The Retail Utility supplies sanitary sewer service to retail customers in several sections of the County. Over the past ten years, the Utility has grown from 33,027 customers to its year 2003 retail base of 35,704 customers, representing an estimated population of 127,000. The Retail Utility serves about 8 percent of the County's total population. For the year 2003, treated wastewater from retail sewer customers equaled about 14.0 MGD on an annual average basis.

The Retail Utility operates four non-contiguous service districts know as District 1, District 2, District 3A and District 3BC. These four service districts are shown on Figure 1, and cover about 40 square miles. The four service districts are operated as independent entities, but are managed as a single entity. The District 1 service area contains portions of the cities of Fort Lauderdale, Lauderdale Lakes, Lauderhill, North Lauderdale, Oakland Park, Plantation, Pompano Beach, and Tamarac. The District 2 service area contains portions of the cities of Deerfield Beach, Lighthouse Point and Pompano Beach. The District 3A service area contains portions of the cities of Dania Beach, Davie, Fort Lauderdale and Hollywood; and provides sanitary sewer service to part of the Fort Lauderdale-Hollywood International Airport. The District 3BC service area contains portions of the cities of Hollywood, Miramar, Pembroke Park and Pembroke Pines. All four service areas also include unincorporated areas. The sanitary sewer service area is different than the potable water service area for all four Districts.

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2. **Level of Service Standard.** WWS has the responsibility to determine if it can adequately serve existing and potential customers. To that end, WWS has set sanitary sewer level of service standards as shown by Table 5-1.

**Table 5-1  
BCWWS Retail Sanitary Sewer Level of Service Standards**

Facility	Level Of Service Standard
Treatment Plant and Effluent Disposal	Average Day
Collection/ Transmission System	Peak

Appendix 1 contains the methodology currently used to determine if the level of service standard can be met. WWS changes the methodology administratively from time to time as new information becomes available.

3. **Existing Treatment and Effluent Disposal Facilities.** Sewage treatment and effluent disposal for Districts 1 and 2 is via the Broward County Operated Regional Wastewater System. See that portion of this document for more information.

Sewage treatment and effluent disposal for Districts 3A and 3BC is via agreement with the City of Hollywood. The agreement acknowledges the City's affirmative, continuing obligation to provide wastewater services for Districts 3A and 3BC.

4. **Existing Transmission/Collection System.** The District 1 transmission and collection system contains approximately 137 miles of gravity sewer pipe, 30 miles of force main pipe and 63 lift (pumping) stations. District 1 connects to the Broward County Operated Regional Wastewater System at locations 51E, 51F, 410, 450, 451 and 456. Currently about 96% of the District 1 population has sanitary sewer service available. The capacity of the system to handle existing and projected demands was determined by WWS using hydraulic modeling. To correct identified deficiencies, WWS is implementing a major rebuilding effort in District 1, which includes rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks. The projects are anticipated to be completed by the year 2008 at an estimated cost of \$320 million.

The District 2 transmission and collection system contains approximately 147 miles of gravity sewer pipe, 33 miles of force main pipe and 94 lift (pumping) stations. District 2 connects to the Broward County Operated Regional Wastewater System at locations 461 and 471.

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Currently about 94% of the District 2 population has sanitary sewer service available. The capacity of the system to handle existing and projected demands was determined by WWS using hydraulic modeling. To correct identified deficiencies, WWS is implementing a major rebuilding effort in District 2, which includes rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks. The projects are anticipated to be completed by the year 2010 at an estimated cost of \$167 million.

The District 3A transmission and collection system contains approximately 30 miles of gravity sewer pipe, 25 miles of force main pipe and 41 lift (pumping) stations. District 3A connects to the City of Hollywood at one location. Currently about 67% of the District 3A population has sanitary sewer service available. The capacity of the system to handle existing and projected demands will be determined by WWS using hydraulic modeling: Once identified, WWS will implement an effort to correct deficiencies.

The District 3BC transmission and collection system contains approximately 35 miles of gravity sewer pipe, 5 miles of force main pipe and 6 lift (pumping) stations. District 3BC connects to the City of Hollywood at one location. All sanitary sewer facilities are newly constructed as part of a \$95 million project to rebuild substantial portions of the potable water system and provide sanitary sewer service to those on septic tanks. The project is estimated to be completed by the year 2005. Prior to starting the project, all of District 3BC was on septic tanks. When this project is completed, approximately 49% of the District 3BC population will have sanitary sewer service available.

All transmission system/collection system facilities have been inventoried using Geographical Information System (GIS) software. The data is updated on a continuous basis and posted to the WWS network for use once or twice a month. In addition, paper maps of the entire transmission/ distribution system are produced twice a year from the GIS database.

5. **Regulatory Requirements.** Broward County, like any sanitary sewer utility, falls under the regulation of multiple authorities. These include the United States Environmental Protection Agency (USEPA), the Florida Department of Environmental Protection (FDEP), the Broward County Environmental Protection and Growth Management Department (EPGMD) and the Broward County Public Health Unit (BCPHU).

The BCPHU has regulatory responsibility for issuing septic tank permits under Chapter 10D-6 of the Florida Administrative Code and Broward County Ordinance 78-50.

Connecting new sanitary sewers to the WWS collection system is the regulatory responsibility of EPGMD. This includes verifying that the treatment facility has adequate capacity.

Capacity, Management, Operation and Maintenance (CMOM) will be a federally mandated program that when implemented will have significant effect on all Utilities throughout the

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United States. CMOM is intended to eliminate or drastically reduce Sanitary Sewer Overflows (SSO). When CMOM is implemented into law, utilities will be required develop and follow very detailed Operating SOP's, Maintenance SOP's, Design Standards, Modeling Requirements, Emergency Response Planning/SOP's and other additional standards throughout the utility. Utility plans will be submitted for authorization and assessment will constantly be monitored.

6. **Overview of Financial Operations.** All four operating Districts are managed financially as one utility; with one set of rates, fees and charges. Operating and general maintenance costs are recovered through service charges, connection charges, and miscellaneous fees and charges. Capital costs for system development, large maintenance project and renewal and replacement projects are funded through net revenues, bond proceeds, developer contributions, contributions from other municipalities and capital recovery charges.

User charges and fees are established by WWS and approved by the Board of County Commissioners. The Board has specific legal authority to fix charges and collect rates, fees and charges from its customers and to acquire, construct, finance and operate the Utility.

### B. Broward County Operated Regional Wastewater System

1. **Service Area and Customer Base.** The concept of "service area" does not apply to the Regional Wastewater System. The Regional Wastewater System has 12 customers, termed "Large Users". Large Users include the Broward County Operated Retail Utility, the City of Coconut Creek, the City of Coral Springs, the City of Deerfield Beach, the City of Lauderdale, the City of North Lauderdale, the North Springs Improvement District, the City of Oakland Park, the City of Parkland, the City of Pompano Beach, Royal Utilities (a private utility), and the City of Tamarac. Altogether, the Large Users account for service to about 40% of the County's population.

Service is provided pursuant to individual contractual agreements between the County and each Large User. Generally the agreements specify the large user's reserve capacity in the plant and provisions for billing and payment of service. All Large Users, except Oakland Park, are required to deliver all wastewater flows collected by it to the Regional Wastewater System. Oakland Park sends a portion of their flow to the Fort Lauderdale wastewater treatment facility.

2. **Level of Service Standard.** The level of service standard for the regional wastewater system is the obligations of the County as described in the contractual agreements with its customers. The Agreements specify that the Regional Wastewater System will treat and dispose of all wastewater delivered to it. Large Users are responsible for maintaining their individual systems and to deliver wastewater to the Regional Wastewater System at the

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required elevation or pressure. They are responsible for the prevention of excessive peak flow rates. Large Users must submit annual updates of flow estimates. The County is required to use these estimates to plan future treatment capacity.

The County's obligation to provide service is limited to the capacities reserved by the Larger Users, which may be changed by amendment to the Agreement. The Agreement allows a Large User to lease or sell excess capacity to another Large User, subject to County approval. The agreements provide that the County will extend and expand the Regional Wastewater System to provide for the Large User's scheduled flow.

**Table 5-2  
Regional Wastewater System Annual Flow and Reserve Capacity**

Customer	Annual Average Flow (MGD)	Reserve Capacity (MGD)
WWS Districts 1 & 2	14.01	16.71
Coconut Creek	4.48	6.04
Coral Springs	7.90	9.79
Deerfield Beach	6.67	7.00
Lauderhill	5.77	7.10
North Lauderdale	3.54	3.80
North Springs	2.33	3.53
Oakland Park	1.13	1.52
Parkland	0.25	0.31
Pompano Beach	16.12	15.71
Royal Utilities	0.24	0.45
Tamarac	7.39	8.04
Not Allocated	-----	4.00

**Note:** All values rounded to the nearest hundredth of an MGD. The County (WWS) does not have a contract with itself; therefore there is no contractual reserve capacity for WWS.

3. **Existing Treatment and Effluent Disposal Facilities.** The North Regional Wastewater Treatment Plant (NRWWTP) is located at 2555 West Copans Road, Pompano Beach. The facility was originally constructed in 1974 with a treatment capacity of 20 MGD. The plant has since been expanded to its current permitted capacity of 84 MGD ADF. The facility's operating permit number with FDEP is FL0031771. The NRWWTP utilizes an activated sludge treatment process for liquid treatment and an anaerobic digestion system for handling the sludge produced from the liquid treatment process. About 75% of the 80,000 tons of biosolids (sludge) generated annually by the treatment process are recycled via landspreading; the remainder is landfilled.

Effluent from the liquid treatment process is chlorinated and either pumped through about 6 miles of 54-inch diameter outfall piping into the Atlantic Ocean, disposed of in on-site deep

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injection wells, or filtered via the County's 10 MGD reclaimed water system. Permitted effluent disposal capacity is 84 MGD ADF.

The County's effluent management program includes the second largest reclaimed water system in South Florida. This 10 MGD system provides highly treated water for industrial and landscape irrigation purposes. Currently reclaimed water is used for irrigation, industrial process water at the North Resource Recovery Plant (a solid waste incinerator), and at the NRWTP. The County and nearby municipalities have been actively pursuing state and local funding for further development of the reclaimed water system.

4. **Existing Transmission System.** The regional wastewater transmission system consists of about 66 miles of force main pipeline ranging in size from 12 inches to 54 inches in diameter; 15 master pump stations and 11 metering points. WWS significantly upgraded the capacity of the transmission piping system in the mid-1990s to meet the then expected "buildout demands". The buildout year varied from large user to large user with most being 2020 to 2023.

The transmission system was re-hydraulically modeled in 2002. The modeling confirmed the need for capacity increases for three pump stations by the year 2005. These pump stations are being modified accordingly.

5. **Regulatory Requirements.** Operation of the Regional Wastewater System is regulated by the USEPA, FDEP, and EPGMD. Regulatory requirements are focused on effluent management, sludge disposal, reclaimed water and an industrial pretreatment program.

In fiscal year 2003, the Regional Wastewater System had no violations. The System was in full compliance with effluent quality standards.

6. **Overview of Financial Operations.** Large User agreements extend for a term that is one year past the last payment of any debt obligation applicable to the Regional Wastewater System. Each agreement designates a Large User's reserve capacity and provides a method to charge each Large User for the availability and provision of service. On a monthly basis, each user is billed a fixed charge depending upon the user's reserve capacity. This fixed charge is designed to recover each large user's equitable share of debt service. Operation and maintenance costs are also billed on a monthly basis, and are based on the Large User's pro rata usage of the Regional Wastewater System. Changes to the rates, fees and charges must be approved by the Board of County Commissioners at a public hearing.

C. Unincorporated Areas. The unincorporated area has greatly decreased since the preparation of the 1997 version of this support document, and this trend is expected to continue as additional properties are annexed into existing municipalities and new municipalities such as

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Southwest Ranches and West Park were created. The 2000 Census population for the unincorporated area was 127,836, while annexations since 2000 have decreased the 2000 Census figures to 22,950. Public sanitary sewer collection/transmission and treatment/disposal services for these annexed areas are either accomplished as previously explained in the Broward County Water and Wastewater Services sections of this support document or in conjunction with the municipal utility departments.

Annexation is currently pending for many of the remaining unincorporated areas. The land use and zoning for many of the unincorporated areas of significant size, such as United Ranches near Cooper City, Country Acres near Coral Springs, and Hillsboro Pines near Parkland support large lot residential development. Public sanitary sewer service is not available for many of these areas, and sanitary service is currently accomplished by on-site treatment and disposal facilities such as septic systems.

Discussions were held with representatives of the utility and/or planning departments of the Cities of Cooper City, Fort Lauderdale, Hollywood, Plantation, and Sunrise. Comprehensive Plan data and other information from the municipalities and from the Broward County Environmental Protection and Growth Management Department (EPGMD) were utilized to prepare the following sections for the unincorporated area.

1. **City of Cooper City.** The City of Cooper City provided sanitary sewer service for two homes in the unincorporated area as reported in the 1997 version of this support document. Discussions with City growth management and utility staff were not conclusive as to whether or not these two homes are still in the unincorporated area. The planning service area stated in the February 2003 revision of the City of Cooper City Comprehensive Plan, Chapter 4, Infrastructure Element; this includes unincorporated areas that either have since become incorporated or contain large lot residential areas that utilize septic systems.
2. **City of Fort Lauderdale.** The City of Fort Lauderdale provides sanitary sewer service for three areas (e.g., Roosevelt Gardens, Franklin Park, and Washington Park) of unincorporated Broward County, as noted in the Sanitary Sewer, Solid Waste, Drainage, Potable Water and Natural Groundwater Aquifer Recharge Element support document amendments of July 16, 2002.
3. **City of Hollywood.** City of Hollywood utility representatives indicated that there may be a small amount of the unincorporated area near State Route 7 for which sanitary sewer service is provided by the City of Hollywood. They also reported that a large portion, if not all, of what was unincorporated area was annexed into the City of Dania Beach. The City of Hollywood also provides wastewater treatment and disposal service for two regional county facilities that remain in the unincorporated area: Fort Lauderdale-Hollywood International Airport and the resource recovery plant and ash landfill east of State Route 7 and south of Interstate 595.

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4. **City of Plantation.** As indicated in Section III.A4 of this document, Broward County Water and Wastewater Services has already completed a conceptual engineering plan to install sanitary sewers in the unincorporated area known as Broadview Park, which is the last large remaining unincorporated area near the City of Plantation. Sewage from Broadview Park would then be transmitted to the North Regional Wastewater Treatment Plant. The City of Plantation currently provides wholesale potable water to the Broadview Park area, as indicated in the City of Plantation Water Supply Facilities Workplan.

5. **City of Sunrise.** The City of Sunrise provides sanitary sewer collection/transmission, treatment, and disposal services for the last remaining significant unincorporated area in its service area, Pine Island Ridge, whose citizens recently voted to be annexed into the Town of Davie effective September 15, 2006.

6. **Wastewater Demands, Treatment Plants and Disposal Methods.** Wastewater demands, treatment plant information, and disposal information for the three municipal systems that provide significant service to the unincorporated areas are shown in the following table 2-A.

**Table 5-2-A  
Population, Sewage Flow, Capacity, Treatment, and Disposal Information for  
Municipalities Serving the Unincorporated Area**

	<b>Fort Lauderdale</b>	<b>Hollywood</b>	<b>Sunrise</b>
2000 Census city population as annexed through October 2005	170,823	139,545	85,787
Annual average daily flow (mgd-2005)	37.52	41.78	22.85
Licensed design capacity (mgd-aadf)	48.00	48.75	30.45
Treatment type	Secondary	Secondary	Secondary
Disposal method	Deep well injection	Reuse, ocean outfall, and deep injection well	Deep well injection and percolation ponds

### III. DATA ANALYSIS

#### A. Broward County Operated Retail Utility

##### 1. **Projected Flows.**

*a. Methodology Used to Determine Future Population.* Population from the decennial Census of Population and Housing, collected by the United States Bureau of the Census, is considered to be the definitive base for population modeling in the United States. New data from the 2000 Census was published in 2001. Based on that

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data, Broward County Planning and Redevelopment Division (PRD) staff projected future population for 2001 to 2030 using the Broward County Population Forecasting Model (BCPFM). This model has been certified by the State of Florida's Department of Community Affairs for use in the Broward County Comprehensive Plan.

The BCPFM is a cohort survival model which consists of two major parts, natural increase and net migration. Natural increase is the difference between the number of births and the number of deaths for a given period. Net migration equals the number of people moving into the County minus the number of people moving out of the County. The BCPFM shows an increase in population from 1.6 million in 2000 to 2.5 million in 2030.

Utilizing Broward County's population forecast, EPGMD staff assigned that population to the County's 892 traffic analysis zones (TAZ). TAZs are the smallest level of geography that allow for both a measure of accuracy and flexibility. First, the population forecasts are translated into households by household size. The implication in this is that population change over time is determined by the number of housing units in an area, the occupancy rate, and the distribution of households by size.

Second, the base distribution of housing units for the year 2000 is determined. While Census 2000 is an adequate base for the County-wide distribution, there are instances of misplacement of units that cause error in both the base population and the forecasts. To set the base, a variety of sources were utilized with checks and cross-checks designed to identify problem areas. The problem areas were then resolved individually.

Third, measures of growth potential and of the pressure for change are calculated. These forces and their interaction will cause the number, the occupancy, and household-size distribution to change over the forecast period. Factors such as available vacant residential parcels, platted lands, and land use plan capacity all play a role in the growth of an area. Combining these elements into a cohesive computer application is then performed. The final product results in a series of worksheets showing the number of households, vacant units, total units, and total population for individual years 2000 through 2010 and for years 2015, 2020, and 2025 for each of the 892 TAZs.

*b. Methodology Used to Determine Projected Flows.* WWS first estimated future potable water flows, then determined future sanitary sewer flows based on the potable water estimates. WWS' potable water and sanitary sewer service areas cover geographically different areas. Each district has locations where WWS provides

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water service but not sanitary sewer service, and/or visa versa. These differences were accounted for when estimating future sewer population.

WWS uses utility analysis zones (UAZ) to plan and coordinate utility activities within its service areas. The UAZ defines the boundaries of the utility's service areas within each TAZ. WWS service areas encompass 150 of the 892 TAZs, which are then divided into 125 UAZs. Retail customers in each UAZ are categorized as "single family residential", "multi-family residential", "commercial" and "other".

In 1995, as part of a master planning effort, water usage for each of the four customer categories listed above was determined for each UAZ using current WWS billing records. System uses were calculated on a District by District basis and allocated to each UAZ to determine a total potable water demand per UAZ. The percentage of a TAZ in each UAZ was also determined. Adjustments were made to account for UAZs where WWS does not provide potable water service (i.e. those UAZs or portions of UAZs where WWS provides services for sewer only, not water) and for UAZs that contained a portion of a TAZ that did not include single or multi-family residential land use. The adjustment consisted of a deduction in the TAZ percentage based on land area.

In February 2003, EPGMD provided WWS with projected population changes prepared by PRD in five year increments from 2000 to 2025 for each TAZ that is totally or partially within the WWS' retail service areas. EPD also provided PRD estimates of dwelling unit changes through the year 2025. Based upon the numbers provided and subsequent briefings by EPGMD staff, WWS service areas are expected to be impacted by two phenomena in the future: (1) A redevelopment corridor loosely defined as bordering and to the east of State Road 7; and (2) An increase in the number of people living in each dwelling unit, both new and existing.

WWS projections utilize the year 2000 as a base year. Following the methodology used in the WWS Master Plan, the year 2000 population was determined for each UAZ based on the 2000 Census data and for the year 2025 based on projections provided by EPGMD. A percentage change was calculated for each UAZ. The 1995 billing records detailed analysis was adjusted for each service area to the year 2000 by a percentage adjustment geared to match the actual year 2000 demand for that service area. Except for District 3A, these percentage adjustments were 5% or less. The adjustment for District 3A was 22%, which may be attributed to commercial demands resulting from the growth associated with expansion of the Fort Lauderdale-Hollywood International Airport.

The 2025 demands for "single family residential" and "multi-family residential" were estimated by multiplying the year 2000 demands by the change in population from

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2000 to 2025 for each UAZ. The year 2025 demands for “commercial” and “other” required a slightly different approach. Because it was not reasonable to assume that a person works or even shops in the same UAZ in which they live, the overall change in population of the combined service areas was multiplied by year 2000 “commercial” and “other” demands for each UAZ. The overall change in population of the combined service areas is approximately equal to the change in population for the entire County. Year 2025 system uses were set as a fixed percentage of demand, with the same percentage used for each District.

Because projections indicate that more people will be living in a dwelling unit, demands should not increase on a straight percentage basis as population increases. While inside use increases in direct proportion to population, irrigation does not as it is not dependent on the number of people in a dwelling unit. This reduction in flow would manifest itself as water conservation (fewer gallons per capita). Therefore, a 4% adjustment was made to account for the differential. Projected water demands for each of the WWS service areas have been reduced by this 4% densification factor.

Currently not all WWS water customers are on sanitary sewer. It was assumed that by the year 2025 all WWS water customers will be on sanitary sewer. The year 2025 billed water to sewer customers was determined by calculating a percentage of acres served by sewer as compared to acres served by water. A reduction was made for water used for irrigation. Total wastewater per UAZ was calculated by adding an infiltration/inflow allowance calculated on a per acre basis. The 2002 Master Plan established two infiltration/inflow criteria: one for new sewer systems and the other for rehabbed sewer systems. The appropriate criteria were applied after considering which UAZs would have their sewer systems reconstructed between now and 2025.

Interim year demands were determined by doing the same detailed population projection as was done for the year 2025, then calculating change in demand as a percentage of change in population.

Overall, year 2025 sewered population in the four retail districts is expected to increase by 95% over year 2000 levels, compared to a 52% increase in the population served with potable water. This difference is due to WWS’ plans to provide sanitary sewer service to currently unserved areas.

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### c. Projected Flows

**Table 5-3**  
**BCWWS Retail District 1 Projected Sewered Population and Sanitary Sewer Demands**

Year	Projected Sewered Population	Average Day Sanitary Sewer Flow (MGD)
2000	57,197	7.1
2005	59,478	7.4
2010	61,703	7.6
2025	84,761	10.2

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD

**Table 5-4**  
**BCWWS Retail District 2 Projected Sewered Population and Sanitary Sewer Demands**

Year	Projected Sewered Population	Average Day Sanitary Sewer Flow (MGD)
2000	60,973	7.8
2005	71,581	8.4
2010	81,556	9.1
2025	105,252	10.6

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD.

**Table 5-5**  
**BCWWS Retail District 3A Projected Sewered Population and Sanitary Sewer Demands**

Year	Projected Sewered Population	Average Day Sanitary Sewer Flow (MGD)
2000	6,958	1.6
2005	8,023	1.8
2010	9,175	2.1
2025	21,646	5.0

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD.

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**Table 5-6**  
**BCWWS Retail District 3BC Projected Sewered Population and Sanitary Sewer Demands**

Year	Projected Sewered Population	Average Day Sanitary Sewer Flow (MGD)
2000	0	0.0
2005	11,649	0.9
2010	12,304	0.9
2025	31,928	2.5

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD.

2. **Level of Service Standards.** The Level of Service Standards as described in Table 1 are not anticipated to change over the planning horizon. WWS has linked its level of service analysis to its developer coordination process as described in appendix 1 - Determining WWS' Ability to Serve.

3. **Treatment and Effluent Disposal Facilities Needs.** District 1 and District 2 treatment and effluent disposal facilities needs will be met by the Regional Wastewater System. See that Section for more information.

District 3A and District 3BC treatment and effluent disposal facilities needs are met by the City of Hollywood's facilities. WWS has 5 MGD of reserve capacity at the Hollywood WWTP, which should be sufficient until about the year 2018. This provides sufficient time for WWS and Hollywood to make arrangements for Hollywood to handle the additional 2.5 MGD required to meet year 2025 needs.

4. **Transmission/Collection System Needs.** The 2002 Master Plan did not contain significant transmission system recommended improvements. Collection system recommended improvements were to increase the capacity of a few force mains and lift stations as growth occurs. Piping that might reach the end of its useful life during the planning period was not addressed as WWS had started implementation of its Neighborhood Improvement Program (NIP) as described below.

Simultaneous with Master Plan development in the late 1990s, WWS implemented a program to address drainage issues in certain areas. This program was quickly expanded by the County to include street improvements, sidewalks and neighborhood landscaping. WWS decided to upgrade a substantial portion of its piping system in the area covered by the program. Water and sewer system were planned to be repaired/ replaced as necessary and service (mostly sewer service) extended to those that did not have it. The NIP which consists

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of a set of projects (Project) in eight major communities representing 25 neighborhoods have grown into a significant effort requiring a substantial portion of WWS' retail utility resources, in terms of money and staff effort. From about 1997 to 2004, WWS' retail utility capital improvement program focused on the NIP as its major component.

District 1 contains the Central County Neighborhood Improvement Program, Riverland Village Neighborhood Improvement Program, North Central County Neighborhood Improvement Program, North Andrews Gardens Neighborhood Improvement Program and the Broadview Estates Neighborhood Improvement Program. These Projects are anticipated to be completed by the year 2008 at an estimated cost of \$320 million (the estimated cost includes a substantial amount of non-utility costs like drainage, sidewalks and landscaping). When completed, about 53% of the District 1 utility system (by area) will have been addressed.

District 2 contains the North County Neighborhood Improvement Program which is anticipated to be completed by the year 2010 at an estimated cost of \$167 million. When completed, about 28% of the District 2 utility system (by area) will have been addressed.

District 3A does contain a Neighborhood Improvement Program.

District 3BC contains the South County Neighborhood Improvement Program which is anticipated to be completed by the year 2005 at an estimated cost of \$95 million. When completed, about 34% of the District 3BC utility system (by area) will have been addressed.

The Projects described above constitute a major commitment on the behalf of WWS to upgrade and improve its sewer transmission/distribution system, and to extend sewer service. All totaled, they will address about 32% of the combined districts utility system (by area).

However, WWS realizes that the effort can not stop with the previously identified NIP. In 2001 WWS developed a Capital Projects Prioritization methodology that is described more fully in the Capital Improvements Section. This methodology provides a systematic approach to continued upgrading of the WWS systems. WWS' proposed FY2005 five year capital improvements program envisions additional millions of dollars spent to continue the improvement effort started via the NIP. As District 3A does not have any Projects it was given special consideration so the needs of all four districts are addressed.

In mid-2004, Broward County acquired the Broadview Park private utility. The Broadview Park service area contains about 715 acres and is located by State Road 7 to the east, Peters Road to the north, Florida's Turnpike to the west and Interstate I595 to the south. The area contains about 6500 people. Projected future sewer demand is 0.6 MGD ADF. WWS has already completed a conceptual engineering plan to update the water system and install sanitary sewers in the area.

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7. **Changing Regulatory Requirements.** Changing regulatory requirements are not expected to significantly affect the WWS retail utility.

8. **Capital Improvement Program.** The Broward County Board of County Commissioners is the authority responsible for approving WWS capital improvement program budgets. Each year the Board approves an encumbrance budget for the next fiscal year and a five year capital improvement plan. See the Capital Improvements Element for information on WWS' capital improvement program.

### B. Broward County Operated Regional Wastewater System

1. **Projected Flows.** Each year users of the Regional Wastewater System are required to submit flow projections. Below are the latest projections.

Year	Total
2005	81.8
2010	86.7
2025	93.4

**Table 5-7  
Regional Wastewater System Projected Demands**

Year	BCWWS Districts 1 & 2	Coconut Creek	Coral Springs	Deerfield Beach	Lauderhill	North Lauderdale
2005	15.8	7.2	9.4	8.5	6.9	3.9
2010	16.7	8.0	10.1	8.6	7.0	4.2
2025	20.8	8.0	10.1	9.0	7.0	4.5

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD. (1) Current projected demands not available; used current plant allocation.

### Regional Wastewater System Projected Demands (continued)

Year	North Springs	Oakland Park	Parkland (1)	Pompano Beach	Royal Utilities (1)	Tamarac
2005	3.6	1.5	0.3	16.3	0.5	7.9
2010	4.4	1.5	0.3	17.3	0.5	8.1
2025	4.6	1.5	0.3	18.9	0.5	8.2

**Note:** All flows are annual average flows, rounded to the nearest tenth of an MGD.

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WWS is the only one of the Large Users that has published its 10-Year Water Supply Facilities Workplan. Based on its own experiences, WWS anticipates that future flow projections of the other Large Users may increase as new potable water projections are completed based on the year 2000 census population projections.

2. **Level of Service Standards.** The level of service standard for the regional water supply is not anticipated to change from the current level of service standard, which is to provide the customer with a “reserve capacity”.
3. **Treatment/ Effluent Disposal Needs.** Treatment and effluent disposal facilities are currently being expanded to 100 MGD ADF. This expansion is scheduled to be completed by the year 2007. Once completed, it should meet the needs of the Large Users through the year 2025.
4. **Transmission System Needs.** The transmission system was most recently modeled the year 2002. The results of that modeling indicated the following schedule for pump station upgrades:

**Table 5-8  
Regional Wastewater System Projected Pump Station Capacity Limitations**

<b>Pump Station</b>	<b>Current Capacity (MGD)</b>	<b>Year Over Capacity</b>
22	2.6	2015
420	2.6	2020
424	3.8	2010
426	2.2	2015
440	16.0	2005
452	16.0	2005
455	15.3	2020
458	9.3	2015
462	12.3	2005

All other pump stations and the transmission piping were adequately sized through the year 2020. WWS should re-examine the transmission system’s capacity after each Large User has completed its 10-Year Water Supply Facilities Workplan and adjusted its wastewater projections accordingly.

5. **Changing Regulatory Requirements.** Management effluent and biosolids will likely continue to challenge WWS. Three potential concerns that could have significant financial impacts to the regional system are:

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- 1) EPA rule-making with regards to the practice of disposing treated wastewater in deep wells. Rule changes that would necessitate higher treatment levels would have a significant financial impact on WWS operations.
- 2) The growing concern over the potential impact that prescription and other drug residuals that reach wastewater effluent may have on both the natural system and humans. Research is under-way that will attempt to measure these impacts and at what dosages they may cause harm. These studies, the results and subsequent potential rule-making will probably occur in the next ten years. New treatment methods will need to be developed and implemented to comply with any rule making.
- 3) The impact of treated wastewater discharged to the ocean and how these discharges are impacting near shore reefs and bottom dwelling plants and sea creatures. NOAA (National Oceanic Atmospheric Administration), the EPA, FDEP and utilities statewide are participating in a long term study to determine what if any impacts these discharges are having. Depending on the outcome of the study, the potential impact on Southeast Florida utilities could be significant. The studies should be completed in approximately ten years.

6. **Capital Improvement Program.** The regional wastewater treatment plant is currently under expansion to 100 MGD. This is the only significant capital improvement currently contemplated.

### C. Unincorporated Areas.

The 2000 Census indicated that 127,365 people lived in the unincorporated area. As of October 2005, 40 neighborhoods have either annexed into existing municipalities or have become part of two new municipalities: Southwest Ranches and West Park. These annexations and new municipalities have resulted in the decrease in the 2000 Census population to 22,950 for the unincorporated area. Referenda in March 2006 resulted in Country Acres annexing into Parkland and Pine Island Ridge annexing into Davie, both effective September 15, 2006. A vote will be held in July 2006 pertaining to the potential annexation of Pine Island Ridge into either Cooper City or Davie, which, if approved, would also be effective September 15, 2006. If these pending actions as well as voluntary parcel annexations are approved, the unincorporated area population will be reduced to 16,699.

The future needs of the municipal wastewater treatment facilities and their respective collection/transmission systems will not be greatly impacted by the annexation or continued unincorporated area status of the remaining unincorporated areas. Most of the areas are already developed, and either are already connected to a municipal system or utilize septic systems. Table 9 illustrates that the municipal facilities have sufficient capacity to support the development of the undeveloped properties in the projected remaining 7.3 square miles of

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unincorporated area outside of the 5.8 acres of already developed regional facilities such as landfills and airports.

**Table 9**  
**Wastewater Treatment Plant Committed and Available Capacities for**  
**Plants Serving the Unincorporated Area**

	<b>Fort Lauderdale</b>	<b>Hollywood</b>	<b>Sunrise</b>
Licensed design capacity (mgd-aadf)	48.00	48.75	30.45
Annual average daily flow (mgd-2005)	36.88	41.01	23.10
Committed flows per building permits (mgd)	1.96	1.27	0.59
Total capacity utilized (mgd)	38.85	42.28	23.69
Total capacity utilized (%)	80.93	86.74	77.99
Available capacity (mgd)	9.15	6.47	6.76
Available capacity (%)	19.06	13.26	22.00

#### IV. IMPLEMENTATION

A. Authority The WWS is concerned with the treatment and collection of wastewater. The EPGMD regulates the operation of sanitary sewer treatment facilities. The EPGMD applies a stringent performance standard to wastewater treatment plants. Because most package plants can not meet the standard, they are effectively disallowed under the regulations. The Florida Department of Health issues septic tank permits in Broward County for installation, design, and location of septic tanks.

The wastewater daily flow design factor for development utilized by EPGMD in determining adequacy and concurrency of sanitary sewer facilities shall be applied to the County's sanitary sewer facilities as well as those municipal and private utilities serving the Unincorporated Areas, Table 10 .

EPGMD utilizes the following unit flows for determining adequacy of wastewater service during the development review process.

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**Table 10  
Wastewater Design Flows**

<b>Type of Structure Design Flow per Unit</b>	<b>Specific Condition Gallons per Day</b>
Airports, bus terminals, train stations, Port & dock facilities per passenger	5
Add per employee per 8 hour shift	20
Assembly Halls per seat	2
Bar & Cocktail Lounges (No food service) per seat	20
Barber and Beauty Shops per dry service chair	100
per wet service chair	200
Assembly Halls per seat	2
Bowling Alleys per lane (no Food Service)	100
Camps day, no food service	25
Luxury resort, per person	100
Labor, per person	100
Camper or RV Trailer Park per space	150
Car Wash automatic type	3500
automatic type (recycled water)	350
hand wash	1750
Churches per sanctuary seat	7
Dance Halls per person	2
Dentist offices per dentist	250
plus wet service chair	200
Doctor offices per physician	250
plus per wet service chair	200
Drive-in theater per car space	5
Fire Station per bed	100

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**Table 10  
Wastewater Design Flows**

Type of Structure Design Flow per Unit	Specific Condition Gallons per Day
Hospitals and Nursing Homes per bed space (Does not include public food service areas and offices)	210
Laundries per coin operated machine per commercial non-coin operated machine	400 650
Institutions per person (including resident staff)	100
Kennels per animal space per veterinarian	30 250
Marinas per boat slip (Does not include office, repair & leisure facilities)	40
Office Buildings per square foot of floor space	0.20
Parks, Public with Comfort Stations per visitor	10
Recreation / pool Buildings per person (300 gallon minimum)	2
Residences Single family, detached Multi-family buildings Motel/Hotel Units Bedroom additions to SFR Mobile Homes	300 GPD each unit 250 GPD per unit 150 GPD per bedroom 150 GPD per bedroom 300 GPD each
Restaurants open 24 hours runoff , per seat (including bar) open less than 24 hours runoff /seat (including bar) open less than 24 hours, with drive thru window, per seat including bar Drive-ins, per space Carry out food service only per 100 square feet	50 30 35 50 50

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**Table 10  
Wastewater Design Flows**

Type of Structure Design Flow per Unit	Specific Condition Gallons per Day	
Schools:	Elementary /Middle	High
each pupil per day	10	15
add for shower/pupil	5	5
add for cafeteria/pupil	5	5
boarding per pupil	100	100
Service Stations and auto repair shops per water closet plus per service bay		250 100
Shopping Centers and retail shops per sq. ft. of floor space (no food service or laundry)		0.1
Theaters and auditoriums per seat		5
Warehouse, mini-storage, with resident manager per square foot of floor space plus resident		0.01 250
Warehouses per sq. ft. of storage space		0.1

**Source:** Article V, "Water Resource Management", Chapter 27, Broward County Code of Ordinances.

The Broward County Land Development Code (LDC) Section 5-182(g), requires adequate wastewater treatment and disposal service prior to issuance of any development permit in the Unincorporated Area. Section 5-198(f) of the LDC requires adequacy of wastewater treatment and disposal service for developments within municipalities which are required to plat. Adequacy of service is based upon the demonstration that an existing wastewater treatment and disposal facility has sufficient capacity to provide for the needs of the new development and the other developments in the service area. If service is not currently available, but there is an economically and fiscally feasible plan to provide service, the development permit may be conditioned on that availability.

The Broward County Health Department, Florida Department of Health has regulatory responsibility for issuing septic tank permits under Chapter 10D-6 of the Florida Administrative Code and Broward County Ordinance 78-50. The Environmental Health Section inspects all constructed systems before they are covered to assure compliance with State and County rules. Permits must be obtained from the Broward County Health Department to install a septic tank. The permitting of septic tanks is conducted on a case by case basis. Septic tanks are permitted if existing sewer lines are more than one-quarter (1/4) mile from a proposed subdivision or one hundred feet from a single family unit. There are

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approximately 200 new septic tank systems approved for operation annually. The demand factor is based on the square footage for residential, private well or public water supply, and commercial use. The design flow demand factor is 2500 gallons per day for residential use and 1500 gallons per day for commercial use. The design flow demand factor is 2500 gallons per day for residential use and 1500 gallons per day for commercial use. This regulation also prohibits the installation of a septic tank discharging greater than 1,500 gallons of wastewater per day per acre where there exists an approved public water distribution system. In instances where there is no approved public water distribution system, no septic tank shall be permitted which discharges over 750 gallons of wastewater a day per acre.

### B. Sources.

1. Broward County Health Department
2. Broward County Water and Wastewater Services
3. Broward County Environmental Protection and Growth Management Department
4. Broward County Planning and Redevelopment Division
5. Broward County Development Management Division
6. City of Hollywood Utilities Division
7. City of Ft. Lauderdale Utilities Division
8. City of Sunrise City
9. City of Cooper City Utilities Division
10. Indian Trace Community Development District
11. City of Pompano Beach Planning

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**V. APPENDICES**

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### APPENDIX 1

**Determining WWS' ability to serve.** Determining WWS' ability to serve a potential sanitary sewer customer starts with calculating average day demand for the potential customer.

**Average Day Demand.** When specific type of use information is available, Table A1 should be used to calculate average day demand, in gallons per day (gpd).

**Table A 1**  
**Specific Type of Use Sanitary Sewer Average Day Demands**

Type of Use	Unit	Demand (gpd/unit)
Bar, Cocktail Lounge	1000 SF of gross building area	305
Condominium, Apartment	Each	197
Day Child Care	1000 SF of gross building area	156
Fast Food Service	1000 SF of gross building area	853
Gas Station (fueling only)	fuel pump	135
Hotel (with restaurant and/ or meeting rooms)	rental room	214
Hotel (without restaurant and/ or meeting rooms)	rental room	63
Laundry and/ or Dry Cleaning (staff operated machines)	1000 SF of gross building area	684
Laundry and/ or Dry Cleaning (coin operated machines)	1000 SF of gross building area	2137
Merchandising	1000 SF of gross building area	136
Mobile Home	Lot	137
Movie Theater	Seat	2
Office	1000 SF of gross building area	157
Place of Worship	1000 SF of gross building area	129
Restaurant	1000 SF of gross building area	615
School	Student	11
Self Service Storage	1000 SF of gross building area	16

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**Table A 1**  
**Specific Type of Use Sanitary Sewer Average Day Demands**

Type of Use	Unit	Demand (gpd/unit)
Single Family Residential	Each	251
Vehicular Repair	1000 SF of gross building area	117
Warehouse (mixed use)	1000 SF of gross building area	91
Warehouse (homogeneous, bulk storage)	1000 SF of gross building area	43

**Source:** Specific Type of Use Potable Water Average Day Demands, adjusted by the ratio of Generic Sewer Average Day Demand (Table A2) to Generic Potable Water Average Day Demand, calculated as follows:

Single Family Residential	77%
Multi-Family Residential	75%
Commercial	82%

WWS reserves the right to develop similar values for other specific types of use not listed above. When specific type of use information not is available, Table A2 should be used to calculate average day demand.

**Table A 2**  
**Generic Sanitary Sewer Average Day Demands per Acre**

Land Use	Average Day Demand (gpd/acre)
Single Family Residential	1300
Multi-Family Residential	1680
Commercial	920

**Source:** 2003 Flow Projections of Year 2025 Demands Based on 2000 Census.  
Includes Infiltration/Inflow for new systems of 160 gpd/acre, Master Plan Section 6.4.1.4

WWS reserves the right to adjust the Table A2 “Commercial” demands as necessary to meet the specific conditions presented by a potential customer.

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**Wastewater Treatment Plant and Effluent Disposal.** The sanitary sewer average day demand calculated above is used for the level of service condition for wastewater treatment plant and effluent disposal.

Any analysis of available capacity must include prior commitments to serve permitted but not yet constructed developments, as well as existing customer flow. Therefore, the sum of existing customer average day flow, prior commitments and potential customer average day demand is compared to the facility's permitted capacity.

Example:	Existing customer average day flow	= 4,000,000 gpd
	Prior commitments average day flow	= 1,000,000 gpd
	Potential customer average day flow	= 500,000 gpd
	Total average day flow	= 5,500,000 gpd
	Facility permitted capacity	= 6,000,000 gpd

Existing customer average day flow plus prior commitments plus potential customer average day demand equals 5,500,000 gpd, which is less than the facility's permitted capacity of 6,000,000 gpd. Therefore, WWS can provide the appropriate wastewater treatment and effluent disposal level of service to this potential customer.

**Sanitary Sewer Collection System.** Detailed analysis of the collection system may be done by WWS when WWS reviews detailed engineering issues with the developer as part of WWS developer coordination process. Collection system issues are not considered in WWS earlier reviews, since the nature of the collection system changes over time as improvements are made. A potential customer must make whatever collection system improvements are necessary to provide the required level of service in order to proceed with their project.

Before the collection system analysis can begin, the development plan must be detailed enough to be able to use Table A1 – Specific Type of Use Sanitary Sewer Average Day Demands to calculate the potential customer's average day demand. The potential customer's average day demand will be increased by a safety factor of 50% for use in collection system analysis and sizing. The average day demand with safety factor is then multiplied by a factor from Table A3 to determine peak demand.

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**Table A 3**  
**Sanitary Sewer Peaking Factors**

<b>Land Use</b>	<b>Factor</b>
Single Family Residential	3.5
Multi-Family Residential	3.5
Commercial	3.8

WWS reserves the right to adjust the Table A3 “Commercial” peaking factor, as necessary, to meet specific conditions presented by a potential customer.

Any analysis of available capacity must include prior commitments to serve as well as existing customer flow. There is no permitted capacity for a collection system. Determining if the collection system can provide the appropriate level of service is accomplished by analyzing the collection system in a peak loading condition. That is, the collection system is loaded with the peak demand of existing customers, prior commitments and the potential customer. Under this loading condition, all gravity sewers must be able to pass the wastewater without surcharging, and all pump stations must be able to pump the wastewater without the use of the station’s standby pump.

Further, the collection system will be analyzed in two configurations: existing system and year 2025 system.

If the collection system meets the loading condition criteria in both the existing and the year 2025 configuration, then the system can provide the required level of service. If the system cannot provide the required level of service, improvements are necessary.