

Section 3: WASTEWATER FLOW FORECASTS

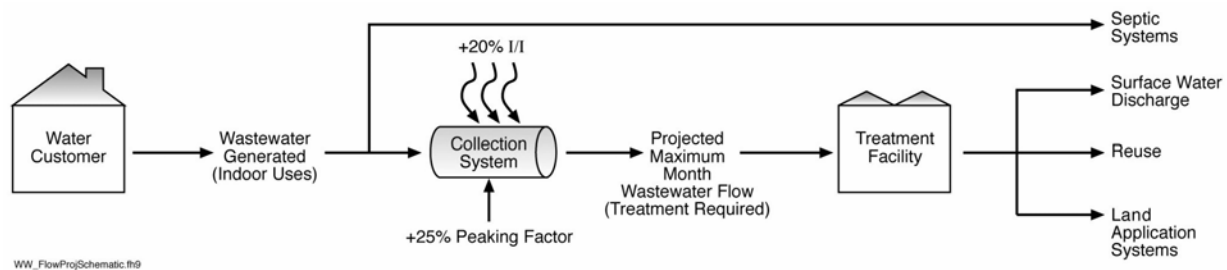
The population of the 15-county Metro Water District is expected to increase by over 3 million people during the planning period: from 4.4 million in 2005 to 7.5 million in 2035. A corresponding increase in economic activity is projected. The increase in population and economic activity is projected to produce 993 million gallons per day of wastewater that will need to be managed during a maximum month in 2035.

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The wastewater flow calculation procedure used for this Plan is illustrated below in Figure 3-1. Wastewater flow calculations were based on water use information for Metro Water District water customers provided by local water providers. The Demand Side Management Least Cost Planning Decision Support System (DSS) model water demand input and outputs are outlined in greater detail in Section 3 of the Metro Water District’s Water Supply and Water Conservation Management Plan.

The DSS model provided per capita water customer usage as indoor and outdoor water use. Per capita and per employee indoor water use rates were multiplied by population and employment forecasts for the planning period. Only indoor water use was considered as wastewater generated since outdoor water use, such as lawn irrigation, is not captured by septic systems or wastewater collection systems.

FIGURE 3-1
Wastewater Flow Calculation



Total wastewater generated was determined by summing all indoor water uses (residential and non-residential). The wastewater generated is discharged to either septic systems or wastewater collection systems. The septic system flows were calculated, as outlined below, and subtracted to determine the flow into collection systems.

Wastewater flows associated with existing non-residential septic systems are a small percent of the overall flows to septic systems and these flows are anticipated to transition to sewer during

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the planning period. Therefore, non-residential septic system flows are accounted for in the flow forecasts to treatment facilities. It was assumed that all future non-residential wastewater flows will be sewerred, to provide conservative future flow forecasts.

Wastewater collection systems are subject to infiltration and inflow (I/I) which includes groundwater and stormwater entering the collection system. The industry standard of 20% is reflective of the Metro Water District based on information provided by local wastewater providers. Adding this I/I factor results in the Annual Average Daily Flow (AAD), which is the flow that arrives at the wastewater plant for treatment. Design capacities and discharge permits for wastewater treatment facilities are commonly based on the Maximum Monthly Flow (MMF). MMF represents the average of the daily flows for the month with the highest flows during the year. For the purpose of this plan, the MMF was calculated by adding 25% to the AAD. The monthly peaking factor of 1.25 was an average number based on a review of available plant data within the Metro Water District during the 2003 Long-term Wastewater Management Plan development and was determined appropriate for the Plan Update. Table 3-2 shows the MMF-MGD wastewater forecasts for each county in the Metro Water District. The projected wastewater flow trend for the planning period is illustrated in Figure 3-2.

POPULATION FORECASTS

Population and employment data for each of the 15 counties were obtained from each county's local Regional Development Center (RDC). Where data was not available from the local RDC, data from the Atlanta Regional Commission was used. For Hall County, the Gainesville-Hall Metropolitan Planning Organization (MPO) data was used. Table 3-1 shows the population forecasts by county.

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TABLE 3-1
Population and Employment Forecasts by County

County	Population Forecasts (# of people)		
	2015	2025	2035
Bartow ¹	139,600	210,800	304,900
Cherokee	229,900	303,000	410,700
Clayton	288,600	294,000	307,300
Cobb	694,200	737,400	796,900
Coweta ²	124,900	162,500	253,400
DeKalb	747,100	789,800	856,400
Douglas	138,000	182,000	257,000
Fayette	114,700	142,200	181,200
Forsyth ¹	256,700	342,100	412,800
Fulton	943,900	1,065,500	1,233,800
Gwinnett	843,900	945,900	1,044,300
Hall ³	245,300	325,200	405,200
Henry	222,600	309,700	424,100
Paulding ¹	215,700	353,000	445,600
Rockdale	88,600	117,100	159,200
District Total	5,293,700	6,280,200	7,492,800
County	Employment Forecasts (# of employees)		
	2015	2025	2035
Bartow ¹	44,900	56,300	67,900
Cherokee	66,700	99,800	141,500
Clayton	138,900	155,700	181,600
Cobb	361,600	415,200	480,700
Coweta ²	43,300	59,600	82,900
DeKalb	343,600	397,100	459,200
Douglas	53,600	72,900	92,400
Fayette	56,800	76,900	99,100
Forsyth ¹	89,800	120,700	146,600
Fulton	845,600	978,300	1,103,600
Gwinnett	396,100	477,200	546,100
Hall ³	134,300	230,700	327,200
Henry	70,100	103,800	140,900
Paulding ¹	27,000	33,900	40,800
Rockdale	42,200	52,900	65,200
District Total	2,714,500	3,331,000	3,975,700

Source: ARC Population and Employment Forecasts were used for all counties within the ARC Region; sources for counties outside the ARC Region are as follows:

¹ RDC Population and Employment Forecasts (Bartow, Forsyth and Paulding)

² ARC Population and Employment Forecasts (Coweta)

³ Gainesville-Hall County 2030 MPO Population and Employment Forecasts (Hall)

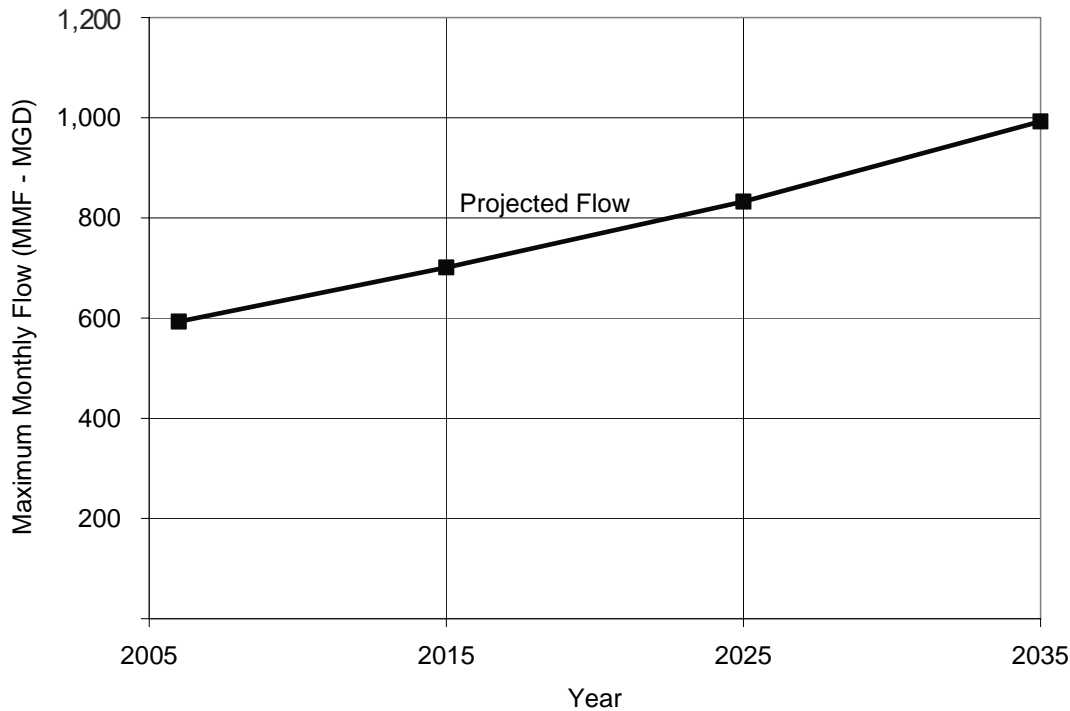
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TABLE 3-2

Summary of Forecasted Wastewater Flow to be Received at Treatment Facilities by County

County	Forecasted Flow (Maximum Monthly Flow – MGD)		
	2015	2025	2035
Bartow	19	25	34
Cherokee	20	28	40
Clayton	37	40	46
Cobb	91	98	108
Coweta	10	15	25
DeKalb	101	107	117
Douglas	11	15	22
Fayette	12	16	22
Forsyth	29	42	52
Fulton	191	213	240
Gwinnett	107	121	135
Hall	27	39	51
Henry	19	28	39
Paulding	20	37	50
Rockdale	7	9	12
District Total	701	833	993

FIGURE 3-2
Trend of Wastewater Flow to be Managed at WWTPs



SEPTIC SYSTEM USAGE FORECASTS

The septic system usage forecasts for the planning horizon of 2035 are shown in Figure 3-3. The baseline septic system usage was based on the Metro Water District’s Septic Systems Status and Issues Working Paper¹, which tabulated the number of structures that use septic systems in the 15-county Metro Water District, shown in Section 2. As growth occurs in the Metro Water District over the planning period, population density in many areas will increase. As population becomes denser, the prevalence of collection systems will increase and the prevalence of septic systems will decline. To reflect this transition, the following empirical correlation was developed between the percent of the population served by septic systems and the population density for the 2003 Plan, and was considered valid for this Plan. Information from the Metro Water District’s Septic System Working Paper for the 15 counties and the U.S. Census Bureau on septic systems was input into the following empirical correlation:

$$\% \text{ population served by septic systems} = 87.4 \times e^{-(0.83 \times \text{density [people/acre]})}$$

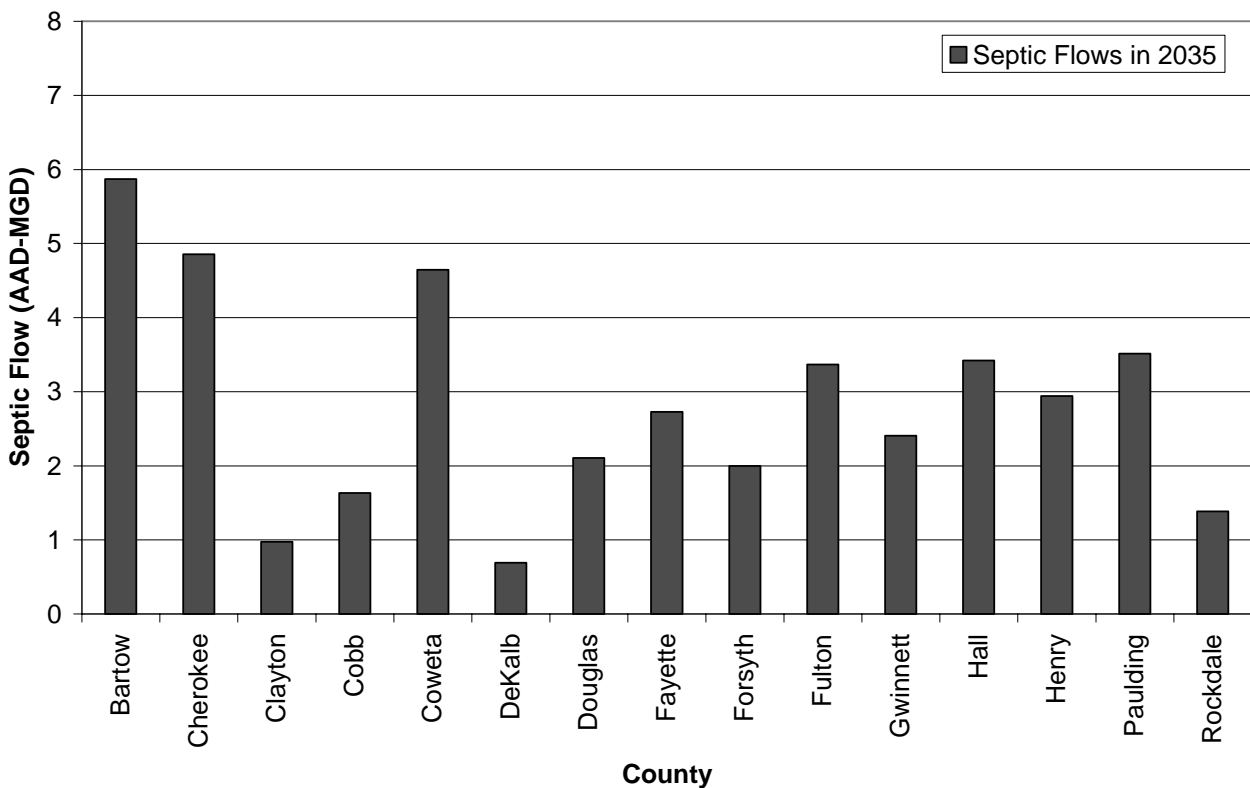
Population density was calculated using the population forecasts for 2035 in Table 3-1 divided by the county area in acres. This correlation with the calculated projected population density provides the percent of the population forecasted to be served by septic systems in 2035. When determining the percentage of units within the Metro Water District with septic systems, it was assumed one septic system served a single housing unit. The flows to treatment facilities in Figure 3-2 reflect the total wastewater treatment flows minus the flows to septic systems in Figure 3-3. Figure 3-3 shows the

¹ Septic Systems Status and Issues Working Paper, Metropolitan North Georgia Water Planning District, March 2006.

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projected flows to be managed by septic systems by county in 2035. Based on the 2035 forecasts, flows to septic systems will represent 11% of residential wastewater generated and 6% of total wastewater generated.

FIGURE 3-3
2035 Forecasted Annual Average Septic System Usage



SEPTIC SYSTEM IMPACT TO WASTEWATER TREATMENT FACILITIES

While septic system flows are not directly treated by the local wastewater treatment facilities, the septage that is pumped from septic systems may impact future treatment facility sizing. Septage is stronger than traditional wastewater influent, specifically there is a higher total suspended solid (TSS) and biological oxygen demand (BOD) load on receiving wastewater treatment plants. To facilitate planning for septage disposal (Action Item 8.4), Table 3-3 provides estimates of the BOD and TSS loading from septage by county. The forecasted loads are based on septic system usage in Figure 3-3 and a septic system pump-out rate of every seven years, consistent with Georgia DHR guidance. Wastewater treatment facilities may need to plan for more capacity than is shown in Table 3-2 to handle anticipated local septage treatment needs.

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TABLE 3-3
TSS and BOD Loading Forecasts from Septic Systems

County	Forecasted TSS Loading (lbs/day)			Forecasted BOD Loading (lbs/day)		
	2015	2025	2035	2015	2025	2035
Bartow	3,321	4,107	4,560	631	781	867
Cherokee	3,893	4,107	4,010	740	781	763
Clayton	726	704	653	138	134	124
Cobb	1,837	1,656	1,428	349	315	272
Coweta	3,002	3,500	4,187	571	665	796
DeKalb	814	702	555	155	133	105
Douglas	1,975	1,959	1,702	375	372	324
Fayette	1,826	1,891	1,867	347	360	355
Forsyth	2,034	1,664	1,341	387	316	255
Fulton	3,578	3,003	2,304	680	571	438
Gwinnett	2,301	1,903	1,567	437	362	298
Hall	3,692	3,767	3,611	702	716	687
Henry	3,096	3,041	2,636	589	578	501
Paulding	2,985	2,776	2,394	568	528	455
Rockdale	1,251	1,247	1,119	238	237	213
District Total	36,331	36,027	33,934	6,907	6,849	6,453

BEYOND 2035

The beyond 2035 wastewater flow forecasts were calculated to initiate planning for long-term wastewater treatment needs for the Metro Water District. Population information for 2050 was obtained, where available, from long range planning by the local Regional Development Centers (RDC), counties and the City of Atlanta. Where this information was not available, the population forecasts were linearly projected out to 2050. Wastewater demands for 2050 were estimated for each county by applying a best fit line to the county-level forecasts (as presented in Table 3-2) to extrapolate year 2050 flows. The population and employment forecasts for 2050 as part of the Comprehensive State-wide Water Management Plan will be used, when available, for the next Plan update.

TABLE 3-4
2050 Population and Wastewater Flow Forecasts

County	2050 Population	2050 Demand (MMF-MGD)
Bartow ¹	486,254	52
Cherokee	499,639	65
Clayton	388,064	55
Cobb	869,974	122
Coweta	287,444	45
DeKalb	923,885	136
Douglas ²	310,000	34
Fayette	208,278	32
Forsyth ²	538,606	61
Fulton ³	1,692,114	280
Gwinnett	1,158,000	146
Hall ¹	442,800	73
Henry	531,098	66
Paulding ¹	479,393	73
Rockdale	185,543	20
District Total	9,001,092	1,260

Notes:

1. Population forecast provided by local RDC.
2. Population forecast provided by county water system.
3. Population forecasts by county water system and City of Atlanta.