20 Year Water Demand Forecast and Resource Availability Analysis for the Washington Metropolitan Area

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PREFACE

On January 11, 1978, the governments of the United States, District of Columbia, Maryland, Virginia, and the Chairmen of the Fairfax County Water Authority and the Washington Suburban Sanitary Commission committed their constituencies to an historic agreement which allocated low flows in the Potomac River. For more than twelve years, the Potomac River Low Flow Allocation Agreement (LFAA) has not had to be implemented; however, in preparation for that possibility, the signatory parties have met during April in each year since its ratification in order to affirm its principles and approve data upon which its implementation would be based.

Modification No. 1 to the LFAA indicates that Article 2.C. include the following requirement: "In April 1990 and in April of each fifth year thereafter ... the Aqueduct, the Authority, the Commission and the District shall review and evaluate the adequacy of the then available water supplies to meet the water demands in the Washington Metropolitan Area which may then be expected to occur during the succeeding twenty year period." At their meeting of April 27, 1989, the parties to the agreement requested the Section for Cooperative Water Supply Operations on the Potomac (CO-OP) of the Interstate Commission on the Potomac River Basin to conduct the required review and evaluation of demands and supplies.

The following report discusses the methods used to determine demands and resources, and presents the results of that analysis.

Table of Contents

List of Tables

List of Figures

I.) STUDY BACKGROUND AND OBJECTIVE

A.) Contents of Report

The forecasting of future water demands is critical to those involved in water supply planning. These forecasts help managers assess the adequacy of the present resources and distribution systems. Since the time required to bring new resources on-line or complete major upgrades in the distribution systems can be 10 years or more, forecasts of future demands help managers decide the scope and direction of future water system improvements.

This report presents the CO-OP Section of the Interstate Commission on the Potomac River Basin's (herein referred to as the CO-OP Section) forecast of long term water demands in the Washington Metropolitan Area. It utilizes information gathered from Virginia, Maryland, the District of Columbia and the U. S. Army Corps of Engineers' water supply utilities to forecast raw water supply demands for individual utilities and for the system as a whole. This report contains a description of each utility's facilities, an analysis of recent trends in water production data, a description of the method used for forecasting long term water demands, a presentation of the model results for each individual utility and the whole system, and a summary of our conclusions.

In addition to the detailed analysis and forecast of water demands, a discussion of the available water resources also is covered in this report. The water resources available to the Washington Metropolitan Area water supply utilities include the Potomac River and the jointly and individually owned reservoirs in the Potomac and Patuxent river basins.

B.) Cooperation Among Water Supply Utilities

The Washington Metropolitan Area is served by three major water utilities: the Washington Aqueduct Division (WAD) of the U.S. Army Corps of Engineers, the Fairfax County Water Authority (FCWA), and the Washington Suburban Sanitary Commission (WSSC). The District of Columbia's government is responsible for distributing most of the finished water treated by WAD and entering into agreements for water resources. These utilities are referred to in this report as the CO-OP Utilities. Each utility maintains its own water withdrawal and filtration facilities on the Potomac River and acts independently during times of adequate flows. However, in 1966 it became apparent that the Potomac River would no longer meet unrestricted withdrawals during times of drought. Several major agreements were signed during the late 1970's and early 1980's which institutionalized cooperation among these water supply utilities.

The first agreement institutionalizing cooperation for water supply withdrawals from the Potomac River was the Potomac River Low Flow Allocation Agreement (LFAA). It was enacted on January 11, 1978 between the states of Virginia and Maryland, the District of Columbia and the three major water supply utilities in anticipation of new and expanded Potomac River withdrawals. This agreement provides a method for allocating low flows in the Potomac River among the various

water supply withdrawers in the event of inadequate flow in the river to meet unrestricted withdrawals. On July 22, 1982 the CO-OP Utilities contracted jointly with the Maryland Potomac Water Authority and the federal government to purchase 13,357 million gallons (mg) of water supply storage in the Bloomington (since renamed Jennings Randolph) Reservoir. This water is intended to augment flows in the Potomac River when natural flows can not meet water supply withdrawals. On the same date these water utilities contracted to jointly share the cost of building Little Seneca Reservoir (storage of 4,000 mg) in Montgomery County, Maryland. Although its storage is much smaller than the Jennings Randolph Reservoir, travel time from this reservoir to the Washington Metropolitan Area water supply intakes is 1 to 2 days versus 4 to 7 days. This reservoir increases the flexibility of the system by having augmentation resources much closer to the intakes. The recommendations in the Corps of Engineers Metropolitan Water Supply Study and those of the CO-OP Section provided the basis for the development of a solution to the water supply problem requiring only minimal construction (Little Seneca Dam). This solution was embodied in the Water Supply Coordination Agreement, also signed on July 22, 1982.

C.) Role of ICPRB's CO-OP Section in Water Supply Management

The Water Supply Coordination Agreement gave the CO-OP Section a direct roll in managing water supply resources and withdrawals in the Washington Metropolitan Area. The agreement provides for an Operations Committee, consisting of representatives from the three major utilities, which is responsible for overseeing CO-OP activities. It binds all parties to joint operations during times of low flow in the Potomac River. In addition, it assigns the responsibility for scheduling water supply releases from Jennings Randolph and Little Seneca reservoirs and allocating water supply withdrawals to the CO-OP Section. In order to carry out these duties, the CO-OP Section has developed a Drought Operations Manual approved by all the CO-OP Utilities. This manual sets down a procedure that the CO-OP Section will follow during times of drought to schedule releases and withdrawals consistent with each individual utility's operating practices.

On a continuing basis, the CO-OP Section is responsible for maintaining readiness in case of a drought on the Potomac River. A drought exercise is conducted annually by CO-OP involving the CO-OP utilities and the Baltimore District of the Army Corps of Engineers which operates the Jennings Randolph project. This exercise simulates drought conditions and follows the procedure set out in the drought operations manual. The CO-OP Section also issues periodic Water Supply Outlooks which assess the probability of requiring reservoir releases throughout the May-October time period. The past and present activities of the CO-OP Section place it in an appropriate position to conduct the present study.

D.) Objective of Study

Article 2 of the LFAA was modified on July 22, 1982 requiring an evaluation of future water demands over a 20 year time period beginning in 1990, and every 5th year thereafter, and a review of the resources available to meet those demands. The objective of this study is to fulfill that mandate. With development proceeding at a rapid and unsteady pace in the Washington Metropolitan Area, the CO-OP Section also sought a procedure that could be easily modified to reflect changing growth and land use patterns. The method described in this report is readily updatable as new demographic data becomes available and has a high degree of geographic resolution to reflect evolving trends in land use and growth patterns.

II.) GENERAL DESCRIPTION OF WASHINGTON METROPOLITAN AREA WATER SUPPLY UTILITIES

A.) Study Area

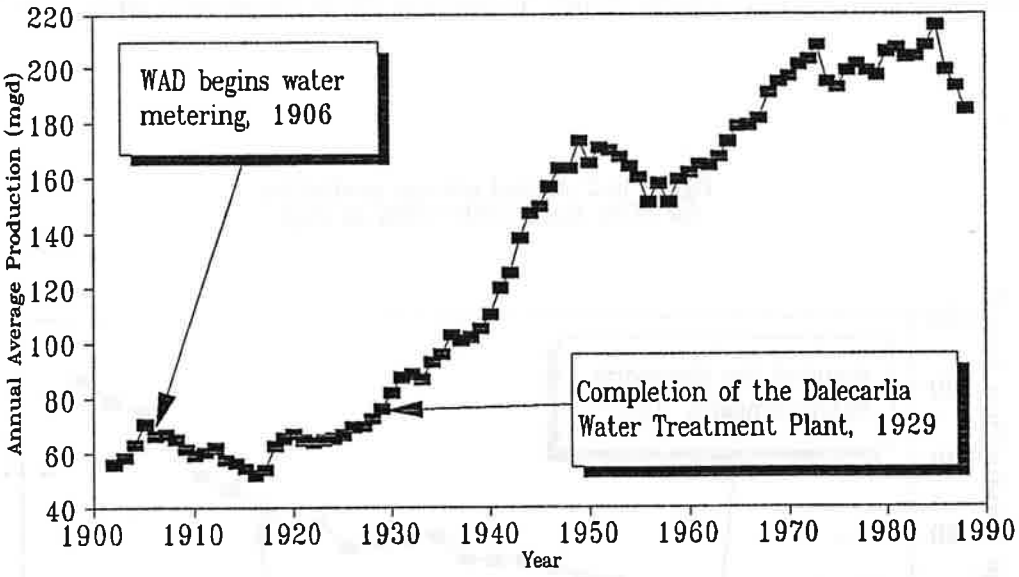
The area covered by the water demand forecast described in this report is the service areas of those utilities in the Washington Metropolitan Area solely or partially dependent on the Potomac River. These include the aforementioned CO-OP utilities (WAD, FCWA, and WSSC) and the other utilities that are provided with treated water by the CO-OP utilities. This forecast also includes the cities of Rockville, Maryland and Leesburg, Virginia which maintain their own Potomac River raw water withdrawal and treatment facilities.

B.) Washington Aqueduct Division

The Chief of Engineers, U. S. Army, was made responsible for "supplying the City of Washington with pure water" in 1850. The first citywide water system, proposed in 1851, included a dam and intake at Great Falls, a conduit from Great Falls to the District of Columbia, storage and settling reservoirs at Dalecarlia and Georgetown, and a system of water mains to serve the inhabited portion of the city. This system began delivering water to the city in 1859 utilizing the impoundment of the Little Falls Branch at the Dalecarlia Reservoir (Water Resources Management Administration, 1979). The conduit from Great Falls began providing Potomac River water to the system in 1863. The completed system was known as the Washington Aqueduct. It is now operated by the Washington Aqueduct Division of the United States Army Corps of Engineers. Water filtration began in 1905 at the McMillan Water Treatment Plant which at that time had a capacity of 75 million gallons per day (mgd). The 80 mgd Dalecarlia Treatment Plant was completed in 1929. Both plants have since expanded. The present treatment capacity is about 360 mgd. Figure II-1 displays annual average production totals for WAD during the 1902-1988 time period. Although the effect of water metering, begun in 1906 (Cowdrey, 1978), is obvious, the reasons for other periods of decline in annual average production is unclear.

The Potomac River currently is the sole source of raw water for WAD which is withdrawn at 2 different locations. In order to reduce pumping cost and electrical requirements, most water is withdrawn at the Great Falls Dam and flows by gravity through 2 conduits (the Old Conduit which was completed in 1863 and the New Conduit which was completed in 1926) to the Dalecarlia Reservoir. The maximum withdrawal that can be made during low flows in the Potomac River is 175 mgd. Additional withdrawals from the Potomac River are made at the Little Falls Pumping Station. The capacity of this station is about 525 mgd, pumped directly into Dalecarlia Reservoir. The Little Falls Pumping Station is used mainly to meet demands exceeding the capacity of the conduits during the summer months. All raw water must pass through Dalecarlia Reservoir. Partially treated water is also stored in Georgetown and McMillan reservoirs. Collection, treatment, and pumping facilities are operated by WAD. There are 5 major pumping stations, 1,400 miles of water mains, and 110 million gallons of distribution

Figure II.1 Annual average production for WAD from 1902-1988 in mgd.



system storage serving the City of Washington. In addition, WAD pumps treated water to Arlington County, and the parts of Fairfax County served by the City of Falls Church. Distribution of finished water to the public is the responsibility of the Water and Sewer Utility Administration (WASUA) in the District of Columbia and the Public Works Departments in Arlington County and Falls Church. WAD's peak one-day production was 280 mgd which occurred during August, 1973.

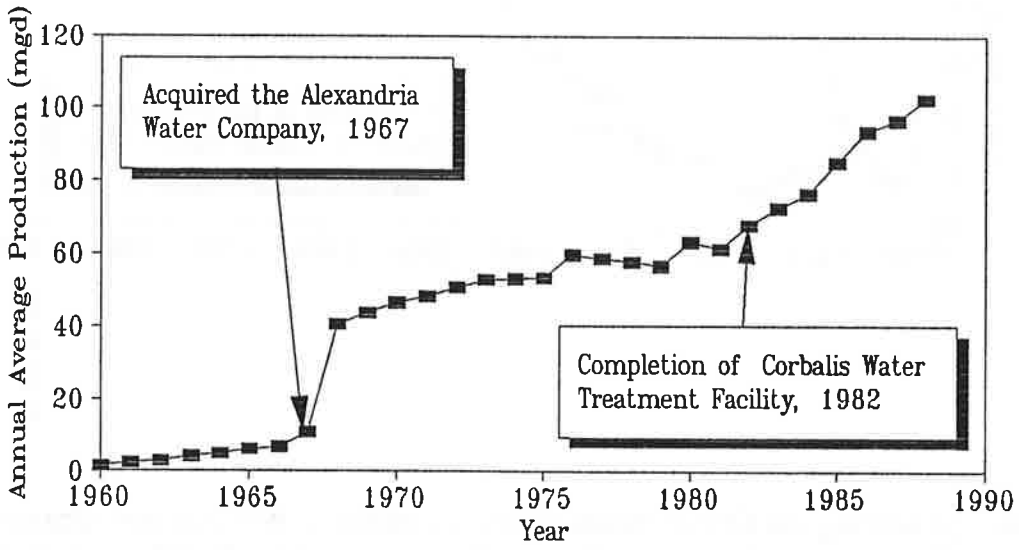
C.) Fairfax County Water Authority

The Fairfax County Water Authority was created by the Fairfax County Board of Supervisors in 1957 for the purpose of the "acquisition, construction, operation, and maintenance of an integrated water system, for supplying and distributing water in Fairfax County." Its charter was amended in 1959 to the "acquisition, construction, operation, and maintenance of water systems, sewer systems and sewage disposal systems located within Fairfax County or partly within and partly without the County" (FCWA, 1974). In 1959, FCWA had an average daily consumption of less than 2 mgd.

Fairfax County prior to 1959 was served by 28 publicly and privately-owned water systems. With its mission to provide an integrated water system to the county, FCWA has over the past 30 years acquired 22 of these systems. In 1967, FCWA acquired the

properties of The Alexandria Water Company, including its Occoquan River water supply and treatment facility (FCWA, 1982). FCWA began utilizing the Potomac River in 1982 with completion of the Corbalis Water Treatment Plant and raw water intake. Figure II-2 shows annual average production totals for FCWA during the 1960-1988 time period This figure clearly shows the effects of the acquisition of The Alexandria Water Company and the completion of the Corbalis Water Treatment Plant on growth within the FCWA system.

Figure II-2 Annual average production for FCWA from 1960-1988 in mgd.



FCWA's current water supply system consists of three water supply withdrawal and treatment facilities, one solely-owned and two jointly-owned storage reservoirs, 29 pumping stations, and 26.7 million gallons of distribution system storage in their direct service area with another 17.5 million gallons under construction. FCWA serves approximately 180,000 households in Fairfax County through 2,357 miles of water mains in its direct service area. FCWA also has a large indirect service area which is provided treated water on a wholesale basis. FCWA provides water to 64,000 households in the cities of Alexandria and Dale City through the Virginia-American Water Company (VAWC) and to 25,000 households in eastern Prince William County through the Prince William County Service Authority (PWCSA). Although currently not a major water demand area, FCWA provides water to Loudoun County through the Loundoun County Sanitation Authority (LCSA). Growth in water demands by PWCSA and LCSA will play

a large role in FCWA's future overall growth. Smaller quantities of water also are wholesaled to the town of Herdon, Fort Belvoir, Lorton Correctional Facility, Dulles International Airport, and Vulcan Materials, Inc. FCWA's peak one-day production was 174.7 mgd which occurred July 17, 1988.

In 1988, 52% of FCWA's production came from the Occoquan Reservoir. The reservoir impounds approximately 11 billion gallons and currently has a safe yield of 65 mgd. There are two interconnected treatment plants with a combined one day capacity of 112 mgd. The remainder of FCWA's supply comes from the Potomac River. Their intake is located 18 miles upstream of Chain Bridge opposite the confluence with Seneca Creek. The raw water intake has a maximum capacity of 150 mgd and the Corbalis Treatment Plant currently has a treatment capacity of 75 mgd. Planned expansion of the treatment plant will bring this capacity up to 150 mgd by 1993.

D.) Washington Suburban Sanitary Commission

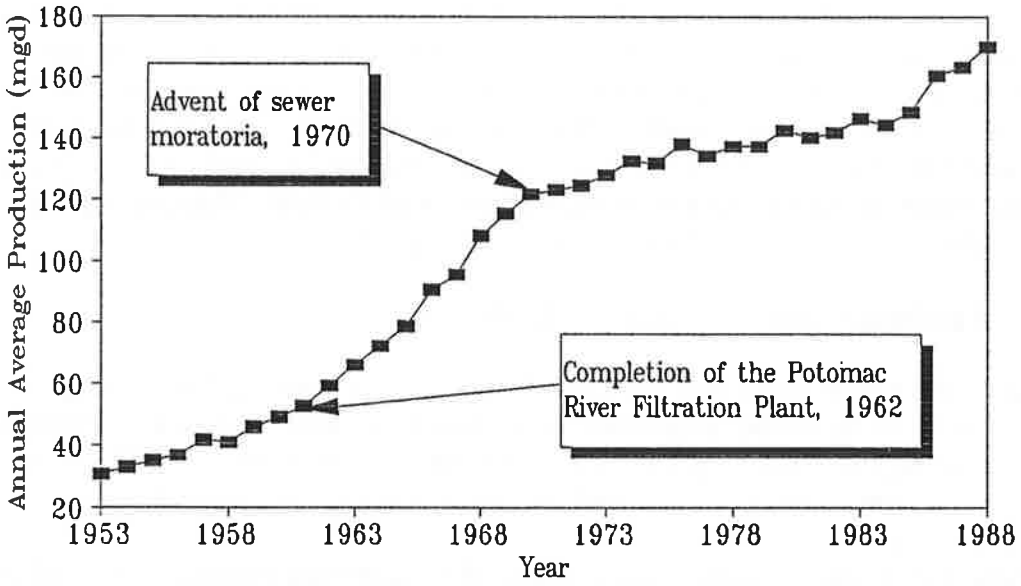
The Washington Suburban Sanitary Commission was created in 1918 by the Maryland General Assembly to provide water and wastewater services to Montgomery and Prince George's counties (COE, 1983). At the time of its creation, WSSC served a population of approximately 32,000 and had an average daily consumption of 250,000 gallons (WSSC, 1988).

WSSC's first water supplies were obtained by acquiring existing municipal facilities in Takoma Park, Mount Rainier, Kensington, Glen Echo, and a few private systems. The first new filtration plant and water supply source added by WSSC was developed in 1920 on a branch of the Anacostia River at Hyattsville. In 1924 WSSC constructed a dam and filtration plant on the Northwest Branch of the Anacostia River which operated until the early 1960's. WSSC began utilizing the Patuxent River in 1944 with the completion of the Brighton Dam and Patuxent River Filtration Plant, and the T. Howard Duckett Dam in 1954. Use of the Potomac River began in 1962 with the completion of the Potomac River Filtration Plant (WSSC, 1988).

Figure II-3 shows WSSC's annual average production during the 1953-1988 time period. Annual average production has been increasing at the rate of 3.2 mgd/year for the past 10 years (1979-1988). This rate is much smaller than the 6.6 mgd/yr growth experienced during the 1960-1969 time period. On a percentage basis, WSSC grew by 23% from 1979 to 1988 compared to 135% between 1960 and 1969. It is interesting to note the influence of the federal government on WSSC's growth. Figure II-4 shows the influence of federal civilian employment in the Washington Metropolitan Area on WSSC's growth between 1953 and 1988. WSSC's growth mirrored the growth of federal civilian employment fairly well until the advent of the sewer moratorium in 1970. WSSC's growth slowed compared to federal employment throughout the 1970's. Since the early 1980's, WSSC's growth rate has increased compared to federal employment.

WSSC's current water supply system consists of two water supply withdrawal and treatment facilities, two solely-owned and two jointly-owned storage reservoirs, 16 pumping stations, 55 distribution reservoirs (low-level reservoirs, standpipes, and elevated tanks) with 184 million gallons of storage and over 4,300 miles of miles of water mains. WSSC serves more than 200,000 households in Montgomery and 230,000 households in

Figure II-3 Annual average production for WSSC from 1953-1988 in mgd.

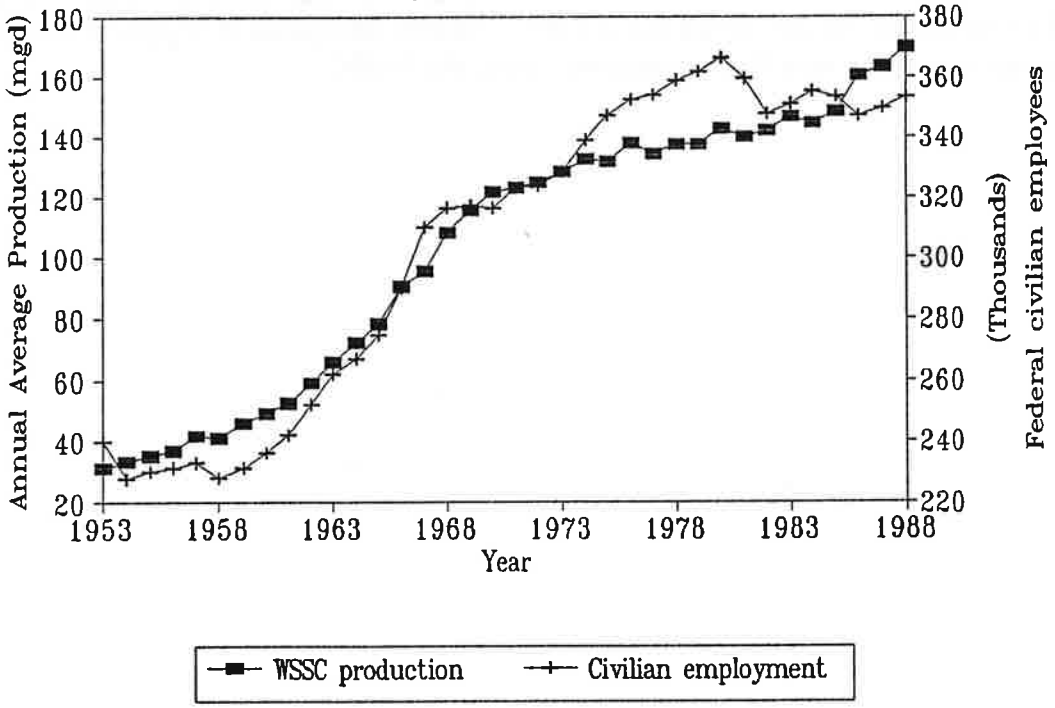


Prince George's counties. WSSC also provides minor amounts of water to Charles and Howard counties. WSSC's peak one-day production was 267.3 mgd on July 8, 1988.

Approximately 75-80% of WSSC's raw water comes from the free-flowing Potomac River. Their Potomac River Treatment Plant is located north of Watkins Island 14 miles upstream of Chain Bridge. This treatment plant has a maximum intake capacity of 400 mgd and a current filtration capacity of 285 mgd.

The other major source of raw water is the Patuxent River reservoir system located along the northern border of Prince George's and Montgomery counties. There are two reservoirs on the river, Tridelphia and T. Howard Duckett, with a combined usable capacity of 11 billion gallons. The estimated yield of the system is 42.5 mgd under drought conditions with a recurrence interval of 100 years; 32 mgd is the allocated withdrawal for water supply purposes and a 10.5 mgd is the flowby requirement (WSSC, 1990). The treatment plant is currently undergoing renovations and will have a capacity of 65 mgd when that work is completed.

Figure II-4 WSSC's production versus federal employment in Washington area



E.) Cities of Rockville, Maryland and Leesburg, Virginia

The city of Rockville, Maryland is the oldest public water supply utility in Montgomery County. In 1918 it was providing 40,000 gallons per day from 3 wells to city residents (Maryland Geological Survey, 1918). It began withdrawing water from the Potomac in 1958 and currently has a treatment capacity of 8 mgd. The city of Leesburg, Virginia began withdrawing water from the Potomac River in 1982. Current demands average 2.2 mgd, of which 1.5 mgd comes from the Potomac River and .7 mgd from groundwater sources.

F.) Other Water Supply Utilities

Other major water supply utilities in the Washington Metropolitan Area include Fairfax City and Manassas, Virginia and Bowie, Maryland. There is some interaction between these utilities and the utilities described above. Fairfax City withdraws water from the Goose Creek Reservoir. It can supply water on a wholesale basis to LCSA and

Herdon, Virginia. However, projected growth in Fairfax City's demands and expansion of FCWA's distribution system may greatly reduce Fairfax City's wholesale service area. The city of Manassas withdraws water from Lake Manassas and supplies wholesale water to PWCSA in western Prince William County. Manassas also can supply raw water to FCWA's Occoquan Reservoir via Broad Run. Bowie, Maryland is supplied completely by groundwater and has very little interaction with the WSSC.

III.) CURRENT PATTERNS OF WATER PRODUCTION FOR WASHINGTON METROPOLITAN AREA WATER SUPPLY UTILITIES

A.) Introduction

This chapter discusses current water production patterns of the CO-OP utilities. Throughout this work, the term production is used in reference to past water usage data and the term demand is used in reference to future water usage. The disaggregation of future annual average water demands to monthly average or peak demands in this study requires an analysis of current water production patterns. This chapter describes the methods used to develop mean monthly production factors, mean peak production factors, and statistical maximum production factors which are used in subsequent chapters to disaggregate future annual average demands. These factors are calculated using 15 years (1974-1988) of daily production data provided by WAD, FCWA, and WSSC. A full listing of our analysis of the daily production data is contained in Appendix A for WAD, Appendix B for FCWA, Appendix C for WSSC, and Appendix D for the system.

B.) Mean Monthly and Mean Peak Production Factors

Mean monthly production factors are used to disaggregate future annual average demands to monthly average demands. These factors reflect seasonal water use patterns within each water supply system. Ratios of monthly average production to annual average production are calculated for each year of data utilizing the following equation:

$$MPF(i,j) = MAP(i,j)/AAP(i)$$

where,

MPF(i,j) = monthly production factor in year i and month j
MAP(i,j) = monthly average production in year i and month j
AAP(i) = annual average production in year i

Mean monthly production factors for each month then are calculated with the following equation:

$$MMPF(j) = \frac{\Sigma\, MPF(i,j)}{NYEARS}$$

where,

MMPF(j) = mean monthly production factor for month j
NYEARS = number of years of production data

Table III-1 shows mean monthly production factors for the CO-OP utilities and whole

Table III-1 Mean monthly production factors for WAD, FCWA, WSSC and system calculated from 1974-1988 production data.

	WAD	FCWA	WSSC	System
January	.94	.89	.93	.93
February	.93	.86	.92	.91
March	.91	.89	.91	.91
April	.94	.94	.94	.94
May	.98	1.05	1.01	1.00
June	1.07	1.14	1.09	1.09
July	1.14	1.19	1.14	1.15
August	1.13	1.13	1.10	1.12
September	1.08	1.08	1.06	1.07
October	1.00	.99	.99	1.00
November	.94	.92	.96	.94
December	.93	.91	.94	.93

system. Appendices A-D contains a full listing of monthly production factors calculated for the 1974-1988 time period.

Mean peak 1 day and mean peak 7 day production factors (so deftly named) are used to disaggregate future monthly average demands to peak 1 and peak 7 day demands within each month. Ratios of peak 1 day to monthly average production are calculated for each year of data using the following equation:

$$P1PF(i,j) = P1P(i,j)/MAP(i,j)$$

where,

P1PF(i,j) = peak 1 day production factor in year i and month j
P1P(i,j) = peak 1 day production in year i and month j

Ratios of peak 7 day to monthly average production are calculated in the same manner. Mean peak 1 day production factors are calculated for each month using the following

equation and are shown in Table III-2 for each utility.

$$MP1PF(j) = \frac{\Sigma\ P1PF(i,j)}{NYEARS}$$

where,

MP1PF(j) = mean peak 1 day production factor for month j
NYEARS = number of years of production data

The mean peak 7 day production factors are calculated in a similar fashion and also shown in Table III-2. A full listing of peak 1 day and peak 7 day production ratios for each year of data is shown in Appendices A-D.

Table III-2 Mean peak 1 day and 7 day production factors.

	WAD		FCWA		WSSC		System	
	1 day	7 day	1 day	7 day	1 day	7 day	1 day	7 day
Jan	1.07	1.03	1.10	1.03	1.10	1.03	1.06	1.03
Feb	1.07	1.03	1.10	1.03	1.09	1.02	1.05	1.02
Mar	1.08	1.02	1.10	1.04	1.08	1.02	1.05	1.02
Apr	1.10	1.04	1.16	1.07	1.14	1.06	1.09	1.04
May	1.11	1.05	1.22	1.10	1.18	1.08	1.14	1.07
Jun	1.13	1.06	1.22	1.11	1.19	1.10	1.14	1.08
Jul	1.12	1.06	1.24	1.13	1.19	1.10	1.14	1.08
Aug	1.11	1.04	1.20	1.09	1.15	1.06	1.11	1.05
Sep	1.11	1.05	1.21	1.09	1.13	1.07	1.11	1.06
Oct	1.08	1.03	1.11	1.04	1.10	1.03	1.07	1.03
Nov	1.07	1.03	1.09	1.03	1.09	1.02	1.06	1.02
Dec	1.08	1.03	1.09	1.03	1.11	1.03	1.06	1.02

It is important to note that these peak 1 day and 7 day factors are calculated on a mean basis (thus the terminology, mean peak production factors). Thus, they represent peak 1 and peak 7 day productions that are forecasted to occur in a statistically average year. Because these factors are calculated on a mean basis, they are not useful from an operational point of view which is more concerned with the high extremes in production.

The ensuing section on statistical maximum production factors addresses the potential high extremes in production.

Table III-3 displays mean peak production factors calculated over continuous 30, 60, 90, 120, and 180 day time periods. These production factors will be used to estimate future peak demands over the 30 - 180 day time periods from forecasts of future annual average demands. The equation to calculate the 30 day peak production factor for each individual year of data is:

$$P30PF(i) = P30P(i)/AAP(i)$$

where,

P30PF(i) = peak 30 day production factor in year i
P30P(i) = peak 30 day production in year i

The means of these peak production factors then are calculated in a similar fashion as described above. Appendices A-D contains peak production factors calculated over continuous 30, 60, 90, 120, and 180 day time periods for each individual year from 1974-1988 and their period of occurrence.

Table III-3 Mean peak 30, 60, 90, 120 and 180 day production factors.

	WAD	FCWA	WSSC	System
30 day	1.17	1.26	1.19	1.19
60 day	1.15	1.20	1.15	1.15
90 day	1.13	1.18	1.12	1.13
120 day	1.11	1.15	1.10	1.11
180 day	1.07	1.10	1.07	1.08

C.) Statistical Maximum Production Factors

This section describes the development of maximum 1 day and maximum 7 day production factors useful for estimating high extremes in future demands. These factors, termed statistical maximum 1 day and 7 day production factors, are developed using a probabilistic framework. These factors can be used to size distribution facilities and estimate upper bounds on system demands. They will be used to disaggregate future annual average demands to statistical maximum 1 day and statistical maximum 7 day demands.

Developing statistical maximum production factors involves assuming a probability

distribution for each set of production factors (for example, the set of yearly maximum 1 day production factors for WAD) and testing whether the hypothesized distribution could be accepted. The assumed probability distribution and statistical parameters (mean and standard deviation) developed for each set of production factors then are used to develop statistical maximum 1 day and 7 day production factors with a small exceedence probability. Table III-4 contains maximum 1 day and 7 day production ratios for the individual CO-OP utilities and the whole system. This table also shows the mean, standard deviation, and maximum for each data set.

Table III-4 Maximum 1 day and 7 day production factors (peak/annual average demands) for 1974-1988. Also displayed are the mean, standard deviation and maximum for each set of data.

	WAD		FCWA		WSSC		System	
	1 day	7 day	1 day	7 day	1 day	7 day	1 day	7 day
1974	1.33	1.27	1.71	1.62	1.56	1.51	1.45	1.40
1975	1.33	1.21	1.53	1.37	1.40	1.33	1.34	1.27
1976	1.29	1.20	1.49	1.39	1.43	1.30	1.32	1.25
1977	1.32	1.22	1.51	1.42	1.38	1.23	1.27	1.22
1978	1.25	1.21	1.47	1.33	1.35	1.28	1.29	1.25
1979	1.22	1.16	1.27	1.22	1.24	1.10	1.20	1.14
1980	1.33	1.22	1.51	1.41	1.34	1.25	1.35	1.25
1981	1.31	1.26	1.50	1.33	1.33	1.24	1.30	1.25
1982	1.28	1.20	1.52	1.31	1.38	1.21	1.31	1.22
1983	1.29	1.23	1.56	1.39	1.46	1.37	1.33	1.29
1984	1.27	1.21	1.54	1.38	1.38	1.31	1.31	1.28
1985	1.27	1.20	1.56	1.43	1.33	1.24	1.32	1.24
1986	1.28	1.21	1.57	1.39	1.40	1.33	1.36	1.29
1987	1.44	1.33	1.59	1.46	1.46	1.39	1.46	1.38
1988	1.40	1.31	1.70	1.62	1.58	1.49	1.50	1.43
Mean	1.31	1.23	1.54	1.41	1.40	1.31	1.34	1.28
S.D.	.055	.045	.098	.101	.084	.101	.075	.071
Max.	1.44	1.33	1.71	1.62	1.58	1.51	1.50	1.43

Each set of maximum production factors is assumed to come from a normally distributed population. Based on a chi-square goodness-of-fit test run on each set of data, it was concluded that this hypothesis could not be rejected. Utilizing the standard normal curve and normal deviate, statistical maximum production factors associated with 1%, 2%, and 5% exceedence probabilities were calculated. Table III-5 shows the statistical maximum 1 day production factors for these exceedence probabilities and Table III-6 shows the same information for the statistical maximum 7 day production factors. Based on the observed maximum production factors and the possibility of an upward trend in these factors discussed in the next section, the statistical maximum 1 day and 7 day production factors associated with a 1% probability of being exceeded will be used to forecast future maximum 1 day and 7 day demands.

Table III-5 - Statistical maximum 1 day production factors for 5%, 2%, and 1% exceedence probability.

	WAD	FCWA	WSSC	System
5% exceedence probability	1.40	1.70	1.54	1.46
2% exceedence probability	1.42	1.74	1.57	1.50
1% exceedence probability	1.44	1.76	1.60	1.52

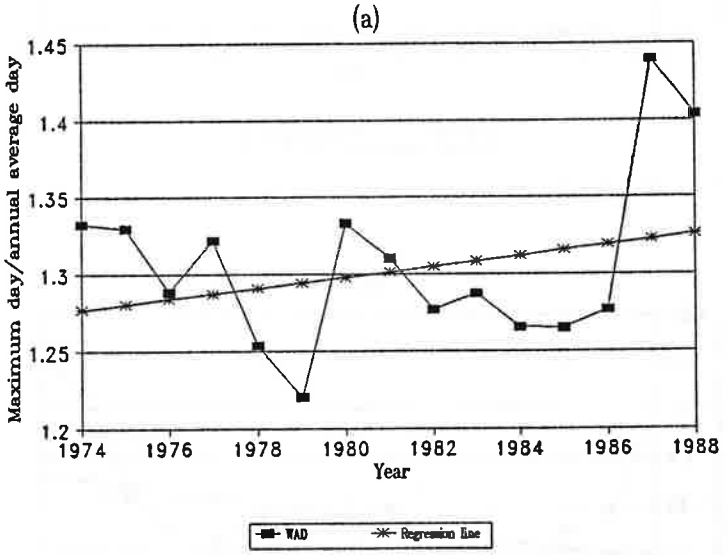
Table III-6 - Statistical maximum 7 day production factors for 5%, 2%, and 1% exceedence probability.

	WAD	FCWA	WSSC	System
5% exceedence probability	1.30	1.57	1.47	1.39
2% exceedence probability	1.32	1.61	1.51	1.42
1% exceedence probability	1.33	1.64	1.54	1.44

D.) Potential Trends in Production Factors

Implicit in the utilization of constant production factors calculated from current production data to disaggregate future annual average demands is the assumption that these factors will remain stationary throughout the forecast period. This assumption will be examined for two particular cases. Figure III-1 (a)-(d) shows plots of linear regression lines through annual maximum day production factors. These figures shows a slight upward trend in these factors over time. However, R squared values for these regression lines are low (.018-.128) and the overall trend is small (3%-7% rise from 1974-1988).

Figure III-1 Annual maximum day production factors for CO-OP Utilities and system.



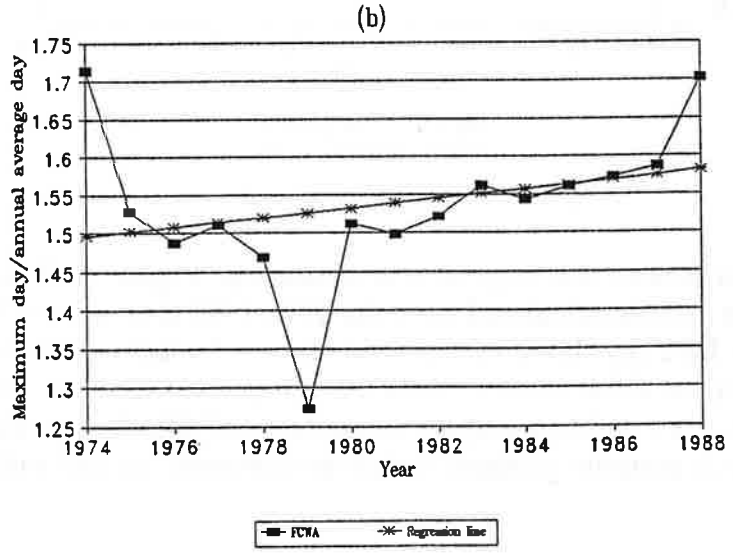
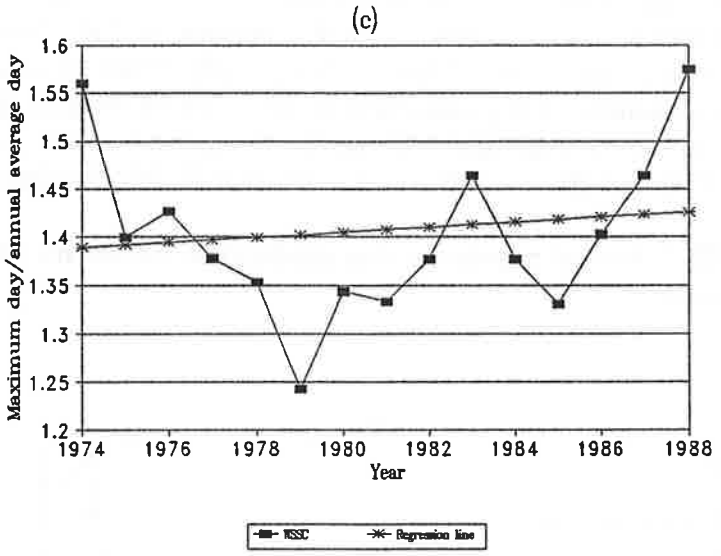
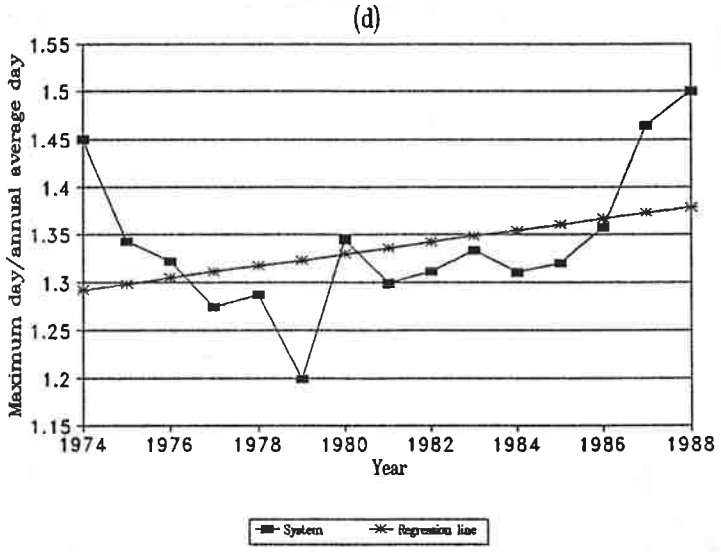


Figure III-1 (continued) Annual maximum day production factors for CO-OP Utilities and system.

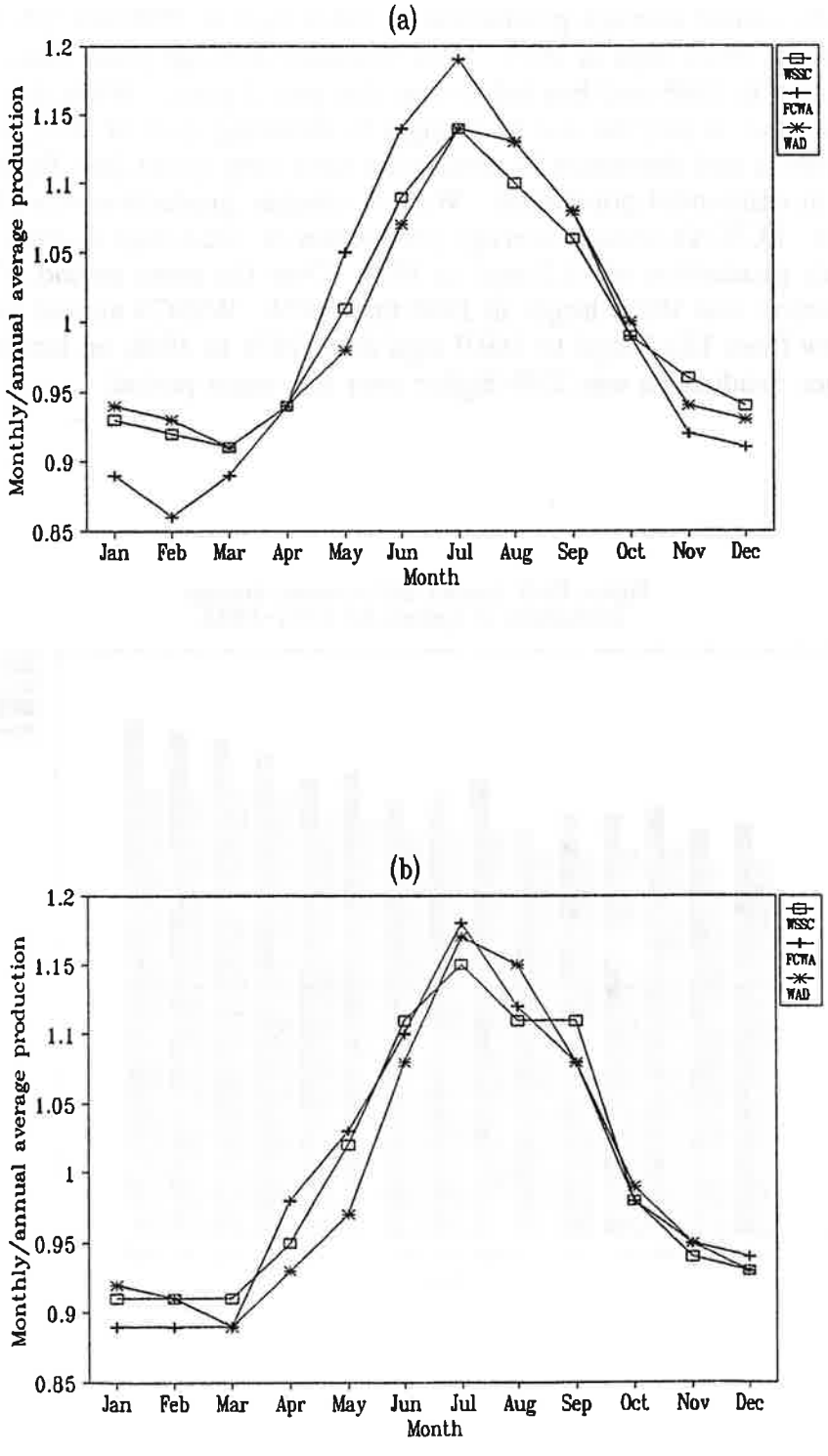




Monthly production factors also may be non-stationary. Figure III-2 (a) shows monthly production factors calculated over the 1974-1988 time period for the CO-OP utilities and Figure III-2 (b) shows monthly production factors calculated over the 1968-1976 time period by the COE (COE, 1983). A comparison of these two figures shows WSSC and WAD currently displaying a lesser range and FCWA currently displaying a greater range in their monthly production factors compared to this earlier data. Again,

these changes are not large and not considered further. Thus, although the assumption of stationarity is a reasonable one, it may not be true in the strictest sense and further study is warranted.

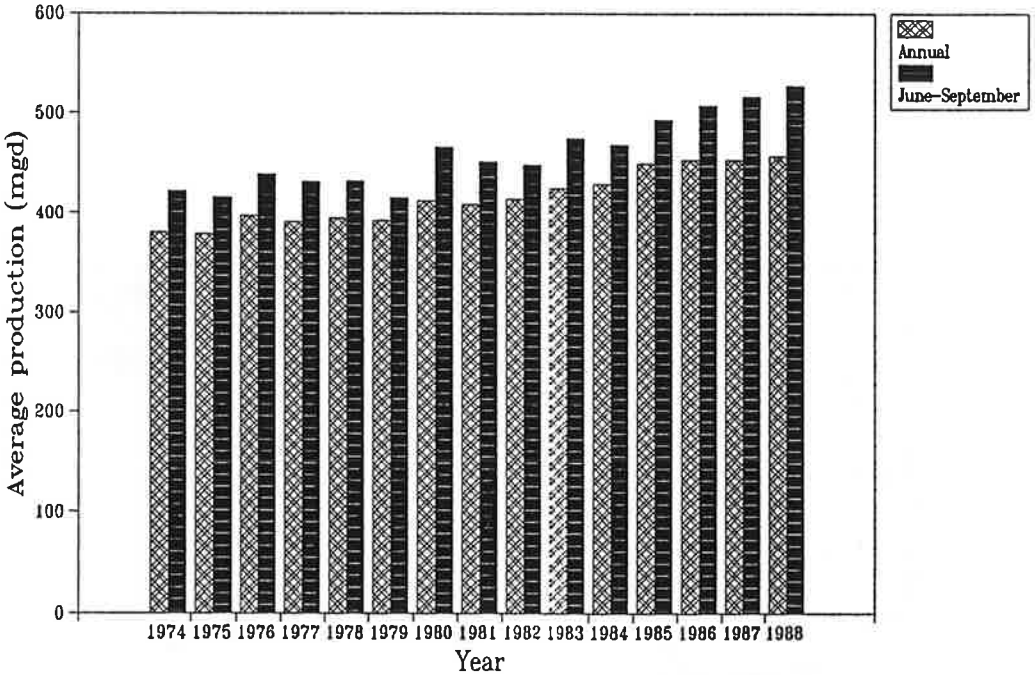
Figure III-2 Monthly production factors for (a) 1974-1988 and (b) 1968-1976.



E.) Changes in Water Supply Production During 1974-1988 Time Period

A review of recent production data shows the Washington Metropolitan Area's water supply needs growing during the 1974-1988 time period. Figure III-3 shows that the system's annual average production has grown by 20% over the past 15 years, from 380.3 mgd in 1974 to 456.8 mgd in 1988. During the same period, this figure shows the system's summer (June - September) average production has grown by 25%, from 421.3 mgd to 527.8 mgd. Figure III-4 shows annual average production for all the CO-OP utilities. WAD's annual average production of 184.6 mgd in 1988 was 5% lower than their production of 194.6 mgd in 1974. WAD's annual average production reached a peak of 215.6 mgd in 1985 and has fallen over the past 3 years. While the causes for this decline are not clear, it may be due to changes in metering, part of WAD's historical pattern of increases and decreases in production over long cycles (see Figure II-1), or an actual decline in residential population. WAD's summer production was 2% lower in 1988 than 1974. FCWA's annual average production of 102.3 mgd in 1988 was 92% larger than their production of 53.2 mgd in 1974. Over the same period, FCWA's summer production was 102% larger in 1988 than 1974. WSSC's annual average production grew from 132.5 mgd to 169.9 mgd from 1974 to 1988, an increase of 28%. WSSC's summer production was 33% higher over this same period.

Figure III-3 Annual and summer average production of system for 1974-1988.



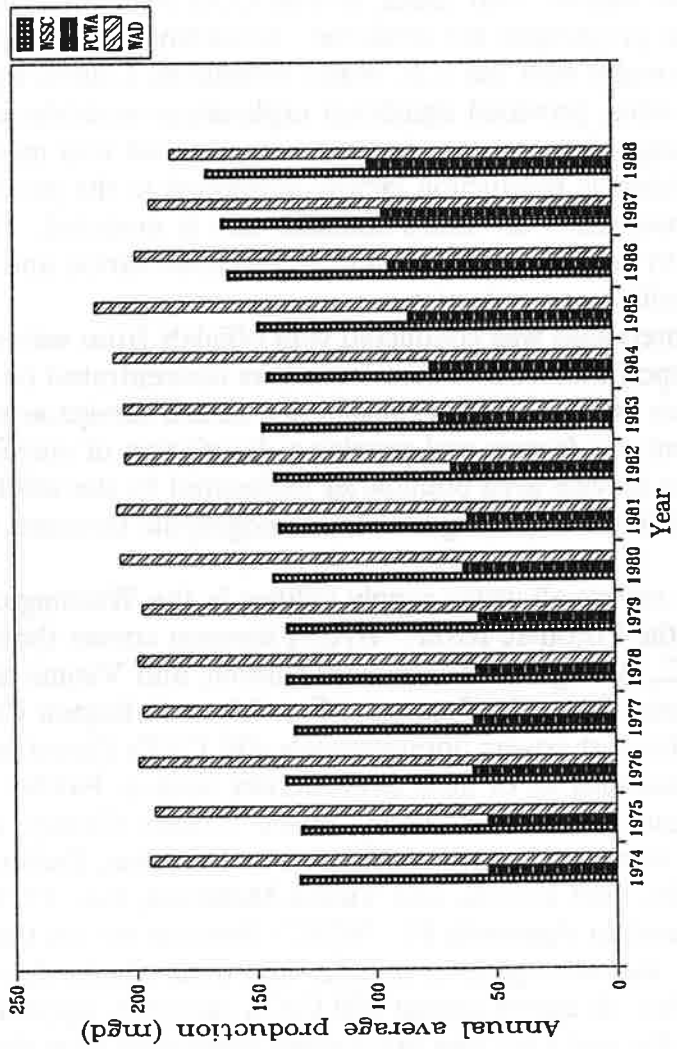


Figure III.4 - WAD, FCWA, and WSSCs annual average production for 1974-1988

IV.) DEVELOPMENT OF THE LONG TERM DEMAND FORECASTING MODEL

A.) Introduction

A long term raw water demand forecasting model for the Washington Metropolitan Area is described in the following sections. The model uses demographic and water use data and unit use factors to forecast annual average water demands from 1985 to 2010 in millions of gallons per day (mgd). Future water demands are disaggregated among 6 water use sectors and 10 water supply utilities. Geographically, the model disaggregates future demands into almost 1300 zones, termed COG Analysis Zones or CAZs, over which demographic projections are available. According to Boland et al., (1983), such an approach should comply with the U.S. Water Resources Council's guidelines set for water implementation studies, provided significant explanatory variables are not excluded. Future annual average demands are further disaggregated into monthly average and peak demands utilizing historic production factors developed in the previous chapter. The effect of water conservation on future demands also is modeled. However, water use is not disaggregated by sector when assessing water conservation and these results should only be used as preliminary estimates.

A series of interviews was conducted with officials from water supply utilities in the Washington Metropolitan Area. These interviews concentrated on developing an accurate delineation of each utility's present and future service areas. They also were used to develop unit use factors and provide a description of current water supply facilities. From the service area boundaries delineated by the utilities and demographic forecasts described in the following section, demographic forecasts were prepared for each utility.

This forecast covers all water supply utilities in the Washington Metropolitan Area withdrawing from the Potomac River. WAD's forecast covers their major service areas in Washington D.C., Arlington County, Falls Church, and Vienna as well as smaller areas at Andrews Air Force Base, the Pentagon, Fort Myer, Arlington Cemetery, and National Airport. WAD's forecast covers approximately 450 CAZs (listed in Appendix E). FCWA's forecast includes all of their direct service area in Fairfax County and their indirect service areas in Loudoun County, Prince William County, and Alexandria. It also includes their smaller wholesale customers of Herndon, Dulles Airport, Lorton Correctional Facility, Fort Belvoir, and Vulcan Materials, Inc. FCWA's forecast covers over 280 CAZs (listed in Appendix F). WSSC's forecast covers their direct service areas in Prince George's and Montgomery counties and their wholesale customers of Howard and Charles counties. It covers almost 500 CAZs (listed in Appendix G). In addition, the cities of Rockville and Leesburg are treated separately from the above utilities (CAZs listed in Appendix H).

B.) Cooperative Forecasting Program

Estimates of population, households, and employment to the year 2010 utilized in the long term water demand model come from the Cooperative Forecasting Program's Round IV totals (Metropolitan Washington Council of Governments, 1988). The Cooperative Forecasting Program (CFP) produces a consistent set of demographic

forecasts for use in regional and local planning. It combines the efforts of the Metropolitan Washington Council of Governments (MWCOG), the Maryland-National Capital Parks and Planning Commission (MNCPPC), and local governments. The planning area covers Loudoun, Prince William, Fairfax and Arlington counties in Virginia; Frederick, Montgomery, and Prince George's counties in Maryland; and the District of Columbia. Since the program's inception in 1975, the CFP has issued four sets of forecasts. The most recent set of forecasts, Round IV, was completed in June of 1988. These forecasts are between 9 and 22 percent higher than those released in the updated Round III forecasts of 1985 and reflect the increased growth experienced recently in this area.

The process uses both regionally and locally derived information as inputs to predict the location and magnitude of future population, households and employment. On a regional scale, local and national demographics and economic trends are used to create a statistical benchmark for the planning area as a whole. Local jurisdictions also develop their own local forecasts based on such information as building permits, site plans, or local policy using an agreed-upon set of guidelines. Regional projections are then reconciled with the jurisdictions' totals to produce local forecasts that are technically sound and politically acceptable. Local governments then produce CAZ forecasts which allocate population, households and employment within smaller districts. Thus, forecasts of water demands can be made at the CAZ level.

C.) Demographic Data

Round IV produced forecasts for low, intermediate, and high-growth scenarios. The intermediate or "most likely" forecasts are used in the long term water demand model. The increases in future water demands forecasted by the long term water demand model reflect demographic trends reported in the Round IV intermediate growth estimates.

Several highlights of the Round IV intermediate forecasts are worth noting. Overall, population in the Washington Metropolitan Area is predicted to grow by 32 percent over the 1985-2010 forecast period, from 3.4 to 4.5 million people. Over this same period, the number of households in the Washington Metropolitan Area is forecasted to rise by 600,000 to 1.9 million in 2010 and employment by 1.3 million to 3.4 million in 2010. The number of households within the District of Columbia is expected to show a slight increase from 257,800 in 1985 to 264,800 in 2010. Employment in the District of Columbia is forecast to gain almost 200,000 jobs to 886,000 during this same period. The number of households within Fairfax County is expected to increase from 238,500 to 392,800 between 1985 and 2010. Employment within Fairfax County is expected to rise from 295,500 to 577,100 during this same period. The number of households within Prince William County is expected to grow from 56,100 to 126,000 and within Loudoun County is expected to grow from 22,300 to 77,400 from 1985 to 2010. Employment is forecasted to rise by 78,700 jobs to 119,600 in Prince William County and by 75,000 jobs to 98,300 in Loudoun County over this same time period. The number of households is expected to increase from 241,300 to 337,000 in Prince George's County and from 235,300 to 371,000 in Montgomery County between 1985 and 2010. Employment is expected to rise by a combined total of almost 500,000 jobs over the

same period for these two counties. (MWCOG, 1988)

It is worthwhile at this point to compare Round IV intermediate population forecasts for 1990 with preliminary results of the 1990 census. Table IV-1 displays the Round IV forecasts and the preliminary census results for the major jurisdictions in the Washington Metropolitan Area. This table shows agreement between the Round IV forecasts and preliminary census results within approximately 10% for individual jurisdictions and much closer for the region as a whole. The District of Columbia's Round IV 1990 population forecast is higher than the preliminary 1990 census results. The preliminary 1990 census population for the District of Columbia of 574,844 also is below the final 1980 census population of 638,432. This decline in population may be the cause of the recent decline in WAD's annual average production discussed in Section E of Chapter 3. Round IV 1990 population forecasts for Fairfax, Arlington, Montgomery, and Prince George's counties and the City of Alexandria are lower than the preliminary 1990 census results whereas Round IV 1990 population forecasts for Loudoun and Prince William counties are higher than the preliminary 1990 census results. It should be noted, however, that the census data are preliminary and undoubtedly will be modified before becoming final.

Table IV-1 Comparison of intermediate Round IV population forecasts for 1990 with preliminary 1990 census results. (sources: MWCOG, 1988 and The Washington Post, 1990)

Jurisdiction	Round IV population forecast for 1990	Preliminary 1990 census results	Round IV forecast - preliminary census results
District of Columbia	628,300	574,844	+53,456
Arlington County	167,000	170,089	-3,089
Fairfax County	784,100	815,223	-31,123
Loudoun County	89,800	85,760	+4,040
Prince William County	240,100	215,862	+24,238
City of Alexandria	109,500	111,620	-2,120
Montgomery County	710,000	750,816	-40,816
Prince George's County	718,400	719,812	-1,412
Total	3,447,200	3,444,026	+3,174

D.) Unit Use Factors and Dwelling Unit Ratios

The long term water demand forecasting model uses numbers of single family households, multifamily households and employees to forecast annual average water demand. This level of disaggregation required estimates of average daily water consumption per single family household, water consumption per multifamily household, and water consumption per employee for the major water supply utilities. Table IV-2 displays these unit use factors.

Table IV-2 Unit use factors for major Washington Metropolitan Area water supply utilities (held constant throughout forecast period).

	Consumption per single family residence in gallons per day (gpd)	Consumption per multifamily residence in gpd	Consumption per employee in gpd
WAD			
District of Columbia	325	315	50
Other service areas (Arlington Co., Falls Church and Vienna)	226	183	50
FCWA			
Direct service area	240	177	44
LCSA	256	177	44
PWCSA	250	250	44
VAWC in Alexandria	212	177	44
WSSC			
Whole service area	241	224	58

Residential unit use factors for WAD's service areas are calculated from billing information provided by WASUA and Arlington County Department of Public Works. The employment unit use factor was obtained from discussions with WASUA and assumed to be constant throughout the service area. Unit use factors for Falls Church and Vienna are assumed to equal those for Arlington County. Residential and employment unit use factors for FCWA's direct service area are determined from billing information provided by FCWA's Engineering and Construction Division. Residential water consumption factors for FCWA's indirect service area are obtained from PWCSA's Department of Engineering and Wastewater and from VAWC's Operations Division. Employment unit use factors for FCWA's direct service area are used throughout the indirect service area. No information was available for LCSA and their unit use factors are assumed to be similar to those calculated for FCWA's direct service area. Residential and employment unit use factors for WSSC are obtained from their report on water production through 1986 (WSSC, 1987) and confirmed through discussions with WSSC's Water Resources Planning Section. Unit use factors developed for FCWA's direct service area are used in the Leesburg forecast and unit use factors developed for WSSC are used in the Rockville forecast.

These unit use factors are assumed to be stationary throughout the forecast period. As with the assumption of stationary production factors, this assumption may not be valid. The COE (1978) quoted per capita water use in Washington D.C. at 203 gallons per day (gpd) in 1903. After metering of the city began in 1906, this rate dropped by a third. Per capita water use from 1924-1929 averaged 137 gpd (COE, 1930). This number increased to a per capita consumption of 172 gpd between 1930 and 1932 (COE, 1932). Although more recent information is sparse, an estimate of per capita consumption for 1985 is 280 gpd and for 1989 is 225 gpd. No attempt was made in this study to develop the data base required to accurately predict future changes in per capita water use. Translating changes in per capita water use to per household or per employee water use also is not straightforward and further impedes incorporating non-stationary unit use factors into this study. However, as with changes in production factors over time, further study on this subject is warranted.

Single family to multifamily dwelling unit ratios are used to estimate the number of each housing type from estimates of undifferentiated households made in the Round IV forecast. Table IV-3 contains dwelling unit ratios for the major jurisdictions in the Washington Metropolitan Area. These numbers were complied from the District of Columbia Office of Planning, Fairfax County Office of Research and Statistics, Loudoun County Department of Planning, Prince William County Planning Office, City of Alexandria Planning and Community Development Office, and the Montgomery and Prince George's offices of the MNCPPC provided estimates of these dwelling unit ratios for their respective jurisdictions.

These ratios are assumed to be constant throughout the water supply service areas within each political jurisdiction, even though most utilities do not cover each jurisdiction completely. For example, WSSC does not serve all of Montgomery County. However, when estimating the number of single and multifamily households in WSSC's service area in Montgomery County, the factors calculated countywide are used. The area not served

in Montgomery County is primarily rural and contains a higher percentage of single family households than the rest of the county. Therefore, using the jurisdictional estimation of single family to multifamily residences for WSSC's service area within Montgomery County will overestimate the number of single family residences within WSSC's service area in Montgomery County. This error is probably not large due to the small percentage of households in Montgomery County not served by WSSC. For other jurisdictions where the water utility does not serve a large percentage of households within the jurisdiction, such as LCSA's service area within Loudoun County, this error may be larger.

Table IV-3 Single family to multifamily dwelling unit ratios for major jurisdictions in the Washington Metropolitan Area. (* indicates data are not published at request of providing agency)

	1985	1990	1995	2000	2005	2010
	no. of single family residences/no. of multifamily residences					
District of Columbia	.61	.61	.61	.61	.61	.61
Virginia						
Fairfax Co.	*	*	*	*	*	*
Loudoun Co.	4.00	4.00	4.00	4.00	4.00	4.00
Arlington Co.	.73	.69	.69	.69	.69	.69
City of Alexandria	.50	.50	.50	.50	.50	.50
Maryland						
Prince George's Co.	1.46	1.61	1.70	1.79	1.85	1.92
Montgomery Co.	2.26	2.38	2.51	2.57	2.58	2.59
City of Rockville	2.71	2.70	2.39	2.12	2.02	2.02

E.) Long Term Water Demand Forecasting Method

Water use is disaggregated into six sectors for this model: single-family residential, multifamily residential, employment, long term wholesale, unaccounted, and process water use. Employment is not broken down into separate employment categories because such projections are not available for each jurisdiction. Since there are no major water consuming industries in the area, this may not introduce a large error. Long term wholesale water use is used for a few small service areas where demographic information was unavailable. Forecasts for these wholesale water demands are obtained from the utilities or customers. This water use sector is used for WAD's service to Blue Plains Sewage Treatment Plant, FCWA's service to Vulcan Materials and WSSC's service to Howard and Charles counties. Unaccounted water use is a constant percentage of total water use and defined as the difference between the finished water metered leaving the plant and the total amount of billed water. For each of the CO-OP Utilities Table IV-4 displays the percentages which are used throughout each utility's service areas. The percentage of unaccounted water use for WAD is taken from the Metropolitan Washington Area Water Supply Study (COE,1983). The percentage of unaccounted water use for FCWA is estimated by their Engineering and Construction Division. The percentage of unaccounted water use for WSSC is estimated by their Water Resources Planning Section. Process water use is defined as water used inside the water treatment plant (particularly backwash water used in filtration and sedimentation basins) that is neither accounted for as finished water leaving the treatment plant nor available to another CO-OP Utility. It is also treated as a constant percentage of total water use and shown in Tables IV-4. Process water use only is calculated for water withdrawn from the Occoquan Reservoir and treated at the Occoquan treatment facilities. The process water use percentage is estimated by FCWA's Engineering and Construction Division. All but a small amount of process water at the other water treatment facilities is recycled or returned to the Potomac River. It should be recognized, however, that future NPDES permits will not allow this water to be returned to the river during low flows. A more explicit treatment of this water use will be needed in the future.

Table IV-4 Unaccounted and process water use as a percentage of total water demand for major Washington Metropolitan Area water supply utilities (held constant throughout forecast period).

	Unaccounted water use	Process water use
WAD - all service areas	18%	0%
FCWA - all service areas	12%	3.5%
WSSC - all service areas	15%	0%

The basic equation used for each utility for forecasting average annual residential and employment water demands is:

$$WATUSE(k,i) = R4PRO(k,i) \times UUF(k,i)$$

where,

WATUSE(k,i) = annual average water demand in sectors k=1,2,3 (single family residential, multifamily residential, and employment) in year i
R4PRO(k,i) = Round IV intermediate projections of the number of units of sector k=1,2,3 in year i
UUF(k,i) = per unit water use factor for sector k in year i

Unaccounted water demand is estimated by:

$$WATUSE(5,i) = [(WATUSE(1,i) + WATUSE(2,i) + WATUSE(3,i) + WATUSE(4,i)) \times WASTE(i)]/(1 - WASTE(i))$$

where,

WATUSE(4,i) = annual average wholesale water demand in year i
WATUSE(5,i) = annual average unaccounted water demand in year i
WASTE(i) = percentage of water demand that is unaccounted water use in year i

Process water demand is estimated in a similar fashion. Annual average water demand is then estimated by:

$$AAD(i) = WATUSE(1,i) + WATUSE(2,i) + WATUSE(3,i) + WATUSE(4,i) + WATUSE(5,i) + WATUSE(6,i)$$

where,

AAD(i) = annual average water demand in year i
WATUSE(6,i) = annual average process water demand in year i

Monthly average and mean peak water demands are then estimated from the forecast of future annual average demand utilizing production factors developed in the previous chapter. Monthly average demand for each utility is calculated from annual average demand using:

$$MAD(i,j) = AAD(i) \times MMPF(j)$$

where,

MAD(i,j) = monthly average water demand in year i and month j
MMPF(j) = mean monthly production factor for month j

Mean peak day demands are calculated (mean peak 7 day demands are calculated in a similar fashion) from:

$$MP1D(i,j) = AAD(i) \times MMPF(j) \times MP1PF(j)$$

where,

MP1D(i,j) = mean peak 1 day demands in year i and month j
MP1PF(j) = mean peak 1 day production factor for month j

Mean peak 30, 60, 90, 120, 180 day demands are calculated utilizing the following method. Only the calculation for the mean peak 30 day demands is shown.

$$MP30D(i) = AAD(i) \times MP30PF$$

where,

MP30D(i) = mean peak 30 day demands in year i
MP30PF = mean peak 30 day production factor

Statistical maximum 1 day and 7 day demands are estimated from the forecast of future annual average demand utilizing the statistical maximum 1 day and 7 day production factors developed in the previous chapter. Statistical maximum 1 day demands are calculated (statistical maximum 7 day demands are calculated in a similar fashion) from:

$$SM1D(i) = AAD(i) \times SM1PF$$

where,

SM1D(i) = statistical maximum 1 day demands in year i
SM1PF = statistical maximum 1 day production factor

F.) Water Conservation Savings

A simple method to forecast water conservation savings is developed to provide preliminary estimates of reductions in future average water demands. The method separates water demand into base level (mainly indoor and nonseasonal employment water use) and seasonal (mainly outdoor and seasonal employment water use) water demands and allocates varying percentages of savings to each. Base level water demand is assumed to equal the lowest monthly demand within a given time period and seasonal water demand is the difference between all other monthly demands and the lowest monthly demand. Reductions in base level water demand are assumed to come from the installation of low use appliances and plumbing fixtures, and improved efficiencies and employment water use. Reductions in seasonal water demand are assumed to come primarily from abatement of outdoor residential water use. Both base level and seasonal water demands also can be decreased through public education and financial incentives.

Two water conservation scenarios are developed, differing only in the percent reductions of base level and seasonal water demands. Scenario 1 assumes base level water demand is reduced by 5% and seasonal water demand by 25%. Scenario 2 assumes base level water demand is reduced by 10% and seasonal water demand by 50%. These scenarios are created with the aid of water supply utilities experienced in reducing water demands. The San Francisco Water Department, through their water allotment program, was successful in reducing base level water demand by 10% and seasonal water demand by 60% during 1988 (San Francisco Water Department, 1989). Overall water demands during 1988 were reduced by an estimated 21%. The East Bay Municipal Utility District (EBMUD) reported reductions in water consumption during the summers of 1988 and 1989 of 30% and 27%, respectively (AWWA, 1990). The EBMUD program emphasized reducing residential and municipal outdoor water use.

The method for calculating savings in monthly average base level demand is as follows:

$$SBW(i,j) = AAD(i) \times MinMPF \times PRBW$$

where,

SBW(i,j) = savings in base level water demand in year i and month j
MinMPF = minimum monthly production factor
PRBW = percent reduction in base water demand/100

Table IV-5 shows minimum monthly production factors for the individual CO-OP Utilities and the system along with the month of their occurrence. Note that this method yields a constant reduction in base level water demand for all months during a year.

Table IV-5 Minimum monthly production factors and month of their occurrence used in calculating base level water demand.

	WAD	FCWA	WSSC	System
Minimum monthly production factor	.91	.86	.91	.91
Month of occurrence	March	February	March	February, March

Reduction in seasonal water demands is calculated as follows:

$$SSW(i,j) = (MMPF(j) - MinMPF) \times AAD(i) \times PRSW$$

where,

SSW(i,j) = savings in seasonal water demand in year i and month j
MMPF(j) = mean monthly production factor for month j
PSSW = percent reduction in seasonal water demand/100

Note that this will yield a varying amount of demand reduction depending on the month. The average monthly demand after reductions in base level and seasonal water demands is calculated as follows:

$$MADAR(i,j) = (AAD(i) \times MMPF(j)) - SBW(i,j) - SSW(i,j)$$

where,

MADAR(i,j) = monthly average water demand in year i and month j after savings in base level and seasonal water demands

Although this method of forecasting water conservation savings yields only preliminary results, it should be useful for water supply planning purposes. The reductions in base level and seasonal water demands are based on an assessment of other water supply utilities' experiences. Thus, this method should forecast reductions that are obtainable in the Washington Metropolitan Area.

V.) FORECASTS OF FUTURE WATER DEMANDS

A.) Introduction

Results of the long term water demand forecasting model are presented in this chapter. Forecasts of unrestricted water demands for each water supply utility and for the whole system are presented initially. Forecasts of water demands with water conservation are then presented. Sections describing the geographical distribution of future growth in water demands and comparing the forecasts contained within this study to earlier forecasts follow. Lastly, this chapter contains a short description of some uncertainties that may effect the likelihood of this study's forecasts being realized.

B.) Forecasts of Unrestricted Water Demands

Annual water demands are forecasted to increase for all Washington Metropolitan area water supply utilities. Table V-1 displays these results. WAD is forecasted to grow by 31.3 mgd, from 195.2 mgd to 226.5 mgd, over the forecast period (1985-2010). This represents an overall increase of 16% at an annual average growth rate of less than 1%. During this same period FCWA is expected to grow from 90.9 mgd to 187.4 mgd, a gain of 96.5 mgd. This is the largest percent gain of the CO-OP utilities, an overall increase of 106% and an annual growth rate of almost 3%. WSSC is expected to show the largest absolute increase (although just barely), gaining 97 mgd during the forecast period. It is predicted to have an annual growth rate of almost 2% and an overall growth of 62%. Rockville and Leesburg are expected to grow by 2.9 mgd and 3.4 mgd, respectively. The system annual average demand is predicted to grow by 231.1 mgd, from 450.7 mgd to 681.8 mgd, during the forecast period. This represents an overall growth of 52%; an annual growth rate of greater than 1.5%. At this annual growth rate, system annual average demand would double in 46 years, i.e. in the year 2031.

Table V-1 Forecasted annual average water demands for the Washington Metropolitan area.

Year	1985	1990	1995	2000	2005	2010
Utility	(millions of gallons per day)					
WAD	195.2	203.4	211.8	217.9	223.3	226.5
FCWA	90.9	112.6	146.8	164.8	176.6	187.4
WSSC	157.7	182.4	202.0	221.1	238.1	254.7
Rockville	5.5	6.2	7.3	8.0	8.2	8.4
Leesburg	1.4	2.0	2.6	3.3	4.0	4.8
System totals	450.7	506.6	570.5	615.1	650.2	681.8

Table V-2 separates growth in annual average demands by utility and water use sector. This table only displays the results for the largest utilities. It also displays the results for only the single family residential, multifamily residential, and employment water use sectors. Growth in the wholesale water use sector is small and growth in the unaccounted and process water use sectors are directly proportional to growth in the other sectors. A complete disaggregation of demands by utility and water use sector is contained in the following appendices: Appendix I for WAD, Appendix J for FCWA, Appendix K for WSSC, Appendix L for Leesburg and Rockville, and Appendix M for the whole system.

Table V-2 Forecasted growth in water demands by utility and for residential and employment water use sectors from 1985 to 2010.

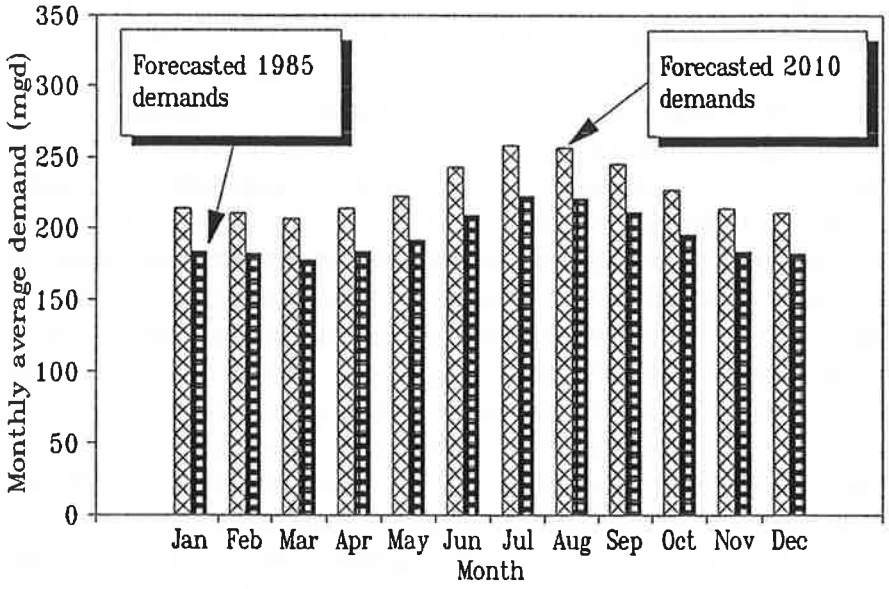
	Growth in single family residential water demands (mgd)	Growth in multifamily residential water demands (mgd)	Growth in employment water demands (mgd)
WAD			
WASUA	.9	1.4	10.0
Arlington Co.	1.6	2.4	4.2
Falls Church and Vienna	2.0	1.3	1.5
FCWA			
Direct service area	19.1	8.4	10.6
LCSA	6.9	1.1	1.9
PWCSA	10.9	3.1	3.1
VAWC in Alexandria	.6	.9	4.1
WSSC			
Direct service area	27.3	23.2	26.3

Most of WAD's growth is forecasted to be in the employment water use sector. WASUA, serving the District of Columbia, is forecasted to experience very little growth in residential water use, especially in the single family residential sector. Growth in Arlington County is split between residential and employment water use with the largest in multifamily water use. Falls Church and Vienna are expected to show the largest increase in single family residential water use of the utilities served by WAD. Most of FCWA's growth is forecasted to be in the single family residential water use sector. This is true for both their direct service area in Fairfax County and indirect service area in Loudoun and Prince William counties. Only the Alexandria Division of the VAWC is expected to see their largest growth sector to be in the employment water use sector. However, due to proposed changes in the Prince William County Comprehensive Plan, PWCSA managers also are projecting a larger increase in employment water use than forecasted by the Round IV employment forecasts. Absolute growth within FCWA's service area is almost evenly split between their direct and indirect service areas. Percent growth is much greater in their indirect service area and, due to Fairfax County's predicted buildout around 2010, should continue in this manner beyond the forecast period described herein. LCSA demand is forecasted to grow by 340% and PWCSA by 150% during the forecast period. This is in contrast to a forecasted growth of 77% within FCWA's direct service area. WSSC's growth is forecasted to be almost evenly divided between the single family residential, multifamily residential, and employment water use sectors. Although their wholesale water use is expected to grow, absolute growth within this water use sector is forecasted to remain proportionally small.

Forecasted annual average demands are disaggregated into mean monthly and mean peak demands utilizing production factors discussed in Chapter 3. A complete listing of the disaggregated demands is listed in Appendix I for WAD, Appendix J for FCWA, Appendix K for WSSC, and Appendix M for the system. Figure V-1 (a)-(d) displays forecasted mean monthly demands for WAD, FCWA, WSSC and the system, respectively, for 1985 and 2010. Mean July demands, which are the peak monthly demands, are forecasted to grow by 35.6 mgd for WAD, 114.9 mgd for FCWA and 110.6 mgd for WSSC. The mean July demand for the system is forecasted to be 784.1 mgd in 2010, a growth of 265.8 mgd from 1985. System demands in September and October, which correspond to the months of lowest Potomac flows, are forecasted to be 729.5 mgd and 681.8 mgd, respectively, in 2010. This is a 247.3 mgd increase for September and a 231.1 mgd increase for October.

Statistical maximum 1 day and 7 day demands are estimated from annual average demands utilizing the statistical maximum 1 day and 7 day production factors described in Section C of Chapter 3. Table V-3 displays these results. Forecasted statistical maximum 1 day and 7 day demands for WAD are expected to rise by 45.1 mgd and 41.6 mgd, respectively, between 1985 and 2010. FCWA's statistical maximum 1 and 7 day demands are predicted to rise by 169.8 mgd and 158.2 mgd, respectively, over the forecast period. This represents the largest growth in statistical maximum demands of the CO-OP Utilities. Statistical maximum 1 day and 7 day demands for WSSC are forecasted to grow by 155.2 mgd and 149.3 mgd, respectively. Utilizing statistical maximum demand factors developed for WSSC, Rockville's statistical maximum 1 day demand is expected to increase by 4.6 mgd and their 7 day demand by 4.4 mgd. Utilizing statistical maximum demand factors developed for FCWA, Leesburg's statistical

(a)



(b)

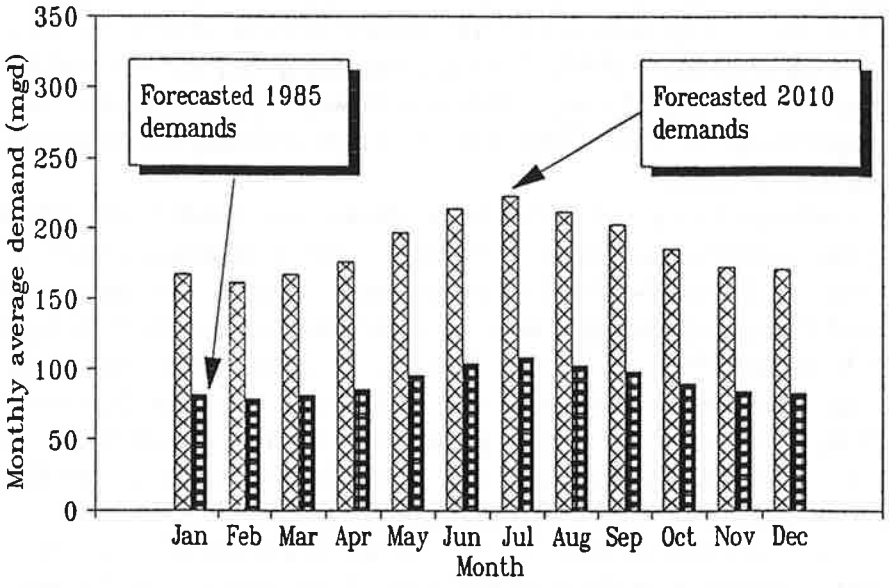
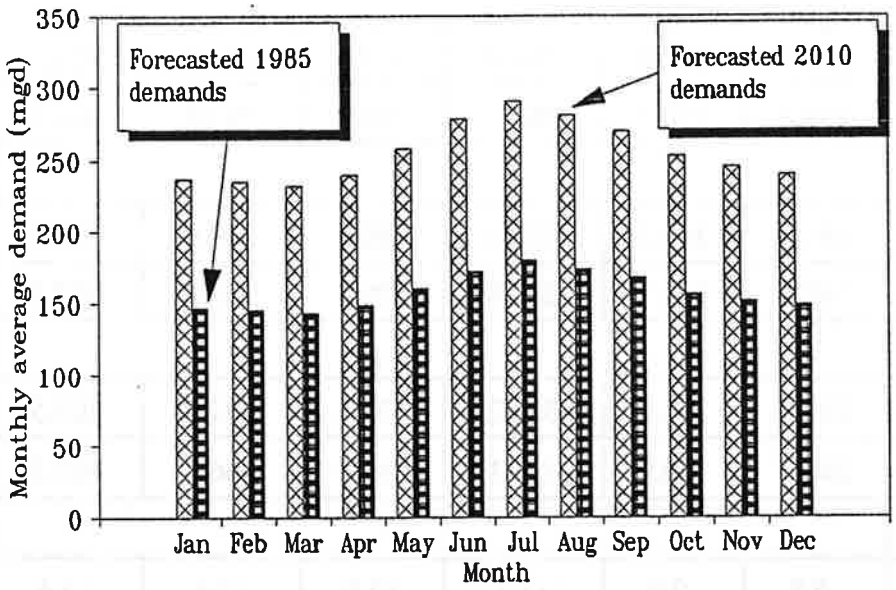


Figure V-1 Forecasted monthly average water demands for 1985 and 2010 for (a) WAD, (b) FCWA, (c) WSSC, and (d) system.

(c)



(d)

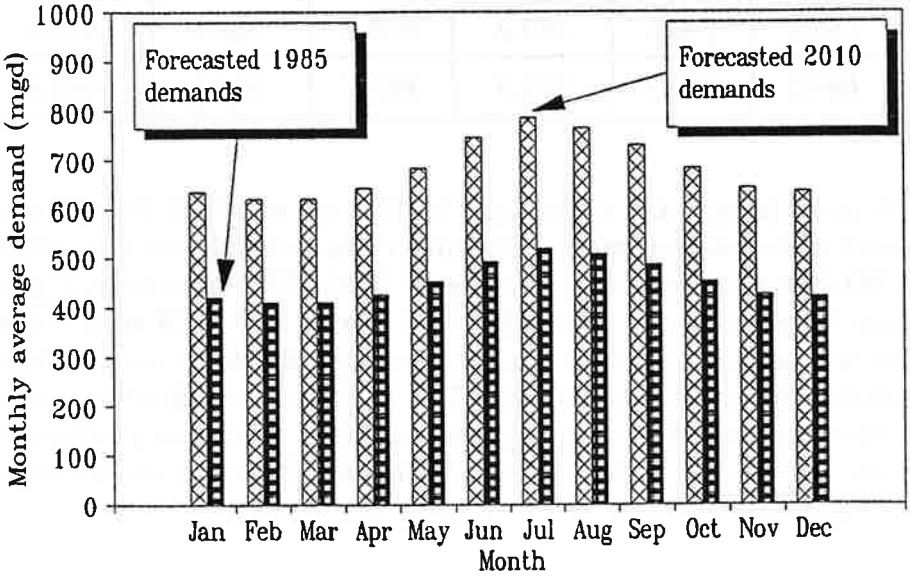


Figure V-1 (continued) Forecasted monthly average water demands for 1985 and 2010 for (a) WAD, (b) FCWA, (c) WSSC, and (d) system.

Table V-3 Forecasted statistical maximum 1 day and 7 day water demands for the Washington Metropolitan area in millions of gallons per day.						
Year	1985	1990	1995	2000	2005	2010
WAD						
1 day	281.1	292.9	305.0	313.8	321.6	326.2
7 day	259.6	270.5	281.7	289.8	297.0	301.2
FCWA						
1 day	160.0	198.2	258.4	290.0	310.8	329.8
7 day	149.1	184.7	240.8	270.3	289.6	307.3
WSSC						
1 day	252.3	291.8	323.2	353.8	381.0	407.5
7 day	242.9	280.9	311.1	340.5	366.7	392.2
Rockville						
1 day	8.8	9.9	11.7	12.8	13.1	13.4
7 day	8.5	9.5	11.2	12.3	12.6	12.9
Leesburg						
1 day	2.5	3.5	4.6	5.8	7.0	8.4
7 day	2.3	3.3	4.3	5.4	6.6	7.9
System						
1 day	685.1	770.0	867.2	935.0	988.3	1,036.3
7 day	649.0	729.5	821.5	885.7	936.3	981.8

maximum 1 day demand is expected to increase by 5.9 mgd and their 7 day demand by 5.6 mgd. Forecasted statistical maximum 1 day and 7 day demands for the system are 1,036.3 mgd and 981.8 mgd, respectively, in the year 2010. This represents a growth in statistical maximum 1 day and 7 day demands of 351.2 mgd and 332.8 mgd, respectively. As shown in Table V-3, system statistical maximum demands are not simply the sum of the individual demands but somewhat smaller. This is because maximum demands for the individual utilities are not concurrent. System statistical maximum production factors developed in Chapter 3 reproduce this lack of concurrence in maximum demands amongst the different utilities.

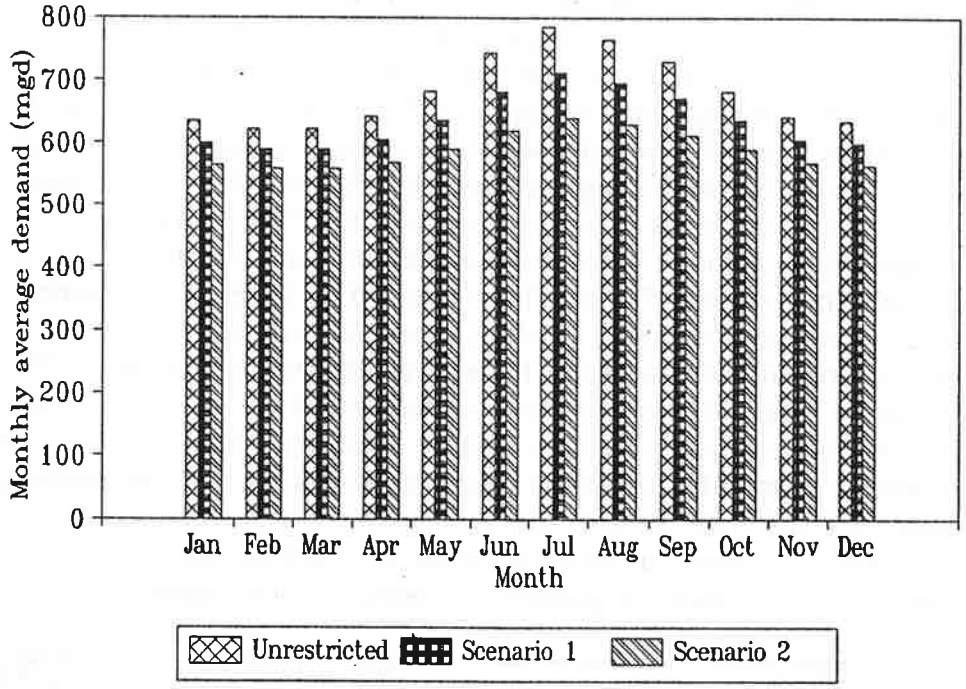
C.) Forecasts of Water Demands with Water Conservation

Water conservation scenarios 1 and 2 are used to estimate annual and monthly average demands with water conservation from the forecast of unrestricted demands. Table V-4 displays forecasted annual average demands for scenarios 1 and 2. Conservation scenario 1, which reduces base level demand by 5% and seasonal demand by 25%, reduces annual average demands by 7-8% for the CO-OP Utilities and the system. Conservation scenario 2, which reduces base level demand by 10% and seasonal demand by 50%, reduces annual average demands by 14-16%. Figure V-2 displays forecasted monthly water demands for the system in 2010. This figure displays unrestricted, conservation scenario 1 and conservation scenario 2 water demands. System July water demands (peak month demands) are reduced by 9% for conservation scenario 1 and 18% for conservation scenario 2. System water demands for September and October (months of lowest Potomac River flows) are reduced an average of 7% under conservation scenario 1 and 15% under conservation scenario 2. A complete listing of forecasted monthly water demands for conservation scenarios 1 and 2 are listed in the following appendices: Appendix I for WAD, Appendix J for FCWA, Appendix K for WSSC, and Appendix M for the system. These appendices also contain the amount of reduction in base level and seasonal water demands for each month. Although reductions in base level demands are greater than reductions in seasonal

Table V-4 Annual average water demands for water conservation scenario 1 and water conservation scenario 2.

Year	1985	1990	1995	2000	2005	2010
WAD						
Scenario 1	181.9	189.6	197.4	203.1	208.1	211.1
Scenario 2	168.7	175.8	183.0	188.3	192.9	195.7
FCWA						
Scenario 1	83.8	103.8	135.3	151.9	162.8	172.8
Scenario 2	76.7	95.0	123.9	139.1	149.0	158.1
WSSC						
Scenario 1	147.0	170.0	188.3	206.0	222.0	237.4
Scenario 2	136.3	157.6	174.6	191.0	205.8	220.1
System						
Scenario 1	420.1	472.2	531.7	573.3	606.0	635.4
Scenario 2	389.4	437.7	492.9	531.4	561.8	589.1

Figure V-2 Forecasted system demands in 2010 with and without conservation.



demands on an annual basis, this relationship is reversed in months with large seasonal water demands. WAD, WSSC, and the system show a larger reduction in seasonal water demands than base level water use for the months of July and August. Because a larger percent of their overall water demand is seasonal water use, FCWA shows a larger reduction in seasonal water use than base level water use for June-September.

D.) Geographical Distribution of Growth in Water Demands

The geographical distribution of growth in water demands is estimated from the changes in households and employment by CAZ over the forecast period. These changes in households and employment are used to estimate the absolute and percent changes in water demands by CAZ from 1985 to 2010. Although this approach shows the general pattern of growth in water demands, the use of unit use factors constant throughout the service areas rather than location-specific factors makes this approach less useful for planning and designing distribution facilities.

In general, most growth in water demands will be outside the Beltway along the major highway corridors. In particular, WAD's growth will occur in the downtown area of the District of Columbia bounded on the north and south by Massachusetts and Constitution avenues, respectively, and on the east and west by Interstate 395 and 23rd Street, respectively. Growth also is forecasted to occur along the Anacostia River, particularly in the Washington Navy Yard, and in Arlington County along Highway 1

near Crystal City and Pentagon City. Other areas of forecasted growth in Arlington County are expected to occur east of the Interstate 66 and Highway 237 junction and in the Clarendon area. Growth in water demands for FCWA's direct service area is concentrated in western Fairfax County west of Fairfax City. Most of the growth is located along the 3 major highway corridors, highways 29 and 50 and Interstate 66, particularly near the junctions of these corridors. Areas in the vicinity of Dulles Airport also are expected to exhibit strong growth in water demands. Growth in FCWA's indirect service area is expected along Highway 7 (LCSA) in Loudoun County, in the undeveloped area along Ashburn and Stunkle roads (LCSA), near Interstate 95 and Highway 610 (PWCSA), and along Interstate 66 and the junction of Interstate 66 and Highway 29 in western Prince William County (PWCSA). Growth in water demands for WSSC's service area in Montgomery County is expected to be concentrated along Interstate 270 in the vicinity of Germantown, Highway 28 and Interstate 270 in Gaithersburg, the junction of highways 97 and 108 in Olney, and Highway 29 near Burtonsville. Strong growth in water demands is also forecasted for Bethesda and Silver Spring. Growth for WSSC's service area in Prince George's County is expected to be concentrated along Interstate 95 between the Beltway and Laurel (where WSSC's new headquarters is located) and along Highway 50 in the vicinity of Bowie.

E.) Comparison of Water Demand Forecasts with Earlier Studies

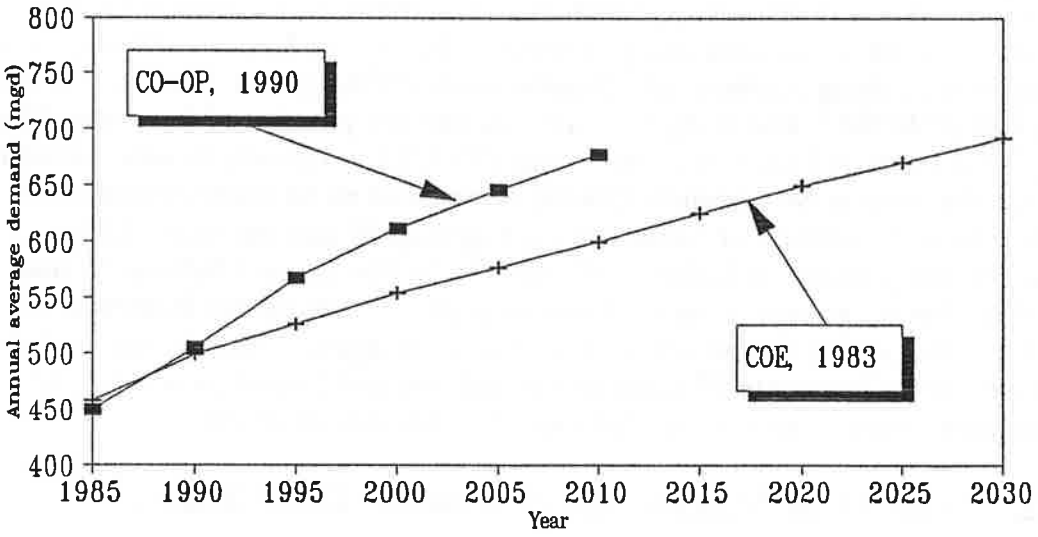
Figure V-3 displays the comparison of the forecasted system annual average demands with the most recent study of system demands, the Metropolitan Washington Area Water Supply Study completed in 1983 by the COE (COE, 1983). The COE forecast utilized the same basic method but earlier demographic data. It is immediately apparent that the CO-OP forecast of annual average demand of 681.8 mgd for 2010 is close to the level forecasted by the COE for 2025-2030. This increased rate of growth is due to the updated demographic forecasts used in this study and the growth in service areas of the CO-OP Utilities. Another forecast of Washington Metropolitan area water demands is contained in Proposed Potomac River Water Supply Structures (COE, 1978). This study was completed in 1978 and used a per capita method to forecast future demands, forecasting annual average demands to grow from 450.1 mgd in 1985 to 652.2 mgd in 2010. An earlier forecast of water demands is contained in the Washington Metropolitan Area Water Supply Report (COE, 1975), which was part of the Northeastern United States Water Supply Study. This forecast, covering the whole Washington Metropolitan area, included some areas outside those covered in the present study. It forecasted water demands to grow from 564.5 mgd in 1985 to 837 mgd in 2010.

F.) Uncertainties in Water Demand Forecast

There are several major unknown factors in forecasts of future water demands that will affect their likelihood of realization. These are stated below.

- There are certain inherent uncertainties in the demographic predictions on which the water demand forecast is based. These uncertainties range from local to national economic and demographic factors from which estimates of households and employment levels are derived.

Figure V-3 Water demand forecasts for the Washington Metropolitan Area.



- Unforeseen local political pressures may force water demand growth away from some transportation corridors and towards others. For example, efforts to downzone portions of Fairfax County, particularly along Highway 29, and upzone portions of western Prince William County will affect the location and, possibly, the magnitude of future growth in water demands. These issues will affect FCWA particularly.

- Since 1985, WAD's annual average production has steadily dropped. This may be due to a decrease in population within the District of Columbia. Preliminary results of the 1990 census indicate such a decrease in population from the 1980 census. For the forecast in this study to be realized, WAD's water demand will need to increase over the forecast period.

- Long term variation in climate may affect demands and supplies in unknown ways, possibly contributing to the overall severity of a water supply shortage or varying consumption patterns significantly.

VI.) COMPARISON OF DEMAND FORECAST WITH AVAILABLE RESOURCES

A.) Introduction

The objective of this chapter is to present a comparison of the yield of the combined river/reservoir system with demands which might be expected to occur during a period when all system resources would be utilized. In addition to annual average demand, the preceding forecast provides peak 1, 7, 30, 60, 90, and 120-day demands. Some multi-day period of operation should be chosen for comparison of demands so as to have meaning in terms of resource availability. A period of 120 days is chosen for the comparison because it approximates the estimated time of system operation of resources to get through a hypothetical repetition of the drought of record. The unrestricted demands derived from the intermediate demographic projections and those demands subject to two alternate conservation scenarios are compared with the available resources.

B.) Description and Current Management of Available Resources

The largest source of water supply withdrawals in the Washington Metropolitan Area is the free flowing Potomac River. The average flow of the Potomac River near Washington D.C. is 7,360 mgd (Carpenter, 1983), almost 20 times greater than the average water supply withdrawal in 1989 of 370 mgd. However, the single day flow dropped as low as 388 mgd on September 10, 1966 and single month flow as low as 450 mgd in October, 1930 whereas the maximum 1 day withdrawal in September, 1988 was 430 mgd and October average withdrawals in the same year averaged over 380 mgd. Thus, with the demands forecasted in the previous chapter and the instream flow requirement, it is clear that the free-flowing Potomac River alone cannot meet future water demands.

There are four major reservoir systems utilized for water supply purposes for the Washington Metropolitan Area. They are the Occoquan (upper and lower reservoirs), Patuxent (the combined Tridelphia and T. Howard Duckett reservoirs), Little Seneca, and Jennings Randolph reservoirs. The Occoquan Reservoir controls a drainage area of 570 square miles with an estimated storage of 11 billion gallons. The Patuxent Reservoir controls a drainage area of 132 square miles with an estimated useable storage of 11 billion gallons. The Little Seneca Reservoir in Montgomery County is intended to provide augmentation water to the Potomac River a short distance away from the Washington Metropolitan Area water supply intakes. It controls a drainage area of 21 square miles and an available storage of 3.5 billion gallons. The Jennings Randolph Reservoir, located on the North Branch Potomac River in western Maryland and West Virginia, provides water quality and water supply storage for augmenting Potomac River flows as well as local flood protection. It has a combined storage (water supply and water quality storage) of 30 billion gallons, of which 13.4 billion gallons is allocated to water supply storage. Its catchment has a drainage area of 263 miles. For water quality purposes, the Jennings Randolph Reservoir is operated in conjunction with the Savage River Reservoir, located nearby in western Maryland, by the Baltimore District of the COE. Water supply storage in the Little Seneca and Jennings Randolph reservoirs is owned jointly by the three CO-OP Utilities whereas the Occoquan and Patuxent reservoirs are individually owned by FCWA and WSSC, respectively.

When the Potomac storage is needed, the system is operated for the benefit of all the CO-OP Utilities without regard to the proportions by which the individual utilities contribute to its cost.

As insight to the relative performance characteristics of these reservoirs, the inflows for each of the reservoirs are shown in Figure VI-1 and Figure VI-2. Figure VI-1 displays cumulative inflows for the period between November 1 and May 31 during more than 50 years of historic and reconstructed records. This is typically the period when inflows exceed releases and the reservoirs refill. Note that the cumulative inflows are large relative to the storage capacities of 30 and 11 billion gallon, respectively, at the Jennings Randolph and Occoquan reservoirs, and in most years their inflows are similar. The similarity of their inflows is interesting because the catchment for the Occoquan Reservoir is more than twice the size of the catchment for the Jennings Randolph Reservoir. However, the catchment for the Jennings Randolph Reservoir is located in the wettest part of the entire Potomac River Basin and annual average rainfalls in parts of the this catchment can be as much as 14 inches greater than the Occoquan Reservoir catchment. The cumulative inflow to the Patuxent Reservoir for this period is less than the net storage capacity of 11 billion gallons for at least one year (water supply withdrawals and minimum flow releases during the period would increase the number of years when inflow would not refill the reservoir by May 31). The cumulative inflow to Little Seneca Reservoir during this period is relatively small in most years compared to its net capacity of 3.5 billion gallons. In a majority of years an empty Little Seneca Reservoir would not fill between November 1 and May 31. Figure VI-2 displays cumulative inflows for the period between June 1 and September 30 during more than 50 years of historic and reconstructed records. This is typically the period when releases exceed inflows and the reservoirs are drawn down. For the Occoquan Reservoir, inflows exceed storage capacity in approximately 70% of the years. For the Patuxent and Jennings Randolph reservoirs, inflows exceed storage capacity in about 12% of the years. For Little Seneca Reservoir, inflows exceed storage capacity in 6% of the years.

Currently, only the Occoquan and Patuxent reservoirs are actively operated for water supply purposes. Potomac River flows have not fallen to levels that would require augmentation since the completion of the Jennings Randolph Reservoir in 1981. Because of differing potential yields and treatment capacities for the Occoquan and Patuxent, these reservoirs are operated in different manners. As mentioned earlier, FCWA currently obtains a majority, about 52%, of their production from the Occoquan Reservoir (an average of 51 mgd for 1987-1988) whereas WSSC obtains only about a quarter of their production from the Patuxent Reservoir (an average of 37 mgd from 1983-1989). The Occoquan Reservoir also is relied on much more heavily to meet summer peak demands than the Patuxent Reservoir. Table VI-1 shows individual monthly production factors for WSSC's resources (the Potomac and Patuxent) and FCWA's (the Potomac and Occoquan) resources. This table shows that, in terms of peak month production, the Occoquan Reservoir is used to meet FCWA's peak summer demands whereas WSSC relies on the Potomac River to meet their peak summer demands. A caveat must be included, however, that these current operating procedures probably will change in the future. WSSC's capacity from the Patuxent

Figure VI-1 Total inflows from Nov 1 - May 31 for water supply reservoirs

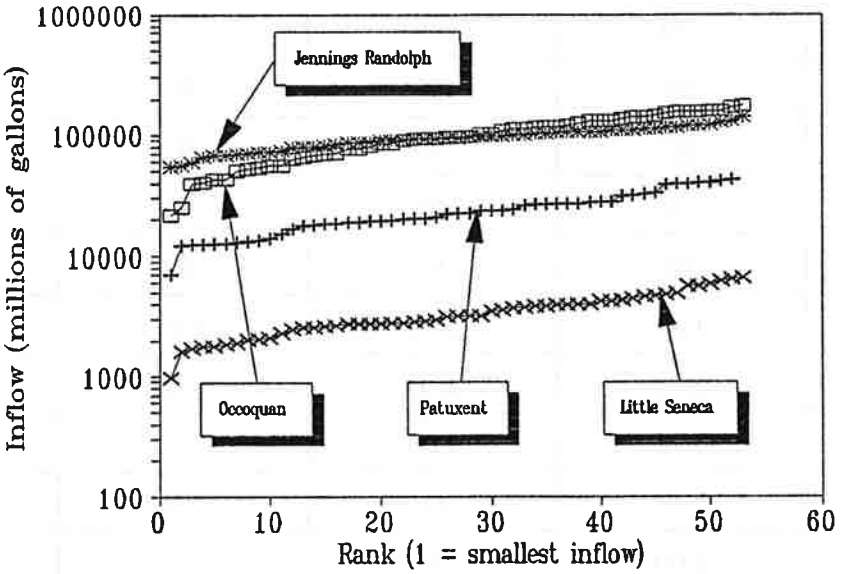


Figure VI-2 Total inflows from June 1 - Sept 30 for water supply reservoirs

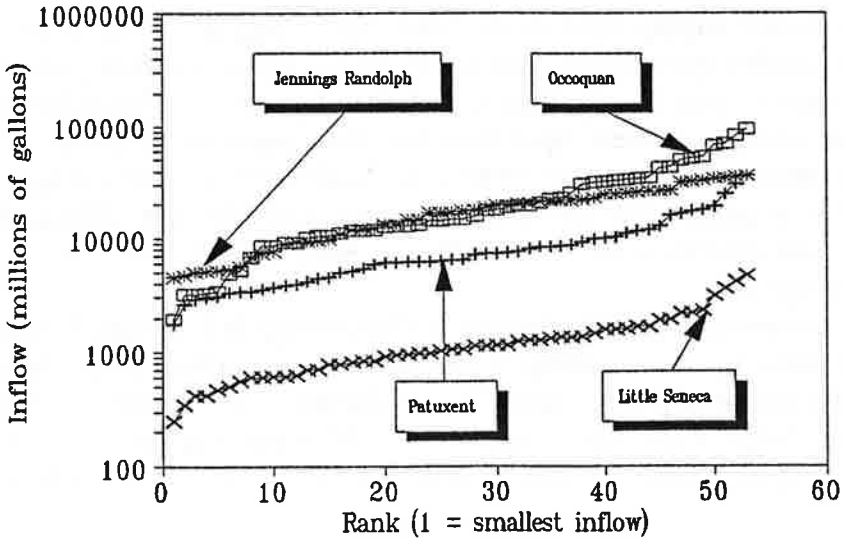


Table VI-1 Mean monthly production factors for individual production facilities.

	WSSC		FCWA	
	Potomac	Patuxent	Potomac	Occoquan
January	.90	.99	.87	.88
February	.88	.98	.88	.86
March	.86	.98	.91	.84
April	.92	.95	.93	.92
May	.99	.97	.98	1.03
June	1.10	1.00	1.15	1.25
July	1.19	1.07	1.20	1.36
August	1.16	1.03	1.21	1.23
September	1.12	.99	.98	1.02
October	1.00	1.01	1.03	.89
November	.93	1.03	.95	.85
December	.93	1.00	.90	.86

Treatment Plant has been limited during recent renovations to the plant and its rated capacity of 65 mgd has not been available. Also, FCWA's Potomac River treatment facility is currently undergoing expansion to increase the production and delivery capacity of this plant. Once these projects are completed, WSSC's and FCWA's production strategies may be modified.

Although water supply operations have never begun at the Jennings Randolph Reservoir, water quality operation of this reservoir has been in effect since its completion. Water quality improvement is a significant authorized purpose of both Jennings Randolph and Savage reservoirs, and their operation for that purpose is linked. When Savage Reservoir was completed in the early 1950's, its 20,000 acre feet of storage was the main source of low flow augmentation and pollution abatement for the effluent from the Luke paper mill. It was operated as such until the early 1980's when Jennings Randolph Reservoir was completed.

Fifty-one thousand acre feet of water quality storage in Jennings Randolph Reservoir provides a great boost to water quality as low flow augmentation in the North Branch and throughout the mainstem of the Potomac River. However, due to the extensive coal mining residue in the Randolph Reservoir watershed, the lake water is severely impacted by acid mine runoff. The more acidic releases from Randolph Reservoir are balanced by

coordinated releases from Savage Reservoir whose catchment is not impacted by coal mining.

The general operating policy is to maintain the largest combined release from both Randolph and Savage reservoirs throughout the low flow period in the summer. This policy improves the water quality in the North Branch, and provides water quality benefits all the way down to and including the environmental flow-by requirement at Little Falls near Washington. Releases from the two reservoirs are coordinated so as to minimize the impact of the more acidic water from Randolph Reservoir. In addition to maximizing the minimum flow, water quality in the North Branch is also improved by short term high flow releases (called artificially varied flow releases). These are also produced by coordinated releases from both Randolph and Savage reservoirs.

C.) Yields of System Resources

An estimation of the available system yield may be obtained by summing the independent yields of the sources. For each of the reservoirs the yield is calculated as the maximum continuous reliable release which could be maintained during the critical period; the critical period in this yield calculation is the interval in the historic record when the reservoir would go from being full to empty to full again while subject to the largest feasible constant withdrawal. The assumed yield of the Potomac River is the lowest daily average flow during any consecutive 120 days in the period of record for Little Falls.

This method provides a conservative total yield value of 849 mgd. Table VI-2 displays this result. In actuality, the available yield would be enhanced by a number of influential factors. The greatest improvement in yield is likely to come from combined system operation of the resources. In past analyses (Palmer, et al, 1982; Sheer and Eastman, 1980; Smith, 1989) this has produced significant increases in yield. The true independent yield of Occoquan Reservoir may be higher, especially if the expected increase in effluent from the UOSA wastewater treatment plant is included. Although the Jennings Randolph Reservoir yield is computed from the combined water supply and water quality storage, it would in all likelihood be augmented by releases from Savage Reservoir. The yield of the Patuxent Reservoirs is the lowest of several quoted in various reports, and excludes 10 mgd required minimum release. Sources not included here, but potentially available to the demand region by the year 2010 include: treated effluent from the proposed Broad Run advanced wastewater treatment plant in Loudoun County, Beaver Dam Creek Reservoir, Goose Creek Reservoir, and releases from Lake Manassas.

Combined system operation of the resources is likely to produce significant gains in yield over and above the sum of the independent source yields. There are plans at ICPRB to extend previous work on this subject by including improved demand forecasting algorithms and the latest facility information. In general, the system operating policy is to minimize the probability at any of the reservoirs of not refilling by June of the following year. This policy has the effect of using the natural flow in the Potomac River to its fullest extent when conditions allow, thus conserving storage in the reservoirs. When releases from the Potomac reservoirs are needed to augment river flow, Jennings Randolph Reservoir is used to meet the expected difference between demand and the sum of available flow in the

Table VI-2 Independent yields of major resources.	
	Independent yield (mgd)
Occoquan Reservoir	65
Jennings Randolph Lake	158
Little Seneca Reservoir	9
Patuxent River Reservoirs	32
Potomac River (historic 120 day minimum flow)	585
Total independent yield	849

river and remaining reliable yield of the Occoquan and Patuxent reservoirs. Due to the time of travel required for upstream releases to reach the Washington Metropolitan Area water intakes and uncertainties in river flow and demand projections, releases from Jennings Randolph may be insufficient to meet demand. In those cases, releases from Little Seneca Reservoir would be made at short notice to make up the difference.

D.) Potential Drought Period Demands

The maximum 120-day demand expected in the year 2010 is selected as the criterion for comparison with resources because it approximates the number of days of required releases from Jennings Randolph Reservoir in a repeat of the worst drought of record with the forecasted demands. The value of 891 mgd for the maximum 120-day demand is the product of the year 2010 average annual daily system demand (681.8 mgd) and the maximum system 120-day demand factor (1.16) plus 100 mgd for environmental flow-by required at Little Falls. The average day demand for the system is the sum of the year 2010 average day demands for the CO-OP utilities plus Rockville and Leesburg. The maximum 120-day demand factor is set equal to the highest 120-day demand factor for the combined demands of the three major utilities in the fifteen years of record (1974-1988); where each calendar year was analyzed separately. It is not expected that a higher factor would be derived if the period of record were examined as a continuous series. Additionally, the factors were derived individually for each of the utilities, and the resulting sum of year 2010 maximum 120-day demands from that analysis was less than 2 mgd more than the selected method.

This method of calculating demands in the year 2010 may understate demand because it is based on stationary unit use factors. However, it is likely that plumbing codes may require the use of water conserving fixtures and appliances in the future. Furthermore, it is probable that during the critical period for operation of resources, short term conservation will be required. Comparable 120-day demands with conservation scenarios 1 and 2 are 837 mgd and 783 mgd, respectively.

E.) Comparison of Demands with Resources

Table VI-3 displays the comparison of year 2010 maximum 120 day demands with the sum of the independent yields of the system. The unrestricted 120-day maximum demand for the CO-OP Utilities plus Rockville, Leesburg, and Little Falls environmental flow-by is

Table VI-3 Comparison of independent yield of system resources with year 2010 maximum 120 day demands.

	Unrestricted demand (mgd)	Conservation scenario 1 demand (mgd)	Conservation scenario 2 demand (mgd)
Maximum 120 day system demand	791	737	683
Little Falls flow-by	100	100	100
Year 2010 maximum 120 day demand	891	837	783
Independent yield	849	849	849
Resource excess (+) or deficit (-)	-42	+12	+66

891 mgd. A comparison of this demand with the estimated resource yield value of 849 mgd reveals an apparent resource deficit of 42 mgd. This deficit may be slightly understated due to the likelihood that all of the average minimum 120-day low flow of the Potomac can not be used for water supply or environmental flowby. During some days in the 120-day minimum flow period the flow in the River will probably be greater than the demand. These flows, although part of the minimum 120-day average, can not be used with 100% efficiency and would decrease the effective yield of the River. The 42 mgd deficit is approximately 5% of forecasted demand. This is within the range of demand reduction which may be expected by structural conservation measures. Furthermore, the deficit is also approximately 5% of system yield which is within the range of yield enhancement expected by coordinated operations. Although there is an apparent deficit with respect to demand forecasted to occur in the year 2010, it is small and could potentially be managed by one or more means. Furthermore, comparisons of the estimated yield of 849 mgd with the conservation scenario demands of 837 mgd and 783 mgd, respectively, indicates adequate resources in both cases.

VII.) STUDY CONCLUSIONS

The preceding chapters have discussed the CO-OP Section's development and application of a long term water demand forecasting model for the Washington Metropolitan Area. The model is designed to forecast annual average and peak demands at 5 year intervals for the 1985-2010 time period. This report also has described the comparison of these forecasted demands with available resources. This study was undertaken to fulfill Article 2 of the Low Flow Allocation Agreement mandating an evaluation of future water demands and the resources available to meet those demands every 5 years beginning in 1990. The following conclusions may be drawn from this study.

- The annual average demand of 682 mgd forecasted for the Washington Metropolitan Area in 2010 had not been previously forecasted to be reached until 2025-2030.

- The Washington Metropolitan Area maximum 120-day demand (including 100 mgd Little Falls flowby) is forecasted to be 891 mgd.

- In general, most growth in water demands will be outside the Beltway, concentrated along major highway corridors.

- WAD's growth in water demands will be in the employment water use sector. Total residential water demands will remain flat within their service area. There will be no expansion in their service area during the forecast period.

- WSSC's growth in water demands will be evenly divided between single family residential, multifamily residential, and employment water use sectors. Most of this growth will be due to expansion and filling in of their direct service area.

- FCWA's growth in water demands will be primarily in the single family residential water use sector. Their growth will be approximately evenly split between growth in their direct (Fairfax County) and indirect (Loudoun and Prince William counties) service areas. As a percentage, FCWA's demands will grow fastest in their indirect service area.

- The combined independent yield of the existing resources is approximately 849 mgd.

- There is an apparent resource deficit of 42 mgd with respect to the maximum 120-day demand expected to occur in the year 2010. However, there is no resource deficit when the maximum 120-day demand is reduced through water conservation.

- A critical issue in water supply planning is the expected timing of the inadequacy of resources to meet demands. Water utility managers should be aware of this when considering the lead time necessary for planning and implementing additional sources or other deficit avoidance strategies. This report provides a basis for such decisions.

- The present process of examining demands and resources to meet demands every 5 years seems to be a good one, relative to changes in population and employment forecasts, and should be adhered to in the future.

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Appendix A - Production Data for WAD

Monthly average and annual average production for
Washington Aqueduct Division

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1974	184.7	182.2	181.7	189.0	190.1	199.9	230.6	214.2	207.0	192.0	184.8	177.6	194.6	71022.5
Peak Day	196.5	190.5	192.5	218.5	212.5	229.5	257.5	233.5	226.5	205.5	201.5	193.5		
Peak 7 Day	186.8	183.9	186.1	193.5	201.8	213.1	246.1	223.8	214.6	197.6	191.2	183.5		
Peak/Ave Day	1.06	1.05	1.06	1.16	1.12	1.15	1.12	1.09	1.09	1.07	1.09	1.09		
Peak 7 Day/ Ave day	1.01	1.01	1.02	1.02	1.06	1.07	1.07	1.04	1.04	1.03	1.03	1.03		
1975	179.2	173.3	174.3	179.2	189.3	209.4	216.1	224.1	202.0	190.3	186.4	185.2	192.5	70273.5
Peak Day	190.5	181.5	187.5	189.5	218.5	255.5	234.5	253.5	221.5	203.5	197.5	196.5		
Peak 7 Day	182.4	176.6	176.5	180.6	202.8	232.2	219.1	233.2	209.9	193.9	191.4	189.6		
Peak/Ave Day	1.06	1.05	1.08	1.06	1.15	1.22	1.09	1.13	1.10	1.07	1.06	1.06		
Peak 7 Day/ Ave day	1.02	1.02	1.01	1.01	1.07	1.11	1.01	1.04	1.04	1.02	1.03	1.02		
1976	187.1	181.4	182.0	194.2	195.8	224.1	224.0	222.5	210.5	192.6	184.9	185.3	198.7	72740.0
Peak Day	196.5	194.5	193.5	233.5	209.5	254.5	248.5	246.5	239.5	205.5	198.5	195.5		
Peak 7 Day	190.8	187.8	183.4	215.2	201.8	237.6	234.4	233.5	221.2	200.5	189.2	189.4		
Peak/Ave Day	1.05	1.07	1.06	1.20	1.07	1.14	1.11	1.11	1.14	1.07	1.07	1.06		
Peak 7 Day/ Ave day	1.02	1.04	1.01	1.11	1.03	1.06	1.05	1.05	1.05	1.04	1.02	1.02		
1977	191.3	174.8	165.2	170.3	189.2	211.8	229.2	226.3	223.7	205.4	187.1	187.3	197.0	71897.5
Peak Day	211.5	193.5	175.5	192.5	220.5	244.5	260.5	240.5	250.5	225.5	204.5	202.5		
Peak 7 Day	206.9	178.9	166.6	180.6	212.1	223.8	239.6	228.4	233.4	218.2	199.2	193.9		
Peak/Ave Day	1.11	1.11	1.06	1.13	1.17	1.15	1.14	1.06	1.12	1.10	1.09	1.08		
Peak 7 Day/ Ave day	1.08	1.02	1.01	1.06	1.12	1.06	1.05	1.01	1.04	1.06	1.06	1.04		
1978	184.5	178.3	182.2	187.5	194.5	210.7	218.5	224.4	218.2	202.6	195.5	185.9	198.7	72515.5
Peak Day	193.5	190.5	197.5	196.5	212.5	229.5	249.5	242.5	240.5	215.5	205.5	196.5		
Peak 7 Day	187.5	181.4	187.5	191.8	201.2	217.6	239.5	229.4	229.8	208.2	202.2	190.4		
Peak/Ave Day	1.05	1.07	1.08	1.05	1.09	1.09	1.14	1.08	1.10	1.06	1.05	1.06		
Peak 7 Day/ Ave day	1.02	1.02	1.03	1.02	1.03	1.03	1.10	1.02	1.05	1.03	1.03	1.02		
1979	190.7	194.2	189.7	186.7	195.8	199.0	209.3	215.3	210.3	200.2	191.1	183.2	197.1	71957.7
Peak Day	200.5	212.5	203.5	197.5	215.5	210.5	234.5	241.5	230.5	212.5	202.5	194.3		
Peak 7 Day	194.6	200.4	196.2	193.1	206.9	202.6	221.4	227.4	217.8	203.8	199.9	190.9		
Peak/Ave Day	1.05	1.09	1.07	1.06	1.10	1.06	1.12	1.12	1.10	1.06	1.06	1.06		
Peak 7 Day/ Ave day	1.02	1.03	1.03	1.03	1.06	1.02	1.06	1.06	1.04	1.02	1.05	1.04		
1980	178.8	184.6	186.7	189.5	196.6	215.3	232.4	236.3	237.6	212.4	201.8	196.5	205.8	75313.9
Peak Day	189.6	196.2	196.2	199.0	215.2	244.1	274.2	257.0	263.5	235.2	218.0	210.9		
Peak 7 Day	180.8	189.6	190.2	193.5	200.6	236.4	247.1	245.8	251.3	220.0	210.5	199.2		
Peak/Ave Day	1.06	1.06	1.05	1.05	1.09	1.13	1.18	1.09	1.11	1.11	1.08	1.07		
Peak 7 Day/ Ave day	1.01	1.03	1.02	1.02	1.02	1.10	1.06	1.04	1.06	1.04	1.04	1.01		

Monthly average and annual average production for
Washington Aqueduct Division (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1981	205.4	200.4	189.2	190.7	193.2	232.1	242.7	227.3	215.2	203.2	194.4	192.6	207.2	75641.9
Peak Day	222.2	216.6	199.6	201.6	210.9	256.3	271.0	246.5	238.2	214.9	204.8	205.1		
Peak 7 Day	208.4	210.9	192.5	195.4	201.9	248.0	262.8	234.6	223.2	208.8	197.9	195.4		
Peak/Ave Day	1.08	1.08	1.06	1.06	1.09	1.10	1.12	1.08	1.11	1.06	1.05	1.06		
Peak 7 Day/ Ave day	1.01	1.05	1.02	1.02	1.04	1.07	1.08	1.03	1.04	1.03	1.02	1.01		
1982	200.1	196.8	191.5	194.1	203.9	211.6	232.6	221.9	217.6	200.9	189.1	185.0	203.8	74394.5
Peak Day	213.5	215.1	203.9	204.3	225.4	241.9	260.5	236.2	238.4	215.6	208.4	201.3		
Peak 7 Day	209.1	203.2	194.2	197.7	216.6	224.7	244.4	225.1	230.8	210.5	195.4	189.6		
Peak/Ave Day	1.07	1.09	1.06	1.05	1.11	1.14	1.12	1.06	1.10	1.07	1.10	1.09		
Peak 7 Day/ Ave day	1.04	1.03	1.01	1.02	1.06	1.06	1.05	1.01	1.06	1.05	1.03	1.03		
1983	183.3	187.8	184.3	194.8	206.1	209.9	231.6	236.1	225.6	198.4	188.8	200.4	204.0	74475.4
Peak Day	193.9	200.8	197.4	215.9	233.9	233.4	260.3	263.2	259.6	212.9	197.9	233.3		
Peak 7 Day	185.7	193.9	188.3	205.6	220.3	221.6	248.7	244.5	250.2	204.7	193.5	214.1		
Peak/Ave Day	1.06	1.07	1.07	1.11	1.14	1.11	1.12	1.11	1.15	1.07	1.05	1.16		
Peak 7 Day/ Ave day	1.01	1.03	1.02	1.06	1.07	1.06	1.07	1.04	1.11	1.03	1.03	1.07		
1984	203.1	191.0	189.2	188.7	201.9	230.3	223.3	228.5	223.7	221.7	197.4	196.8	208.0	76144.6
Peak Day	223.5	203.4	203.1	201.4	222.1	262.3	240.3	244.7	246.1	232.9	209.2	207.6		
Peak 7 Day	213.5	192.9	195.6	194.0	216.7	250.4	233.2	233.4	231.8	227.1	201.9	204.0		
Peak/Ave Day	1.10	1.07	1.07	1.07	1.10	1.14	1.08	1.07	1.10	1.05	1.06	1.05		
Peak 7 Day/ Ave day	1.05	1.01	1.03	1.03	1.07	1.09	1.04	1.02	1.04	1.02	1.02	1.04		
1985	199.0	200.1	198.3	215.2	214.3	223.8	244.0	238.9	237.2	224.2	198.8	192.6	215.6	78702.8
Peak Day	223.4	208.8	219.6	237.9	231.8	238.5	260.8	270.6	273.3	233.6	212.4	214.2		
Peak 7 Day	212.3	204.3	201.6	226.5	225.3	232.8	257.9	254.6	257.7	228.6	207.8	199.7		
Peak/Ave Day	1.12	1.04	1.11	1.11	1.08	1.07	1.07	1.13	1.15	1.04	1.07	1.11		
Peak 7 Day/ Ave day	1.07	1.02	1.02	1.05	1.05	1.04	1.06	1.07	1.09	1.02	1.05	1.04		
1986	187.5	183.7	181.8	184.7	201.4	228.7	226.5	218.2	207.3	200.3	186.7	181.3	199.1	72673.5
Peak Day	200.9	203.3	192.0	201.4	230.9	251.9	253.1	248.0	226.2	229.7	205.0	204.4		
Peak 7 Day	194.3	186.1	186.8	188.8	206.3	240.2	234.4	232.6	215.8	213.3	190.5	185.8		
Peak/Ave Day	1.07	1.11	1.06	1.09	1.15	1.10	1.12	1.14	1.09	1.15	1.10	1.13		
Peak 7 Day/ Ave day	1.04	1.01	1.03	1.02	1.02	1.05	1.04	1.07	1.04	1.06	1.02	1.02		
1987	183.2	183.5	180.0	184.8	189.8	211.6	232.8	229.4	200.9	180.5	173.2	165.9	193.0	70459.5
Peak Day	199.9	200.9	196.9	201.3	206.0	229.2	275.9	265.6	227.5	194.0	187.1	179.6		
Peak 7 Day	189.7	190.6	186.3	189.9	194.9	219.5	255.4	239.1	210.8	187.0	179.6	171.5		
Peak/Ave Day	1.09	1.10	1.09	1.09	1.09	1.08	1.19	1.16	1.13	1.07	1.08	1.08		
Peak 7 Day/ Ave day	1.04	1.04	1.04	1.03	1.03	1.04	1.10	1.04	1.05	1.04	1.04	1.03		

Monthly average and annual average production for
Washington Aqueduct Division (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1988	173.5	168.6	166.5	171.3	172.0	202.9	221.6	217.4	192.8	180.7	174.6	172.0	184.6	67551.7
Peak Day	186.3	173.8	189.6	198.3	193.6	257.2	259.1	252.7	207.6	195.8	187.0	189.5		
Peak 7 Day	180.9	170.9	171.8	177.8	175.2	224.3	241.9	236.1	197.0	185.0	178.0	178.4		
Peak/Ave Day	1.07	1.03	1.14	1.16	1.13	1.27	1.17	1.16	1.08	1.08	1.07	1.10		
Peak 7 Day/ Ave day	1.04	1.01	1.03	1.04	1.02	1.11	1.09	1.09	1.02	1.02	1.02	1.04		

Peak day/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.07	1.07	1.08	1.10	1.11	1.13	1.12	1.11	1.11	1.08	1.07	1.08

Peak week/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.03	1.03	1.02	1.04	1.05	1.06	1.06	1.04	1.05	1.03	1.03	1.03

Monthly production factors for the
Washington Aqueduct Division

(ratio of monthly average to annual average production)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	.95	.94	.93	.97	.98	1.03	1.19	1.10	1.06	.99	.95	.91
1975	.93	.90	.91	.93	.98	1.09	1.12	1.16	1.05	.99	.97	.96
1976	.94	.91	.92	.98	.98	1.13	1.13	1.12	1.06	.97	.93	.93
1977	.97	.89	.84	.86	.96	1.08	1.16	1.15	1.14	1.04	.95	.95
1978	.93	.90	.92	.94	.98	1.06	1.10	1.13	1.10	1.02	.98	.94
1979	.97	.98	.96	.95	.99	1.01	1.06	1.09	1.07	1.02	.97	.93
1980	.87	.90	.91	.92	.96	1.05	1.13	1.15	1.15	1.03	.98	.96
1981	.99	.97	.91	.92	.93	1.12	1.17	1.10	1.04	.98	.94	.93
1982	.98	.97	.94	.95	1.00	1.04	1.14	1.09	1.07	.99	.93	.91
1983	.90	.92	.90	.95	1.01	1.03	1.13	1.16	1.11	.97	.93	.98
1984	.98	.92	.91	.91	.97	1.11	1.07	1.10	1.08	1.07	.95	.95
1985	.92	.93	.92	1.00	.99	1.04	1.13	1.11	1.10	1.04	.92	.89
1986	.94	.92	.91	.93	1.01	1.15	1.14	1.10	1.04	1.01	.94	.91
1987	.95	.95	.93	.96	.98	1.10	1.21	1.19	1.04	.93	.90	.86
1988	.94	.91	.90	.93	.93	1.10	1.20	1.18	1.04	.98	.95	.93

Average monthly production factors

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
.94	.93	.91	.94	.98	1.07	1.14	1.13	1.08	1.00	.94	.93

Peak 30, 60, 90, 120, and 180 days production for
Washington Aqueduct Division

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
	(millions of gallons per day)						
1974	231.7	222.7	217.8	213.6	206.4	194.6	71022.5
From	7/ 8	7/ 2	7/ 1	6/ 3	5/13		
To	8/ 6	8/30	9/28	9/30	11/ 8		
Peak/ Annual Ave	1.19	1.14	1.12	1.10	1.06		
1975	225.6	220.5	218.4	213.7	206.4	192.5	70273.5
From	7/31	7/ 1	6/16	5/21	5/19		
To	8/29	8/29	9/13	9/17	11/14		
Peak/ Annual Ave	1.17	1.15	1.13	1.11	1.07		
1976	228.8	226.7	224.6	220.6	213.3	198.7	72740.0
From	6/ 8	6/ 8	6/ 7	6/ 1	4/19		
To	7/ 7	8/ 6	9/ 4	9/28	10/15		
Peak/ Annual Ave	1.15	1.14	1.13	1.11	1.07		
1977	231.9	228.4	227.1	223.7	216.6	197.0	71897.5
From	6/27	7/ 5	6/27	6/16	5/16		
To	7/26	9/ 2	9/24	10/13	11/11		
Peak/ Annual Ave	1.18	1.16	1.15	1.14	1.10		
1978	226.7	225.6	221.6	218.3	212.6	198.7	72515.5
From	7/19	7/18	7/ 7	6/16	5/19		
To	8/17	9/15	10/ 4	10/13	11/14		
Peak/ Annual Ave	1.14	1.14	1.12	1.10	1.07		
1979	219.4	215.3	212.7	209.4	205.4	197.1	71957.7
From	7/12	7/11	7/ 9	7/ 9	5/ 7		
To	8/10	9/ 8	10/ 6	11/ 5	11/ 2		
Peak/ Annual Ave	1.11	1.09	1.08	1.06	1.04		
1980	242.0	239.0	236.2	232.3	223.6	205.8	75313.9
From	8/25	7/14	6/27	6/23	5/27		
To	9/23	9/11	9/24	10/20	11/22		
Peak/ Annual Ave	1.18	1.16	1.15	1.13	1.09		
1981	248.4	241.2	235.2	230.1	220.1	207.2	75641.9
From	6/22	6/15	6/ 7	6/ 4	5/25		
To	7/21	8/13	9/ 4	10/ 1	11/20		
Peak/ Annual Ave	1.20	1.16	1.14	1.11	1.06		

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1982	234.9	228.5	226.4	222.2	215.2	203.8	74394.5
From	7/ 7	7/ 6	6/21	6/15	5/ 3		
To	8/ 5	9/ 3	9/18	10/12	10/29		
Peak/ Annual Ave	1.15	1.12	1.11	1.09	1.06		
1983	242.9	238.9	232.7	226.9	218.9	204.0	74475.4
From	7/13	7/15	6/24	6/10	4/22		
To	8/11	9/12	9/21	10/ 7	10/18		
Peak/ Annual Ave	1.19	1.17	1.14	1.11	1.07		
1984	232.7	228.6	228.4	227.1	222.4	208.0	76144.6
From	6/ 5	6/ 5	6/ 5	6/ 5	5/14		
To	7/ 4	8/ 3	9/ 2	10/ 2	11/ 9		
Peak/ Annual Ave	1.12	1.10	1.10	1.09	1.07		
1985	246.3	243.5	240.4	236.7	230.8	215.6	78702.8
From	7/18	7/10	6/29	6/14	5/ 6		
To	8/16	9/ 7	9/26	10/11	11/ 1		
Peak/ Annual Ave	1.14	1.13	1.11	1.10	1.07		
1986	231.3	228.6	225.5	220.6	214.2	199.1	72673.5
From	7/ 7	6/ 4	5/30	5/30	5/ 5		
To	8/ 5	8/ 2	8/27	9/26	10/31		
Peak/ Annual Ave	1.16	1.15	1.13	1.11	1.08		
1987	241.2	232.2	226.0	219.7	208.9	193.0	70459.5
From	7/21	7/ 6	6/ 8	5/28	4/ 6		
To	8/19	9/ 3	9/ 5	9/24	10/ 2		
Peak/ Annual Ave	1.25	1.20	1.17	1.14	1.08		
1988	228.1	223.5	215.5	209.4	199.2	184.6	67551.7
From	6/21	6/20	6/13	6/ 6	5/23		
To	7/20	8/18	9/10	10/ 3	11/18		
Peak/ Annual Ave	1.24	1.21	1.17	1.13	1.08		

Peak/average day factors - averaged over number of years of data

30 days	60 days	90 days	120 days	180 days
1.17	1.15	1.13	1.11	1.07

Appendix B - Production Data for FCWA

Monthly average and annual average production for
Fairfax County Water Authority

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1974	46.6	44.9	45.9	50.2	54.9	58.2	72.3	57.1	55.1	54.2	50.3	48.1	53.2	19419.8
Peak Day	50.0	47.0	51.0	64.0	64.9	72.3	91.1	67.4	59.0	59.5	55.0	54.0		
Peak 7 Day	47.0	45.7	47.6	54.9	60.1	66.5	85.7	58.7	55.7	56.1	52.0	49.6		
Peak/Ave Day	1.07	1.05	1.11	1.27	1.18	1.24	1.26	1.18	1.07	1.10	1.09	1.12		
Peak 7 Day/ Ave day	1.01	1.02	1.04	1.09	1.09	1.14	1.19	1.03	1.01	1.04	1.03	1.03		
1975	48.9	49.1	47.5	50.6	56.1	61.8	58.9	61.1	54.4	52.5	49.0	49.3	53.3	19457.5
Peak Day	52.0	54.0	51.0	56.0	65.3	76.5	67.2	81.3	61.7	57.3	52.0	52.0		
Peak 7 Day	49.9	50.9	49.9	52.4	60.0	72.9	61.1	67.3	55.8	54.1	51.0	50.1		
Peak/Ave Day	1.06	1.10	1.07	1.11	1.16	1.24	1.14	1.33	1.13	1.09	1.06	1.06		
Peak 7 Day/ Ave day	1.02	1.03	1.05	1.04	1.07	1.18	1.04	1.10	1.02	1.03	1.04	1.02		
1976	49.4	50.2	51.5	60.0	62.9	71.4	68.4	68.9	65.7	58.3	53.7	53.4	59.5	21773.7
Peak Day	52.0	54.0	55.0	75.0	68.3	88.7	80.9	81.4	80.7	64.5	56.0	57.0		
Peak 7 Day	50.4	51.1	54.0	70.9	65.9	83.0	73.6	76.6	73.3	60.2	55.1	54.6		
Peak/Ave Day	1.05	1.08	1.07	1.25	1.09	1.24	1.18	1.18	1.23	1.11	1.04	1.07		
Peak 7 Day/ Ave day	1.02	1.02	1.05	1.18	1.05	1.16	1.08	1.11	1.12	1.03	1.03	1.02		
1977	55.5	55.0	55.1	58.5	69.3	68.4	71.8	64.3	59.3	52.0	46.3	49.9	58.8	21469.6
Peak Day	60.0	59.0	60.0	67.0	88.8	86.1	87.4	71.7	67.1	56.3	52.0	57.0		
Peak 7 Day	57.7	56.4	56.1	64.3	80.8	74.1	83.4	69.3	64.3	54.3	50.1	51.6		
Peak/Ave Day	1.08	1.07	1.09	1.15	1.28	1.26	1.22	1.12	1.13	1.08	1.12	1.14		
Peak 7 Day/ Ave day	1.04	1.03	1.02	1.10	1.17	1.08	1.16	1.08	1.08	1.05	1.08	1.03		
1978	54.8	52.6	54.2	53.9	60.6	67.6	65.4	62.0	61.2	57.1	52.9	51.9	57.9	21131.2
Peak Day	60.0	58.0	62.0	59.0	70.4	80.8	85.1	70.0	68.0	64.3	57.0	56.0		
Peak 7 Day	56.0	53.9	60.7	55.4	67.1	70.5	77.2	66.6	65.6	58.1	54.6	52.4		
Peak/Ave Day	1.09	1.10	1.14	1.09	1.16	1.19	1.30	1.13	1.11	1.13	1.08	1.08		
Peak 7 Day/ Ave day	1.02	1.02	1.12	1.03	1.11	1.04	1.18	1.07	1.07	1.02	1.03	1.01		
1979	55.6	52.5	52.6	52.4	60.7	62.0	62.9	61.0	58.8	56.6	52.1	53.1	56.7	20708.3
Peak Day	67.0	61.0	56.0	60.0	72.5	69.1	71.1	68.4	64.0	61.0	56.0	57.3		
Peak 7 Day	58.6	56.4	53.1	56.1	69.0	65.1	68.0	66.5	59.8	57.7	53.0	54.1		
Peak/Ave Day	1.20	1.16	1.07	1.14	1.19	1.11	1.13	1.12	1.09	1.08	1.07	1.08		
Peak 7 Day/ Ave day	1.05	1.07	1.01	1.07	1.14	1.05	1.08	1.09	1.02	1.02	1.02	1.02		
1980	53.4	52.4	52.7	54.9	65.0	72.6	74.9	75.7	78.2	65.4	55.4	56.3	63.1	23097.7
Peak Day	60.3	56.1	59.7	61.3	73.2	94.8	90.7	90.6	95.8	71.7	61.0	60.4		
Peak 7 Day	56.2	53.1	54.2	59.3	67.9	85.1	83.7	84.4	89.4	68.3	57.4	57.5		
Peak/Ave Day	1.13	1.07	1.13	1.12	1.13	1.31	1.21	1.20	1.22	1.10	1.10	1.07		
Peak 7 Day/ Ave day	1.05	1.01	1.03	1.08	1.04	1.17	1.12	1.12	1.14	1.04	1.04	1.02		

Monthly average and annual average production for
Fairfax County Water Authority (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1981	51.7	45.3	57.3	59.0	64.4	68.3	72.1	69.0	65.8	62.5	59.2	58.3	61.2	22331.9
Peak Day	59.1	56.6	65.8	63.2	78.9	74.4	91.7	80.3	79.8	69.0	65.7	63.0		
Peak 7 Day	56.8	50.3	59.4	60.7	69.2	71.1	81.5	75.6	71.3	65.0	60.3	60.3		
Peak/Ave Day	1.14	1.25	1.15	1.07	1.22	1.09	1.27	1.16	1.21	1.10	1.11	1.08		
Peak 7 Day/ Ave day	1.10	1.11	1.04	1.03	1.07	1.04	1.13	1.10	1.08	1.04	1.02	1.03		
1982	60.3	59.6	61.7	64.7	73.5	69.3	79.6	72.8	77.2	67.8	64.4	63.4	67.9	24790.7
Peak Day	67.5	66.0	64.3	73.5	91.8	80.0	103.6	83.7	99.1	74.3	68.3	73.4		
Peak 7 Day	63.1	60.6	62.5	68.4	86.3	74.3	89.0	76.7	86.0	72.0	65.7	65.2		
Peak/Ave Day	1.12	1.11	1.04	1.14	1.25	1.15	1.30	1.15	1.28	1.10	1.06	1.16		
Peak 7 Day/ Ave day	1.05	1.02	1.01	1.06	1.17	1.07	1.12	1.05	1.11	1.06	1.02	1.03		
1983	63.2	60.4	63.3	65.9	72.2	77.5	89.0	88.4	82.7	70.8	68.6	69.2	72.7	26530.6
Peak Day	68.0	65.2	71.9	76.3	83.8	92.0	113.9	106.2	113.6	78.7	76.7	79.7		
Peak 7 Day	64.8	62.1	65.5	68.6	77.6	85.1	101.3	94.0	101.2	72.7	70.4	73.1		
Peak/Ave Day	1.08	1.08	1.14	1.16	1.16	1.19	1.28	1.20	1.37	1.11	1.12	1.15		
Peak 7 Day/ Ave day	1.02	1.03	1.03	1.04	1.08	1.10	1.14	1.06	1.22	1.03	1.03	1.06		
1984	70.1	66.1	66.1	68.4	74.6	90.3	79.3	83.7	84.4	79.7	76.6	75.8	76.3	27915.4
Peak Day	74.3	73.3	72.3	73.0	90.7	114.9	94.5	96.7	117.3	87.1	80.2	79.2		
Peak 7 Day	72.5	69.3	68.1	70.8	83.1	105.8	85.6	92.9	91.1	81.9	77.6	76.6		
Peak/Ave Day	1.06	1.11	1.09	1.07	1.22	1.27	1.19	1.15	1.39	1.09	1.05	1.04		
Peak 7 Day/ Ave day	1.04	1.05	1.03	1.04	1.11	1.17	1.08	1.11	1.08	1.03	1.01	1.01		
1985	76.1	73.7	72.5	86.8	87.7	89.1	104.1	94.2	96.0	82.0	78.7	78.5	85.0	31031.4
Peak Day	82.9	79.7	77.7	121.1	122.0	120.3	133.2	117.3	128.9	90.1	85.5	83.1		
Peak 7 Day	78.5	74.6	75.4	102.6	101.9	102.5	121.7	108.6	111.0	85.5	80.1	79.7		
Peak/Ave Day	1.09	1.08	1.07	1.40	1.39	1.35	1.28	1.25	1.34	1.10	1.09	1.06		
Peak 7 Day/ Ave day	1.03	1.01	1.04	1.18	1.16	1.15	1.17	1.15	1.16	1.04	1.02	1.01		
1986	78.3	77.2	80.7	85.8	106.4	121.8	109.8	95.7	99.3	95.1	87.2	84.3	93.5	34142.1
Peak Day	85.8	84.0	93.4	101.6	142.5	147.5	138.6	117.6	119.9	113.2	99.3	91.8		
Peak 7 Day	80.0	78.1	85.7	92.3	119.0	130.5	122.8	101.6	107.6	102.8	89.6	86.6		
Peak/Ave Day	1.10	1.09	1.16	1.18	1.34	1.21	1.26	1.23	1.21	1.19	1.14	1.09		
Peak 7 Day/ Ave day	1.02	1.01	1.06	1.08	1.12	1.07	1.12	1.06	1.08	1.08	1.03	1.03		
1987	84.7	85.0	84.9	87.3	99.1	105.3	120.4	120.7	98.2	93.7	90.0	86.8	96.5	35207.5
Peak Day	92.4	91.6	93.0	94.7	128.6	128.7	152.9	149.8	122.1	100.3	99.1	92.3		
Peak 7 Day	86.3	86.4	86.3	90.0	104.6	115.5	141.1	128.5	108.2	96.0	92.2	88.9		
Peak/Ave Day	1.09	1.08	1.10	1.08	1.30	1.22	1.27	1.24	1.24	1.07	1.10	1.06		
Peak 7 Day/ Ave day	1.02	1.02	1.02	1.03	1.06	1.10	1.17	1.06	1.10	1.02	1.02	1.02		

Monthly average and annual average production for
Fairfax County Water Authority (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1988	89.5	87.9	89.2	95.8	100.5	134.1	134.5	121.1	100.6	97.1	88.2	88.5	102.3	37441.8
Peak Day	96.2	93.9	95.0	106.7	126.3	164.0	174.7	160.0	109.6	114.9	93.5	94.4		
Peak 7 Day	91.1	88.8	92.5	99.2	107.1	148.8	167.2	145.1	104.1	102.8	89.7	91.6		
Peak/Ave Day	1.07	1.07	1.07	1.11	1.26	1.22	1.30	1.32	1.09	1.18	1.06	1.07		
Peak 7 Day/ Ave day	1.02	1.01	1.04	1.03	1.06	1.11	1.24	1.20	1.03	1.06	1.02	1.04		

Peak day/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.10	1.10	1.10	1.16	1.22	1.22	1.24	1.20	1.21	1.11	1.09	1.09

Peak week/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.03	1.03	1.04	1.07	1.10	1.11	1.13	1.09	1.09	1.04	1.03	1.03

Monthly production factors for the
Fairfax County Water Authority

(ratio of monthly average to annual average production)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	.88	.84	.86	.94	1.03	1.09	1.36	1.07	1.04	1.02	.95	.90
1975	.92	.92	.89	.95	1.05	1.16	1.11	1.15	1.02	.99	.92	.92
1976	.83	.84	.86	1.01	1.06	1.20	1.15	1.16	1.10	.98	.90	.90
1977	.94	.94	.94	.99	1.18	1.16	1.22	1.09	1.01	.88	.79	.85
1978	.95	.91	.94	.93	1.05	1.17	1.13	1.07	1.06	.99	.91	.90
1979	.98	.93	.93	.92	1.07	1.09	1.11	1.07	1.04	1.00	.92	.94
1980	.85	.83	.84	.87	1.03	1.15	1.19	1.20	1.24	1.04	.88	.89
1981	.85	.74	.94	.96	1.05	1.12	1.18	1.13	1.08	1.02	.97	.95
1982	.89	.88	.91	.95	1.08	1.02	1.17	1.07	1.14	1.00	.95	.93
1983	.87	.83	.87	.91	.99	1.07	1.22	1.22	1.14	.97	.94	.95
1984	.92	.87	.87	.90	.98	1.18	1.04	1.10	1.11	1.04	1.00	.99
1985	.89	.87	.85	1.02	1.03	1.05	1.22	1.11	1.13	.97	.93	.92
1986	.84	.83	.86	.92	1.14	1.30	1.17	1.02	1.06	1.02	.93	.90
1987	.88	.88	.88	.91	1.03	1.09	1.25	1.25	1.02	.97	.93	.90
1988	.88	.86	.87	.94	.98	1.31	1.31	1.18	.98	.95	.86	.87

Average monthly production factors

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
.89	.86	.89	.94	1.05	1.14	1.19	1.13	1.08	.99	.92	.91

Peak 30, 60, 90, 120, and 180 days production for
Fairfax County Water Authority

(millions of gallons per day)

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1974	73.1	66.1	62.9	61.0	58.9	53.2	19419.8
From	7/ 3	6/ 8	6/ 8	5/14	4/27		
To	8/ 1	8/ 6	9/ 5	9/10	10/23		
Peak/ Annual Ave	1.37	1.24	1.18	1.15	1.11		
1975	62.5	61.7	60.7	59.7	57.6	53.3	19457.5
From	5/27	6/15	6/ 2	5/10	5/ 2		
To	6/25	8/13	8/30	9/ 6	10/28		
Peak/ Annual Ave	1.17	1.16	1.14	1.12	1.08		
1976	73.4	70.4	69.8	68.8	66.8	59.5	21773.7
From	6/ 7	6/ 8	6/ 9	5/18	4/16		
To	7/ 6	8/ 6	9/ 6	9/14	10/12		
Peak/ Annual Ave	1.23	1.18	1.17	1.16	1.12		
1977	73.0	71.6	70.7	68.7	65.5	58.8	21469.6
From	6/26	5/12	5/13	5/12	3/27		
To	7/25	7/10	8/10	9/ 8	9/22		
Peak/ Annual Ave	1.24	1.22	1.20	1.17	1.11		
1978	68.2	66.9	65.2	64.7	62.4	57.9	21131.2
From	5/29	5/29	5/29	5/17	4/28		
To	6/27	7/27	8/26	9/13	10/24		
Peak/ Annual Ave	1.18	1.16	1.13	1.12	1.08		
1979	64.9	63.3	62.2	61.7	60.4	56.7	20708.3
From	7/ 9	6/10	5/ 7	5/ 1	4/29		
To	8/ 7	8/ 8	8/ 4	8/28	10/25		
Peak/ Annual Ave	1.14	1.12	1.10	1.09	1.06		
1980	81.8	77.9	77.3	75.6	72.2	63.1	23097.7
From	8/25	7/11	6/24	6/12	5/ 1		
To	9/23	9/ 8	9/21	10/ 9	10/27		
Peak/ Annual Ave	1.30	1.23	1.22	1.20	1.14		
1981	73.7	70.9	70.1	69.2	67.2	61.2	22331.9
From	6/25	6/ 7	6/17	5/21	4/26		
To	7/24	8/ 5	9/14	9/17	10/22		
Peak/ Annual Ave	1.20	1.16	1.15	1.13	1.10		

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1982	80.0	77.5	77.4	75.3	73.6	67.9	24790.7
From	7/ 1	7/16	6/22	6/15	4/16		
To	7/30	9/13	9/19	10/12	10/12		
Peak/ Annual Ave	1.18	1.14	1.14	1.11	1.08		
1983	92.6	91.5	88.2	84.7	80.4	72.7	26530.6
From	7/12	7/14	6/15	6/10	4/28		
To	8/10	9/11	9/12	10/ 7	10/24		
Peak/ Annual Ave	1.27	1.26	1.21	1.17	1.11		
1984	90.5	84.9	85.0	84.5	82.6	76.3	27915.4
From	6/ 2	5/18	6/ 5	6/ 2	5/18		
To	7/ 1	7/16	9/ 2	9/29	11/13		
Peak/ Annual Ave	1.19	1.11	1.11	1.11	1.08		
1985	107.3	101.4	99.5	96.3	94.0	85.0	31031.4
From	6/26	6/21	6/24	6/17	4/18		
To	7/25	8/19	9/21	10/14	10/14		
Peak/ Annual Ave	1.26	1.19	1.17	1.13	1.11		
1986	124.1	116.6	113.2	108.9	105.1	93.5	34142.1
From	5/29	5/30	5/ 5	4/27	4/27		
To	6/27	7/28	8/ 2	8/24	10/23		
Peak/ Annual Ave	1.33	1.25	1.21	1.16	1.12		
1987	129.7	121.7	116.8	112.6	106.6	96.5	35207.5
From	7/18	7/ 7	6/ 7	5/ 9	4/30		
To	8/16	9/ 4	9/ 4	9/ 5	10/26		
Peak/ Annual Ave	1.34	1.26	1.21	1.17	1.11		
1988	151.7	137.6	131.0	123.7	115.3	102.3	37441.8
From	6/18	6/16	5/30	5/28	4/21		
To	7/17	8/14	8/27	9/24	10/17		
Peak/ Annual Ave	1.48	1.35	1.28	1.21	1.13		

Peak/average day factors - averaged over number of years of data

30 days	60 days	90 days	120 days	180 days
1.26	1.20	1.18	1.15	1.10

Appendix C - Production Data for WSSC

Monthly average and annual average production for
Washington Suburban Sanitary Commission

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1974	117.0	116.2	116.1	125.2	134.7	144.9	172.4	134.6	137.5	134.9	130.8	124.9	132.5	48374.5
Peak Day	125.5	124.5	122.5	163.5	164.5	173.5	206.5	146.5	146.5	143.5	141.5	137.5		
Peak 7 Day	118.9	117.6	117.4	142.4	148.6	164.1	200.4	138.8	143.1	138.1	133.6	129.4		
Peak/Ave Day	1.07	1.07	1.05	1.31	1.22	1.20	1.20	1.09	1.07	1.06	1.08	1.10		
Peak 7 Day/ Ave day	1.02	1.01	1.01	1.14	1.10	1.13	1.16	1.03	1.04	1.02	1.02	1.04		
1975	126.7	128.6	125.3	126.6	135.5	147.8	142.3	150.0	133.1	123.7	121.7	119.8	131.8	48099.5
Peak Day	139.5	136.5	137.5	137.5	162.5	184.5	165.5	183.5	143.5	135.5	129.5	126.5		
Peak 7 Day	131.1	130.8	127.5	129.6	144.1	176.5	149.5	158.8	139.9	128.2	124.9	122.6		
Peak/Ave Day	1.10	1.06	1.10	1.09	1.20	1.25	1.16	1.22	1.08	1.10	1.06	1.06		
Peak 7 Day/ Ave day	1.03	1.02	1.02	1.02	1.06	1.19	1.05	1.06	1.05	1.04	1.03	1.02		
1976	124.1	126.7	126.0	141.6	141.1	160.2	147.3	147.9	143.4	135.5	133.2	130.7	138.1	50557.0
Peak Day	133.5	134.5	133.5	172.5	155.5	196.5	170.5	170.5	164.5	145.5	141.5	138.5		
Peak 7 Day	126.8	129.2	129.6	160.6	147.8	179.2	155.6	159.9	156.1	137.6	135.2	132.5		
Peak/Ave Day	1.08	1.06	1.06	1.22	1.10	1.23	1.16	1.15	1.15	1.07	1.06	1.06		
Peak 7 Day/ Ave day	1.02	1.02	1.03	1.13	1.05	1.12	1.06	1.08	1.09	1.02	1.02	1.01		
1977	136.6	132.9	127.4	130.6	142.1	142.2	142.8	143.3	140.8	125.7	122.2	126.0	134.4	49055.5
Peak Day	144.5	143.5	136.5	149.5	177.5	184.5	172.5	154.5	156.5	135.5	131.5	137.5		
Peak 7 Day	141.6	136.6	130.5	141.9	164.6	149.9	150.6	147.9	149.8	130.5	123.8	130.4		
Peak/Ave Day	1.06	1.08	1.07	1.15	1.25	1.30	1.21	1.08	1.11	1.08	1.08	1.09		
Peak 7 Day/ Ave day	1.04	1.03	1.02	1.09	1.16	1.05	1.05	1.03	1.06	1.04	1.01	1.03		
1978	126.6	128.8	125.4	129.7	135.2	153.4	151.9	150.2	146.5	137.5	134.3	132.2	137.7	50252.5
Peak Day	136.5	139.5	133.5	141.5	153.5	179.5	186.5	171.5	163.5	150.5	142.5	142.5		
Peak 7 Day	128.5	132.4	126.2	132.8	144.6	158.8	176.2	160.1	154.9	139.4	137.8	134.4		
Peak/Ave Day	1.08	1.08	1.06	1.09	1.14	1.17	1.23	1.14	1.12	1.09	1.06	1.08		
Peak 7 Day/ Ave day	1.01	1.03	1.01	1.02	1.07	1.04	1.16	1.07	1.06	1.01	1.03	1.02		
1979	135.0	135.1	131.8	129.7	139.2	142.7	146.3	145.1	143.2	137.7	132.9	131.4	137.5	50198.2
Peak Day	146.5	143.5	142.5	142.5	171.5	156.5	163.5	167.5	153.5	151.5	139.5	140.8		
Peak 7 Day	139.8	142.6	135.4	135.2	149.4	146.2	149.9	152.6	147.6	139.5	134.8	134.6		
Peak/Ave Day	1.09	1.06	1.08	1.10	1.23	1.10	1.12	1.15	1.07	1.10	1.05	1.07		
Peak 7 Day/ Ave day	1.04	1.06	1.03	1.04	1.07	1.02	1.02	1.05	1.03	1.01	1.01	1.02		
1980	131.6	130.6	129.2	131.6	138.4	151.6	160.5	164.1	163.8	144.0	136.7	132.6	142.9	52310.8
Peak Day	136.7	134.9	136.6	144.2	153.0	181.1	192.9	187.4	186.6	157.7	158.1	154.7		
Peak 7 Day	133.3	132.7	131.8	137.7	142.3	174.1	179.3	173.3	177.6	147.8	141.8	136.5		
Peak/Ave Day	1.04	1.03	1.06	1.10	1.11	1.19	1.20	1.14	1.14	1.09	1.16	1.17		
Peak 7 Day/ Ave day	1.01	1.02	1.02	1.05	1.03	1.15	1.12	1.06	1.08	1.03	1.04	1.03		

Monthly average and annual average production for
Washington Suburban Sanitary Commission (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1981	133.4	130.4	129.4	132.9	139.0	148.6	158.7	155.9	148.2	138.9	134.2	132.9	140.3	51197.6
Peak Day	152.5	144.0	147.4	146.3	153.7	170.8	186.5	177.0	170.4	161.0	155.5	156.2		
Peak 7 Day	137.4	132.7	132.8	138.3	147.9	157.2	174.9	166.2	156.8	142.5	136.7	138.2		
Peak/Ave Day	1.14	1.10	1.14	1.10	1.11	1.15	1.18	1.14	1.15	1.16	1.16	1.17		
Peak 7 Day/ Ave day	1.03	1.02	1.03	1.04	1.06	1.06	1.10	1.07	1.06	1.03	1.02	1.04		
1982	134.7	134.5	130.7	132.4	149.6	145.2	159.7	150.5	153.9	140.9	138.4	135.1	142.2	51903.7
Peak Day	155.8	152.4	149.7	147.0	182.9	165.7	196.2	170.0	187.8	158.4	151.3	150.0		
Peak 7 Day	140.4	139.1	134.5	137.8	168.1	157.1	173.3	155.4	166.6	147.4	139.3	140.8		
Peak/Ave Day	1.16	1.13	1.15	1.11	1.22	1.14	1.23	1.13	1.22	1.12	1.09	1.11		
Peak 7 Day/ Ave day	1.04	1.03	1.03	1.04	1.12	1.08	1.08	1.03	1.08	1.05	1.01	1.04		
1983	134.6	131.4	130.8	131.5	144.5	151.5	176.2	166.3	162.6	147.0	143.6	141.3	146.9	53616.4
Peak Day	155.2	149.2	142.3	149.1	169.8	181.0	214.6	196.5	192.0	161.9	165.9	165.8		
Peak 7 Day	138.1	133.9	136.6	134.7	150.8	162.5	200.8	176.9	184.3	150.4	149.9	153.0		
Peak/Ave Day	1.15	1.14	1.09	1.13	1.18	1.19	1.22	1.18	1.18	1.10	1.16	1.17		
Peak 7 Day/ Ave day	1.03	1.02	1.04	1.02	1.04	1.07	1.14	1.06	1.13	1.02	1.04	1.08		
1984	141.5	134.7	131.1	133.2	143.1	162.6	153.8	156.6	159.3	146.5	138.7	135.8	144.8	52979.0
Peak Day	164.8	151.3	139.5	148.3	162.7	199.4	180.8	175.3	182.0	161.4	148.0	149.5		
Peak 7 Day	147.3	137.2	134.7	135.9	156.5	189.7	162.5	170.6	171.8	152.9	140.1	138.0		
Peak/Ave Day	1.16	1.12	1.06	1.11	1.14	1.23	1.18	1.12	1.14	1.10	1.07	1.10		
Peak 7 Day/ Ave day	1.04	1.02	1.03	1.02	1.09	1.17	1.06	1.09	1.08	1.04	1.01	1.02		
1985	138.5	136.3	132.1	148.7	152.0	156.1	166.6	162.9	161.6	145.6	139.8	142.1	148.6	54236.9
Peak Day	158.6	146.6	140.6	188.1	189.2	181.1	195.2	197.4	197.0	157.4	152.8	157.8		
Peak 7 Day	147.5	138.3	134.5	170.9	170.4	169.5	178.0	180.5	184.8	150.3	144.3	146.3		
Peak/Ave Day	1.14	1.08	1.06	1.27	1.24	1.16	1.17	1.21	1.22	1.08	1.09	1.11		
Peak 7 Day/ Ave day	1.06	1.01	1.02	1.15	1.12	1.09	1.07	1.11	1.14	1.03	1.03	1.03		
1986	141.6	140.9	141.5	150.4	174.2	196.5	188.5	171.2	167.3	159.7	150.1	147.4	160.9	58721.5
Peak Day	154.2	153.3	153.1	171.2	219.5	226.7	223.6	198.4	187.3	186.7	167.9	168.0		
Peak 7 Day	143.6	143.3	145.3	156.3	191.3	214.5	197.2	181.1	177.2	168.4	153.6	151.2		
Peak/Ave Day	1.09	1.09	1.08	1.14	1.26	1.15	1.19	1.16	1.12	1.17	1.12	1.14		
Peak 7 Day/ Ave day	1.01	1.02	1.03	1.04	1.10	1.09	1.05	1.06	1.06	1.05	1.02	1.03		
1987	145.2	145.4	144.1	145.4	161.6	176.5	199.8	195.9	172.1	165.8	159.2	149.4	163.5	59680.0
Peak Day	162.1	160.7	152.8	158.0	190.8	205.4	238.8	227.7	198.4	186.3	173.0	164.1		
Peak 7 Day	150.4	149.5	146.1	149.0	169.2	190.3	227.9	209.3	184.2	168.9	162.0	153.3		
Peak/Ave Day	1.12	1.11	1.06	1.09	1.18	1.16	1.20	1.16	1.15	1.12	1.09	1.10		
Peak 7 Day/ Ave day	1.04	1.03	1.01	1.03	1.05	1.08	1.14	1.07	1.07	1.02	1.02	1.03		

Monthly average and annual average production for
Washington Suburban Sanitary Commission (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1988	155.9	149.0	148.9	153.8	160.6	200.5	212.3	195.3	176.9	170.3	158.4	156.3	169.9	62197.5
Peak Day	166.8	160.3	156.4	164.2	181.8	249.7	267.3	233.3	195.8	188.6	170.2	170.1		
Peak 7 Day	159.6	150.2	153.8	157.1	168.2	225.1	252.3	216.4	183.5	174.5	161.8	160.4		
Peak/Ave Day	1.07	1.08	1.05	1.07	1.13	1.25	1.26	1.19	1.11	1.11	1.07	1.09		
Peak 7 Day/ Ave day	1.02	1.01	1.03	1.02	1.05	1.12	1.19	1.11	1.04	1.02	1.02	1.03		

Peak day/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.10	1.09	1.08	1.14	1.18	1.19	1.19	1.15	1.13	1.10	1.09	1.11

Peak week/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.03	1.02	1.02	1.06	1.08	1.10	1.10	1.06	1.07	1.03	1.02	1.03

Monthly production factors for the
Washington Suburban Sanitary Commission

(ratio of monthly average to annual average production)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	.88	.88	.88	.94	1.02	1.09	1.30	1.02	1.04	1.02	.99	.94
1975	.96	.98	.95	.96	1.03	1.12	1.08	1.14	1.01	.94	.92	.91
1976	.90	.92	.91	1.03	1.02	1.16	1.07	1.07	1.04	.98	.96	.95
1977	1.02	.99	.95	.97	1.06	1.06	1.06	1.07	1.05	.94	.91	.94
1978	.92	.94	.91	.94	.98	1.11	1.10	1.09	1.06	1.00	.98	.96
1979	.98	.98	.96	.94	1.01	1.04	1.06	1.05	1.04	1.00	.97	.96
1980	.92	.91	.90	.92	.97	1.06	1.12	1.15	1.15	1.01	.96	.93
1981	.95	.93	.92	.95	.99	1.06	1.13	1.11	1.06	.99	.96	.95
1982	.95	.95	.92	.93	1.05	1.02	1.12	1.06	1.08	.99	.97	.95
1983	.92	.89	.89	.90	.98	1.03	1.20	1.13	1.11	1.00	.98	.96
1984	.98	.93	.91	.92	.99	1.12	1.06	1.08	1.10	1.01	.96	.94
1985	.93	.92	.89	1.00	1.02	1.05	1.12	1.10	1.09	.98	.94	.96
1986	.88	.88	.88	.93	1.08	1.22	1.17	1.06	1.04	.99	.93	.92
1987	.89	.89	.88	.89	.99	1.08	1.22	1.20	1.05	1.01	.97	.91
1988	.92	.88	.88	.91	.95	1.18	1.25	1.15	1.04	1.00	.93	.92

Average monthly production factors

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
.93	.92	.91	.94	1.01	1.09	1.14	1.10	1.06	.99	.96	.94

Peak 30, 60, 90, 120, and 180 days production for
Washington Suburban Sanitary Commission

(millions of gallons per day)

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1974	173.1	159.5	152.2	147.9	143.9	132.5	48374.5
From	7/ 2	6/ 4	5/12	5/15	5/13		
To	7/31	8/ 2	8/ 9	9/11	11/ 8		
Peak/ Annual Ave	1.31	1.20	1.15	1.12	1.09		
1975	151.8	148.9	147.2	144.8	139.7	131.8	48099.5
From	7/31	6/14	6/ 8	5/13	4/10		
To	8/29	8/12	9/ 5	9/ 9	10/ 6		
Peak/ Annual Ave	1.15	1.13	1.12	1.10	1.06		
1976	161.9	154.0	152.0	150.2	147.5	138.1	50557.0
From	6/ 6	6/ 1	6/ 4	5/18	4/12		
To	7/ 5	7/30	9/ 1	9/14	10/ 8		
Peak/ Annual Ave	1.17	1.12	1.10	1.09	1.07		
1977	148.2	145.5	144.7	144.4	140.9	134.4	49055.5
From	5/10	5/11	5/13	5/11	4/10		
To	6/ 8	7/ 9	8/10	9/ 7	10/ 6		
Peak/ Annual Ave	1.10	1.08	1.08	1.07	1.05		
1978	154.2	153.1	152.0	150.7	146.5	137.7	50252.5
From	7/ 6	5/30	6/ 1	5/30	5/18		
To	8/ 4	7/28	8/29	9/26	11/13		
Peak/ Annual Ave	1.12	1.11	1.10	1.09	1.06		
1979	149.3	146.7	145.7	144.9	142.5	137.5	50198.2
From	7/12	6/13	6/23	6/ 6	4/30		
To	8/10	8/11	9/20	10/ 3	10/26		
Peak/ Annual Ave	1.09	1.07	1.06	1.05	1.04		
1980	168.9	166.6	164.3	160.8	154.4	142.9	52310.8
From	7/15	7/15	6/24	6/20	5/15		
To	8/13	9/12	9/21	10/17	11/10		
Peak/ Annual Ave	1.18	1.17	1.15	1.12	1.08		
1981	162.6	158.7	156.2	153.4	148.6	140.3	51197.6
From	7/ 8	7/ 8	6/17	6/ 6	4/26		
To	8/ 6	9/ 5	9/14	10/ 3	10/22		
Peak/ Annual Ave	1.16	1.13	1.11	1.09	1.06		
1982	161.5	156.2	156.3	153.2	150.2	142.2	51903.7
From	6/28	7/ 6	6/22	6/15	5/ 2		
To	7/27	9/ 3	9/19	10/12	10/28		
Peak/ Annual Ave	1.14	1.10	1.10	1.08	1.06		

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1983	183.6	174.7	169.5	164.7	158.4	146.9	53616.4
From	7/12	7/13	6/24	5/31	5/11		
To	8/10	9/10	9/21	9/27	11/ 6		
Peak/ Annual Ave	1.25	1.19	1.15	1.12	1.08		
1984	163.4	158.5	158.7	158.2	154.1	144.8	52979.0
From	8/26	6/ 4	6/ 7	6/ 3	5/ 8		
To	9/24	8/ 2	9/ 4	9/30	11/ 3		
Peak/ Annual Ave	1.13	1.10	1.10	1.09	1.06		
1985	169.6	167.0	165.6	162.1	159.5	148.6	54236.9
From	6/26	6/22	6/24	6/ 2	4/18		
To	7/25	8/20	9/21	9/29	10/14		
Peak/ Annual Ave	1.14	1.12	1.11	1.09	1.07		
1986	198.2	193.1	187.5	183.1	176.8	160.9	58721.5
From	5/30	5/31	5/ 5	5/ 1	4/28		
To	6/28	7/29	8/ 2	8/28	10/24		
Peak/ Annual Ave	1.23	1.20	1.17	1.14	1.10		
1987	211.4	199.6	192.3	186.8	179.5	163.5	59680.0
From	7/18	7/ 8	6/ 8	5/28	5/ 9		
To	8/16	9/ 5	9/ 5	9/24	11/ 4		
Peak/ Annual Ave	1.29	1.22	1.18	1.14	1.10		
1988	229.6	213.0	203.9	197.0	186.9	169.9	62197.5
From	6/19	6/19	6/ 6	5/30	5/12		
To	7/18	8/17	9/ 3	9/26	11/ 7		
Peak/ Annual Ave	1.35	1.25	1.20	1.16	1.10		

Peak/average day factors - averaged over number of years of data

30 days	60 days	90 days	120 days	180 days
1.19	1.15	1.12	1.10	1.07

Appendix D - Production Data for System

Monthly average and annual average production for
Total System (WSSC+FCWA+WAD)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1974	348.4	343.3	343.7	364.4	379.6	402.9	475.4	405.9	399.6	381.1	365.9	350.5	380.3	138816.8
Peak Day	359.0	352.0	361.0	428.0	423.8	460.7	549.7	442.4	421.2	402.6	387.0	371.0		
Peak 7 Day	351.1	347.1	349.9	389.9	408.3	441.9	530.9	419.4	410.6	391.5	376.9	361.7		
Peak/Ave Day	1.03	1.03	1.05	1.17	1.12	1.14	1.16	1.09	1.05	1.06	1.06	1.06		
Peak 7 Day/ Ave day	1.01	1.01	1.02	1.07	1.08	1.10	1.12	1.03	1.03	1.03	1.03	1.03		
1975	354.7	351.0	347.2	356.4	381.0	419.0	417.4	435.2	389.5	366.5	357.1	354.2	377.6	137830.6
Peak Day	371.0	362.0	365.0	376.0	445.3	505.5	467.2	491.9	415.7	383.4	376.0	367.0		
Peak 7 Day	361.7	357.6	349.6	361.3	405.6	479.2	429.7	459.3	403.8	374.8	365.0	361.6		
Peak/Ave Day	1.05	1.03	1.05	1.06	1.17	1.21	1.12	1.13	1.07	1.05	1.05	1.04		
Peak 7 Day/ Ave day	1.02	1.02	1.01	1.01	1.06	1.14	1.03	1.06	1.04	1.02	1.02	1.02		
1976	360.6	358.3	359.5	395.9	399.7	455.7	439.7	439.2	419.6	386.4	371.7	369.3	396.4	145070.7
Peak Day	378.0	372.0	378.0	465.0	427.5	525.8	491.5	490.9	478.5	411.5	385.0	381.0		
Peak 7 Day	364.6	366.7	366.6	446.1	412.8	495.7	463.4	469.7	446.7	397.5	377.4	375.7		
Peak/Ave Day	1.05	1.04	1.05	1.17	1.07	1.15	1.12	1.12	1.14	1.06	1.04	1.03		
Peak 7 Day/ Ave day	1.01	1.02	1.02	1.13	1.03	1.09	1.05	1.07	1.06	1.03	1.02	1.02		
1977	383.4	362.7	347.7	359.4	400.6	422.5	443.8	433.9	423.8	383.1	355.7	363.3	390.2	142422.6
Peak Day	410.0	383.0	367.0	407.0	470.5	500.3	490.1	459.1	466.1	412.0	373.0	385.0		
Peak 7 Day	403.0	368.6	352.0	385.3	452.0	444.8	473.7	440.9	447.4	403.0	361.4	371.4		
Peak/Ave Day	1.07	1.06	1.06	1.13	1.17	1.18	1.10	1.06	1.10	1.08	1.05	1.06		
Peak 7 Day/ Ave day	1.05	1.02	1.01	1.07	1.13	1.05	1.07	1.02	1.06	1.05	1.02	1.02		
1978	366.0	359.7	361.8	371.1	390.3	431.7	435.8	436.6	425.9	397.2	382.8	370.0	394.2	143899.2
Peak Day	377.0	381.0	379.0	384.0	429.7	471.6	507.6	474.6	460.0	428.4	401.0	384.0		
Peak 7 Day	370.4	365.4	370.7	378.3	411.0	441.0	491.2	455.8	448.8	404.2	394.4	375.0		
Peak/Ave Day	1.03	1.06	1.05	1.03	1.10	1.09	1.16	1.09	1.08	1.08	1.05	1.04		
Peak 7 Day/ Ave day	1.01	1.02	1.02	1.02	1.05	1.02	1.13	1.04	1.05	1.02	1.03	1.01		
1979	381.3	381.8	374.1	368.8	395.7	403.7	418.5	421.3	412.3	394.6	376.1	367.7	391.4	142864.2
Peak Day	397.0	412.0	392.0	391.0	456.4	428.9	461.5	466.5	443.7	415.6	394.0	386.2		
Peak 7 Day	390.4	399.0	382.1	383.1	425.3	413.4	437.4	444.6	423.9	398.9	385.7	375.9		
Peak/Ave Day	1.04	1.08	1.05	1.06	1.15	1.06	1.10	1.11	1.08	1.05	1.05	1.05		
Peak 7 Day/ Ave day	1.02	1.05	1.02	1.04	1.07	1.02	1.05	1.06	1.03	1.01	1.03	1.02		
1980	363.8	367.6	368.6	376.0	400.1	439.5	467.8	476.1	479.6	421.8	393.8	385.4	411.8	150722.4
Peak Day	382.6	382.9	382.8	402.8	432.5	515.9	551.0	520.8	543.6	457.1	424.5	419.2		
Peak 7 Day	368.9	374.8	373.8	389.9	408.9	494.5	510.1	501.4	517.7	434.0	405.7	393.2		
Peak/Ave Day	1.05	1.04	1.04	1.07	1.08	1.17	1.18	1.09	1.13	1.08	1.08	1.09		
Peak 7 Day/ Ave day	1.01	1.02	1.01	1.04	1.02	1.13	1.09	1.05	1.08	1.03	1.03	1.02		

Monthly average and annual average production for
Total System (WSSC+FCWA+WAD) (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1981	390.6	376.1	375.9	382.6	396.6	448.9	473.4	452.1	429.2	404.6	387.7	383.9	408.7	149171.3
Peak Day	415.2	393.6	406.2	403.1	436.6	500.7	529.7	491.6	475.9	440.9	420.7	413.2		
Peak 7 Day	401.4	384.6	383.2	390.3	416.8	476.2	511.8	470.4	450.5	412.4	394.1	393.5		
Peak/Ave Day	1.06	1.05	1.08	1.05	1.10	1.12	1.12	1.09	1.11	1.09	1.09	1.08		
Peak 7 Day/ Ave day	1.03	1.02	1.02	1.02	1.05	1.06	1.08	1.04	1.05	1.02	1.02	1.03		
1982	395.1	390.8	384.0	391.2	427.0	426.1	472.0	445.2	448.8	409.6	391.9	383.5	413.9	151088.9
Peak Day	436.8	416.5	407.1	414.1	496.5	482.2	544.6	471.4	499.4	439.9	418.1	405.3		
Peak 7 Day	411.1	400.8	388.9	400.5	471.0	455.7	505.6	454.3	482.7	429.9	399.7	391.6		
Peak/Ave Day	1.11	1.07	1.06	1.06	1.16	1.13	1.15	1.06	1.11	1.07	1.07	1.06		
Peak 7 Day/ Ave day	1.04	1.03	1.01	1.02	1.10	1.07	1.07	1.02	1.08	1.05	1.02	1.02		
1983	381.1	379.6	378.5	392.2	422.7	438.9	496.8	490.7	470.8	416.2	401.0	411.0	423.6	154622.4
Peak Day	415.8	412.0	401.0	436.3	464.6	497.2	566.9	553.9	550.8	440.5	431.8	471.8		
Peak 7 Day	385.2	388.3	382.1	407.5	445.1	465.8	547.7	510.4	534.9	425.7	411.2	440.3		
Peak/Ave Day	1.09	1.09	1.06	1.11	1.10	1.13	1.14	1.13	1.17	1.06	1.08	1.15		
Peak 7 Day/ Ave day	1.01	1.02	1.01	1.04	1.05	1.06	1.10	1.04	1.14	1.02	1.03	1.07		
1984	414.7	391.8	386.5	390.2	419.7	483.2	456.3	468.9	467.3	447.9	412.7	408.4	429.1	157039.0
Peak Day	446.9	420.5	402.8	412.2	468.0	562.0	510.1	515.3	513.8	470.1	434.0	430.9		
Peak 7 Day	427.2	396.4	394.5	399.2	451.5	544.0	479.1	496.9	493.5	459.9	417.6	416.1		
Peak/Ave Day	1.08	1.07	1.04	1.06	1.12	1.16	1.12	1.10	1.10	1.05	1.05	1.06		
Peak 7 Day/ Ave day	1.03	1.01	1.02	1.02	1.08	1.13	1.05	1.06	1.06	1.03	1.01	1.02		
1985	413.6	410.1	402.9	450.6	454.0	469.0	514.7	496.0	494.8	451.9	417.2	413.1	449.2	163971.1
Peak Day	460.8	423.4	429.1	530.2	537.6	530.7	577.6	579.2	595.6	471.3	436.3	445.4		
Peak 7 Day	437.4	414.4	409.6	499.7	496.0	504.8	557.4	542.3	552.0	458.9	425.8	419.4		
Peak/Ave Day	1.11	1.03	1.06	1.18	1.18	1.13	1.12	1.17	1.20	1.04	1.05	1.08		
Peak 7 Day/ Ave day	1.06	1.01	1.02	1.11	1.09	1.08	1.08	1.09	1.12	1.02	1.02	1.02		
1986	407.4	401.9	404.0	420.8	482.0	547.1	524.7	485.1	473.9	455.1	424.0	413.0	453.5	165537.1
Peak Day	430.6	428.5	428.6	462.8	579.7	603.5	614.9	557.7	508.3	522.5	448.2	433.2		
Peak 7 Day	415.7	404.6	417.8	435.3	516.4	583.5	553.1	515.4	499.7	484.5	429.2	420.9		
Peak/Ave Day	1.06	1.07	1.06	1.10	1.20	1.10	1.17	1.15	1.07	1.15	1.06	1.05		
Peak 7 Day/ Ave day	1.02	1.01	1.03	1.03	1.07	1.07	1.05	1.06	1.05	1.06	1.01	1.02		
1987	413.1	413.9	408.9	417.5	450.6	493.4	552.9	546.0	471.3	440.0	422.5	402.0	453.0	165346.9
Peak Day	440.6	439.3	422.6	446.7	524.4	554.6	662.2	643.1	548.0	472.0	445.8	424.5		
Peak 7 Day	425.4	426.2	415.5	428.3	468.8	524.2	622.5	576.7	503.3	448.8	432.7	411.5		
Peak/Ave Day	1.07	1.06	1.03	1.07	1.16	1.12	1.20	1.18	1.16	1.07	1.06	1.06		
Peak 7 Day/ Ave day	1.03	1.03	1.02	1.03	1.04	1.06	1.13	1.06	1.07	1.02	1.02	1.02		

Monthly average and annual average production for
Total System (WSSC+FCWA+WAD) (continued)

(millions of gallons per day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Total (in mg)
1988	418.9	405.6	404.6	421.0	433.1	537.4	568.3	533.7	470.3	448.2	421.1	416.8	456.8	167190.9
Peak Day	441.8	421.6	435.9	447.6	494.6	652.3	686.4	611.4	497.3	486.9	435.7	447.8		
Peak 7 Day	428.7	409.0	417.5	425.4	450.0	597.6	656.2	595.4	482.2	460.6	426.9	427.7		
Peak/Ave Day	1.05	1.04	1.08	1.06	1.14	1.21	1.21	1.15	1.06	1.09	1.03	1.07		
Peak 7 Day/ Ave day	1.02	1.01	1.03	1.01	1.04	1.11	1.15	1.12	1.03	1.03	1.01	1.03		

Peak day/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.06	1.05	1.05	1.09	1.14	1.14	1.14	1.11	1.11	1.07	1.06	1.06

Peak week/average day factors - averaged over number of years of data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.03	1.02	1.02	1.04	1.07	1.08	1.08	1.05	1.06	1.03	1.02	1.02

Monthly production factors for the
Whole system (WSSC+FCWA+WAD)

(ratio of monthly average to annual average production)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	.92	.90	.90	.96	1.00	1.06	1.25	1.07	1.05	1.00	.96	.92
1975	.94	.93	.92	.94	1.01	1.11	1.11	1.15	1.03	.97	.95	.94
1976	.91	.90	.91	1.00	1.01	1.15	1.11	1.11	1.06	.97	.94	.93
1977	.98	.93	.89	.92	1.03	1.08	1.14	1.11	1.09	.98	.91	.93
1978	.93	.91	.92	.94	.99	1.10	1.11	1.11	1.08	1.01	.97	.94
1979	.97	.98	.96	.94	1.01	1.03	1.07	1.08	1.05	1.01	.96	.94
1980	.88	.89	.90	.91	.97	1.07	1.14	1.16	1.16	1.02	.96	.94
1981	.96	.92	.92	.94	.97	1.10	1.16	1.11	1.05	.99	.95	.94
1982	.95	.94	.93	.95	1.03	1.03	1.14	1.08	1.08	.99	.95	.93
1983	.90	.90	.89	.93	1.00	1.04	1.17	1.16	1.11	.98	.95	.97
1984	.97	.91	.90	.91	.98	1.13	1.06	1.09	1.09	1.04	.96	.95
1985	.92	.91	.90	1.00	1.01	1.04	1.15	1.10	1.10	1.01	.93	.92
1986	.90	.89	.89	.93	1.06	1.21	1.16	1.07	1.04	1.00	.93	.91
1987	.91	.91	.90	.92	.99	1.09	1.22	1.21	1.04	.97	.93	.89
1988	.92	.89	.89	.92	.95	1.18	1.24	1.17	1.03	.98	.92	.91

Average monthly production factors

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
.93	.91	.91	.94	1.00	1.09	1.15	1.12	1.07	1.00	.94	.93

Peak 30, 60, 90, 120, and 180 days production for
Total System (WSSC+FCHA+WAD)

(millions of gallons per day)

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1974	477.6	443.5	430.0	422.2	409.0	380.3	138816.8
From	7/ 3	6/ 8	6/ 8	6/ 3	5/13		
To	8/ 1	8/ 6	9/ 5	9/30	11/ 8		
Peak/ Annual Ave	1.26	1.17	1.13	1.11	1.08		
1975	439.0	430.4	425.3	417.9	402.4	377.6	137830.6
From	7/31	6/16	6/14	5/19	5/ 4		
To	8/29	8/14	9/11	9/15	10/30		
Peak/ Annual Ave	1.16	1.14	1.13	1.11	1.07		
1976	463.4	450.7	446.0	439.3	427.4	396.4	145070.7
From	6/ 7	6/ 7	6/ 7	6/ 1	4/14		
To	7/ 6	8/ 5	9/ 4	9/28	10/10		
Peak/ Annual Ave	1.17	1.14	1.13	1.11	1.08		
1977	449.9	440.9	436.9	433.3	419.3	390.2	142422.6
From	6/26	6/26	6/27	5/17	5/10		
To	7/25	8/24	9/24	9/13	11/ 5		
Peak/ Annual Ave	1.15	1.13	1.12	1.11	1.07		
1978	445.5	442.7	436.3	433.1	421.3	394.2	143899.2
From	7/13	7/15	6/15	5/30	5/18		
To	8/11	9/12	9/12	9/26	11/13		
Peak/ Annual Ave	1.13	1.12	1.11	1.10	1.07		
1979	433.3	423.7	418.7	415.2	408.2	391.4	142864.2
From	7/12	7/10	7/ 7	6/ 6	5/ 7		
To	8/10	9/ 7	10/ 4	10/ 3	11/ 2		
Peak/ Annual Ave	1.11	1.08	1.07	1.06	1.04		
1980	492.4	483.2	477.6	468.5	449.1	411.8	150722.4
From	8/25	7/14	6/26	6/20	5/12		
To	9/23	9/11	9/23	10/17	11/ 7		
Peak/ Annual Ave	1.20	1.17	1.16	1.14	1.09		
1981	482.3	468.8	460.7	452.3	435.3	408.7	149171.3
From	6/24	6/15	6/ 8	6/ 4	5/22		
To	7/23	8/13	9/ 5	10/ 1	11/17		
Peak/ Annual Ave	1.18	1.15	1.13	1.11	1.07		

Year	30 days	60 days	90 days	120 days	180 days	Annual	Total (in mg)
1982	475.1	461.1	459.9	450.8	438.8	413.9	151088.9
From	7/ 7	7/ 6	6/22	6/15	5/ 2		
To	8/ 5	9/ 3	9/19	10/12	10/28		
Peak/ Annual Ave	1.15	1.11	1.11	1.09	1.06		
1983	518.7	504.9	490.1	476.2	457.1	423.6	154622.4
From	7/13	7/14	6/24	6/10	4/30		
To	8/11	9/11	9/21	10/ 7	10/26		
Peak/ Annual Ave	1.22	1.19	1.16	1.12	1.08		
1984	485.2	471.6	471.9	469.7	458.9	429.1	157039.0
From	6/ 4	6/ 4	6/ 6	6/ 4	5/12		
To	7/ 3	8/ 2	9/ 3	10/ 1	11/ 7		
Peak/ Annual Ave	1.13	1.10	1.10	1.09	1.07		
1985	519.9	509.6	505.4	494.8	484.0	449.2	163971.1
From	6/26	6/22	6/24	6/17	4/18		
To	7/25	8/20	9/21	10/14	10/14		
Peak/ Annual Ave	1.16	1.13	1.12	1.10	1.08		
1986	550.8	536.8	523.2	511.1	496.1	453.5	165537.1
From	5/30	5/31	5/29	5/ 1	4/28		
To	6/28	7/29	8/26	8/28	10/24		
Peak/ Annual Ave	1.21	1.18	1.15	1.13	1.09		
1987	581.0	553.2	534.9	518.5	494.0	453.0	165346.9
From	7/20	7/ 7	6/ 8	5/28	4/30		
To	8/18	9/ 4	9/ 5	9/24	10/26		
Peak/ Annual Ave	1.28	1.22	1.18	1.14	1.09		
1988	608.1	573.0	549.2	529.4	500.3	456.8	167190.9
From	6/19	6/20	6/ 6	5/30	5/12		
To	7/18	8/18	9/ 3	9/26	11/ 7		
Peak/ Annual Ave	1.33	1.25	1.20	1.16	1.10		

Peak/average day factors - averaged over number of years of data

30 days	60 days	90 days	120 days	180 days
1.19	1.15	1.13	1.11	1.08

Appendix E - CAZs in WAD's service area

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

CITY OF WASHINGTON D.C.

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0	001A	1	1 100%	625	643	614	643	606	1043	601	1244	607	1442	600	1442
0	001B	2	1 100%	640	7323	624	7323	611	7323	601	7323	607	7323	600	7323
0	001C	3	1 100%	0	11159	0	11659	0	12160	0	12160	0	12160	0	12160
0	001D	4	1 100%	0	10029	0	10029	0	10029	0	10029	0	10029	0	10029
0	001E	5	1 100%	0	4451	0	4451	0	4451	0	4451	0	4451	0	4451
0	001F	6	1 100%	0	10845	0	10845	0	10845	0	10845	0	10845	0	10845
0	002A	7	2 100%	577	7471	582	7571	590	8371	601	9172	607	9372	600	9372
0	002B	8	2 100%	97	16197	97	17199	98	17199	100	17199	100	17199	100	17199
0	002C	9	2 100%	190	24537	193	25537	196	25537	201	25537	202	25537	202	25537
0	002D	10	2 100%	645	10788	628	12790	613	12790	601	12790	607	12790	600	12790
0	002E	11	2 100%	894	2683	893	2883	894	3684	902	3684	910	3684	901	3684
0	002F	12	2 100%	1118	12086	1109	12286	1102	13087	1103	13087	1113	13087	1101	13087
0	003A	13	3 100%	0	19586	0	19586	0	19586	0	19586	0	19586	0	19586
0	003B	14	3 100%	288	2559	458	5059	627	8558	802	12059	809	13058	800	13058
0	003C	15	3 100%	845	5510	1128	8010	1412	11011	1704	13011	1719	13011	1701	13011
0	003D	16	3 100%	488	20813	491	20813	495	20813	501	20813	505	20813	500	20813
0	003E	17	3 100%	119	14259	112	15259	105	15259	100	15259	101	15259	100	15259
0	003F	18	3 100%	133	8652	121	8851	110	9153	100	9153	101	9153	100	9153
0	004A	19	4 100%	159	10389	240	13388	319	14089	400	14089	404	14089	400	14089
0	004B	20	4 100%	472	978	680	1978	888	4977	1103	5677	1113	5677	1101	5677
0	004C	21	4 100%	379	7232	519	7232	658	9232	802	10232	809	10632	800	10632
0	004D	22	4 100%	453	561	568	561	683	3561	802	5561	809	7560	800	7560
0	004E	23	4 100%	144	5279	229	5279	314	6277	400	6777	404	6777	400	6777
0	005A	24	5 100%	0	11945	0	12446	0	13444	0	14445	0	14945	0	14945
0	005B	25	5 100%	74	6286	115	6286	158	7286	201	8286	203	9587	200	9587
0	005C	26	5 100%	15	3809	10	3809	5	4309	0	5311	0	7008	0	7008
0	005D	27	5 100%	0	10517	0	12518	0	12518	0	12518	0	12518	0	12518
0	005E	28	5 100%	0	1610	0	1610	0	1610	0	1610	0	1610	0	1610
0	005F	29	5 100%	0	7133	0	7133	0	7133	0	7133	0	7133	0	7133
0	006A	30	6 100%	1	3116	1	3116	1	3116	1	3116	1	3116	1	3116
0	006B	31	6 100%	0	6880	0	8879	0	10880	0	12379	0	13881	0	13881
0	006C	32	6 100%	0	5168	0	5968	0	8967	0	11168	0	12169	0	12169
0	006D	33	6 100%	0	7335	0	7335	0	13334	0	14335	0	15334	0	15334
0	006E	34	6 100%	0	4364	0	4364	0	4364	0	4364	0	4364	0	4364
0	006F	35	6 100%	0	1	0	1	0	1	0	1	0	1	0	1
0	011A	36	11 100%	726	3346	715	3346	706	3346	701	3346	708	3346	700	3346
0	011B	37	11 100%	1812	638	1802	638	1798	888	1804	1138	1821	1138	1801	1138
0	011C	38	11 100%	884	3811	888	4811	891	5811	902	6312	910	6312	901	6312
0	011D	39	11 100%	87	5688	91	5788	95	5888	100	5988	100	6088	100	6088
0	011E	40	11 100%	644	3242	627	3242	613	3242	601	3242	607	3242	600	3242
0	011F	41	11 100%	0	0	0	0	0	0	0	0	0	0	0	0
0	011G	42	11 100%	106	2668	103	2767	100	2867	100	2968	101	3068	100	3068
0	011H	43	11 100%	229	1677	219	1978	209	1978	201	1978	203	1978	200	1978
0	011J	44	11 100%	204	1178	202	1178	200	1178	201	1178	203	1178	200	1178
0	011K	45	11 100%	126	2329	116	3829	108	4329	100	4329	101	4329	100	4329
0	012A	46	12 100%	613	1869	607	1970	602	2069	601	2069	607	2069	600	2069
0	012B	47	12 100%	1681	2641	1649	2641	1621	2641	1603	2741	1618	2942	1601	3142
0	012C	48	12 100%	3673	3714	3602	3813	3550	3913	3407	3913	3439	3913	3402	3913
0	012D	49	12 100%	1363	874	1338	874	1316	874	1302	973	1314	1173	1300	1373

CITY OF WASHINGTON D.C. (continued)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0 013A	50 13	100%	3202	1886	3726	1986	4258	2086	4810	2184	4855	2785	4802	3887
0 013B	51 13	100%	2159	2007	2233	2107	2314	2206	2405	2206	2427	2206	2401	2206
0 013C	52 13	100%	2276	2493	2243	2493	2219	2493	2204	2493	2225	2493	2201	2493
0 013D	53 13	100%	1518	1453	1508	1453	1501	1453	1503	1453	1517	1453	1501	1453
0 013E	54 13	100%	1211	619	1271	720	1333	820	1403	1120	1416	1621	1400	2620
0 014A	55 14	100%	1327	587	1480	587	1637	587	1804	587	1821	3088	1801	6087
0 014B	56 14	100%	626	322	615	322	607	322	601	322	607	322	600	322
0 014C	57 14	100%	693	215	694	215	695	215	701	215	708	215	700	215
0 014D	58 14	100%	468	660	443	660	420	660	400	660	404	660	400	660
0 015A	59 15	100%	249	2951	365	2951	482	2951	601	2951	607	3452	600	4951
0 015B	60 15	100%	1084	551	1118	551	1157	551	1202	551	1213	551	1200	1052
0 015C	61 15	100%	238	5367	257	5367	279	8368	301	10366	304	11367	301	12367
0 015D	62 15	100%	118	7800	112	10101	105	13400	100	14401	101	14401	100	14401
0 015E	63 15	100%	419	8800	411	8800	404	8800	400	8800	404	9399	400	10798
0 015F	64 15	100%	0	8435	0	9435	0	12435	0	13434	0	14435	0	14435
0 015G	65 15	100%	0	2236	0	2437	0	2737	0	3236	0	4237	0	6236
0 015H	66 15	100%	196	466	197	466	198	466	201	466	203	665	200	965
0 015J	67 15	100%	485	1779	488	1779	494	1779	501	1779	505	1779	500	1779
0 016A	68 16	100%	0	1956	0	1956	0	1956	0	1956	0	1956	0	1956
0 016B	69 16	100%	519	2307	511	2307	505	2307	501	2307	505	2307	500	2307
0 016C	70 16	100%	622	8432	613	8432	606	8432	601	8432	607	8432	600	8432
0 016D	71 16	100%	129	11977	118	11977	109	11977	100	11977	101	12478	100	13978
0 017A	72 17	100%	0	1537	0	1537	0	1537	0	1537	0	1537	0	1537
0 017B	73 17	100%	0	3718	0	3718	0	3718	0	3718	0	3718	0	3718
0 017C	74 17	100%	0	2781	0	2781	0	2781	0	2781	0	2781	0	2781
0 017D	75 17	100%	21	8668	14	8668	7	8668	0	8668	0	9668	0	11168
0 017E	76 17	100%	0	11090	0	11090	0	11090	0	11090	0	11090	0	11090
0 017F	77 17	100%	0	9436	0	9436	0	9436	0	9436	0	9436	0	9436
0 017G	78 17	100%	0	6728	0	6728	0	6728	0	6728	0	6728	0	6728
0 017H	79 17	100%	0	1204	0	1204	0	1204	0	1204	0	1204	0	1204
0 017J	80 17	100%	0	6946	0	6946	0	6946	0	6946	0	6946	0	6946
0 017K	81 17	100%	0	13394	0	13394	0	13394	0	13394	0	13394	0	13394
0 018A	82 18	100%	0	2505	0	2505	0	2505	0	2505	0	2505	0	2505
0 018B	83 18	100%	0	0	0	0	0	0	0	0	0	0	0	0
0 018C	84 18	100%	0	0	0	0	0	0	0	0	0	0	0	0
0 018D	85 18	100%	0	1	0	1	0	1	0	1	0	1	0	1
0 018E	86 18	100%	0	0	0	0	0	0	0	0	0	0	0	0
0 018F	87 18	100%	0	0	0	0	0	0	0	0	0	0	0	0
0 018G	88 18	100%	0	3	0	3	0	3	0	3	0	3	0	3
0 020A	89 20	100%	656	1018	635	1018	617	1018	601	1018	607	1018	600	1018
0 020B	90 20	100%	0	8193	0	8193	0	8193	0	8193	0	8193	0	8193
0 020C	91 20	100%	335	565	322	565	310	565	301	565	304	565	301	565
0 020D	92 20	100%	596	1002	628	1002	663	1002	701	1002	708	1002	700	1002
0 020E	93 20	100%	822	193	812	193	805	193	802	193	809	193	800	193
0 020F	94 20	100%	100	394	99	394	99	394	100	394	101	394	100	394
0 020G	95 20	100%	256	50	270	50	285	50	301	50	304	50	301	50
0 020H	96 20	100%	179	306	218	306	259	306	301	306	304	306	301	306
0 020J	97 20	100%	3203	282	3160	282	3126	282	3106	282	3135	282	3101	282
0 020K	98 20	100%	724	1449	714	1449	705	1449	701	1449	708	1449	700	1449
0 020L	99 20	100%	3477	570	3407	570	3349	570	3307	570	3338	570	3302	570

CITY OF WASHINGTON D.C. (continued)

	COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0	020M	100	20	100%	1254	1683	1298	1683	1347	1683	1403	1683	1416	1683	1400	1683
0	020N	101	20	100%	2356	5834	2430	5834	2512	5834	2605	5834	2630	5834	2601	5834
0	021A	102	21	100%	1374	758	1344	758	1319	758	1302	758	1314	758	1300	758
0	021B	103	21	100%	729	1650	717	1650	707	1650	701	1650	708	1650	700	1650
0	021C	104	21	100%	95	171	96	171	97	171	100	171	100	171	100	171
0	021D	105	21	100%	563	544	540	544	519	544	501	544	505	544	500	544
0	021E	106	21	100%	847	289	829	289	813	289	802	289	809	289	800	289
0	021F	107	21	100%	206	2570	204	2570	201	2570	201	2570	203	2570	200	2570
0	021G	108	21	100%	251	912	234	912	216	912	201	912	203	912	200	912
0	021H	109	21	100%	1816	2218	1771	2218	1733	2218	1704	2218	1719	2218	1701	2218
0	021J	110	21	100%	302	1496	300	1496	299	1496	301	1496	304	1496	301	1496
0	021K	111	21	100%	1687	802	1653	802	1623	802	1603	802	1618	802	1601	802
0	021L	112	21	100%	970	1843	943	1843	920	1843	902	1843	910	1843	901	1843
0	021M	113	21	100%	2726	3740	2676	3841	2634	3939	2605	4039	2630	4039	2601	4039
0	022A	114	22	100%	1727	3519	1679	3519	1637	3519	1603	3519	1618	3519	1601	3519
0	022B	115	22	100%	1917	741	1871	741	1832	741	1804	741	1821	741	1801	741
0	022C	116	22	100%	2047	1701	2025	1701	2009	1701	2003	1701	2022	1701	2000	1701
0	022D	117	22	100%	1642	1730	1690	1730	1742	1730	1804	1730	1821	1730	1801	1730
0	022E	118	22	100%	3382	586	3378	586	3384	586	3407	586	3439	586	3402	586
0	022F	119	22	100%	3939	826	3879	826	3834	826	3807	826	3843	826	3802	826
0	022G	120	22	100%	1660	138	1634	138	1615	138	1603	138	1618	138	1601	138
0	022H	121	22	100%	451	42	432	42	415	42	400	42	404	42	400	42
0	022J	122	22	100%	89	2049	92	2049	95	2049	100	2049	100	2049	100	2049
0	023A	123	23	100%	812	810	839	1210	867	1610	902	1809	910	1809	901	1809
0	023B	124	23	100%	1450	143	1429	143	1412	143	1403	143	1416	143	1400	143
0	023C	125	23	100%	1751	226	1728	226	1712	226	1704	226	1719	226	1701	226
0	023D	126	23	100%	1100	348	1062	348	1029	348	1002	348	1012	348	1001	348
0	023E	127	23	100%	1276	576	1246	576	1221	576	1202	576	1213	602	1200	625
0	023F	128	23	100%	1244	903	1391	903	1543	903	1704	903	1719	1002	1701	1102
0	023G	129	23	100%	2648	371	2724	1070	2808	1571	2905	1772	2933	1871	2901	1871
0	023H	130	23	100%	1099	137	1062	137	1029	137	1002	137	1012	137	1001	137
0	023J	131	23	100%	1574	1014	1545	1014	1520	1014	1503	1014	1517	1014	1501	1014
0	023K	132	23	100%	451	134	432	134	415	134	400	134	404	134	400	134
0	024A	133	24	100%	2558	570	2530	570	2512	570	2505	570	2529	570	2501	570
0	024B	134	24	100%	1707	771	1665	771	1630	771	1603	771	1618	771	1601	771
0	024C	135	24	100%	487	9632	490	9632	494	9632	501	9632	505	9632	500	9632
0	024D	136	24	100%	1668	212	1607	212	1550	212	1503	212	1517	237	1501	262
0	024E	137	24	100%	0	10099	0	10099	0	10099	0	10298	0	10599	0	11099
0	024F	138	24	100%	0	283	0	283	0	283	0	283	0	283	0	283
0	024G	139	24	100%	573	78	580	78	589	78	601	78	607	78	600	78
0	024H	140	24	100%	0	2006	0	2006	0	2006	0	2006	0	2006	0	2006
0	024J	141	24	100%	164	1056	243	1056	320	1056	400	1056	404	1056	400	1056
0	024K	142	24	100%	760	50	737	50	717	50	701	50	708	50	700	50
0	025A	143	25	100%	879	68	849	68	824	68	802	68	809	68	800	68
0	025B	144	25	100%	675	1450	648	1651	623	1951	601	1951	607	1951	600	1951
0	025C	145	25	100%	959	822	935	822	916	822	902	822	910	822	901	822
0	025D	146	25	100%	75	280	82	480	91	780	100	780	101	780	100	780
0	025E	147	25	100%	0	390	0	390	0	390	0	390	0	892	0	1391
0	025F	148	25	100%	1348	895	1295	895	1245	895	1202	895	1213	1495	1200	2894
0	026A	149	26	100%	989	1412	923	1412	859	1412	802	1412	809	1511	800	1611

CITY OF WASHINGTON D.C. (continued)

	COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0	026B	150	26	100%	819	499	809	599	804	698	802	800	809	800	800	800
0	026C	151	26	100%	1204	662	1200	662	1197	1162	1202	1662	1213	1963	1200	2262
0	026D	152	26	100%	747	205	729	205	713	205	701	205	708	305	700	405
0	026E	153	26	100%	204	3526	202	3727	200	4026	201	4526	203	5026	200	6027
0	026F	154	26	100%	606	1805	735	1805	865	1805	1002	2204	1012	2603	1001	3804
0	026G	155	26	100%	22	330	15	330	7	330	0	330	0	330	0	330
0	026H	156	26	100%	3285	638	3247	638	3219	638	3206	638	3236	686	3202	738
0	026J	157	26	100%	750	579	764	579	781	779	802	979	809	1079	800	1178
0	026K	158	26	100%	2286	1847	2251	1847	2222	1847	2204	1847	2225	1947	2201	2049
0	026L	159	26	100%	471	69	478	69	489	69	501	69	505	95	500	119
0	026M	160	26	100%	1630	320	1581	320	1538	420	1503	521	1517	620	1501	620
0	026N	161	26	100%	3311	1142	3230	1142	3160	1642	3106	2143	3135	2443	3101	2643
0	027A	162	27	100%	1812	577	1768	577	1732	626	1704	676	1719	676	1701	676
0	027B	163	27	100%	806	911	801	911	799	961	802	1010	809	1010	800	1010
0	027C	164	27	100%	937	567	922	567	909	567	902	618	910	668	901	668
0	027D	165	27	100%	1146	211	1126	211	1111	211	1103	259	1113	310	1101	310
0	027E	166	27	100%	1680	206	1648	206	1621	206	1603	258	1618	308	1601	308
0	027F	167	27	100%	391	231	393	231	395	231	400	279	404	331	400	331
0	027G	168	27	100%	442	26	427	26	412	26	400	26	404	51	400	76
0	027H	169	27	100%	0	2895	0	2895	0	3896	0	3996	0	4096	0	4195
0	027J	170	27	100%	167	304	178	304	188	304	201	304	203	304	200	304
0	027K	171	27	100%	33	20	23	20	11	20	11	20	11	120	11	220
0	028A	172	28	100%	512	281	507	281	503	281	501	281	505	281	500	281
0	028B	173	28	100%	77	698	84	698	91	698	100	698	101	799	100	899
0	028C	174	28	100%	33	695	23	695	11	1195	0	1695	0	2695	0	4696
0	028D	175	28	100%	17	9981	11	9981	5	12581	0	13881	0	14981	0	15980
0	028E	176	28	100%	838	821	823	821	810	821	802	821	809	972	800	1323
0	028F	177	28	100%	913	1764	905	1764	901	1764	902	1764	910	1764	901	1865
0	028G	178	28	100%	447	832	430	832	414	832	400	832	404	832	400	832
0	028H	179	28	100%	567	105	610	105	654	155	701	204	708	204	700	204
0	028J	180	28	100%	638	296	622	296	611	296	601	296	607	394	600	495
0	028K	181	28	100%	0	89	0	89	0	89	0	89	0	89	0	89
0	028L	182	28	100%	0	294	0	995	0	4695	0	8396	0	12096	0	14396
0	029A	183	29	100%	0	583	0	583	0	583	0	583	0	583	0	583
0	029B	184	29	100%	233	387	222	387	210	387	201	486	203	587	200	587
0	029C	185	29	100%	0	1433	0	1433	0	1433	0	1433	0	1433	0	1433
0	029D	186	29	100%	1417	6211	1374	6512	1334	6811	1302	6811	1314	6811	1300	6811
0	029E	187	29	100%	1500	524	1461	524	1428	524	1403	825	1416	1025	1400	1025
0	029F	188	29	100%	263	394	375	394	487	394	601	394	607	444	600	495
0	029G	189	29	100%	2374	797	2442	797	2518	797	2605	996	2630	1297	2601	1797
0	029H	190	29	100%	967	452	941	452	919	553	902	653	910	753	901	953
0	029J	191	29	100%	69	1917	79	1917	89	1917	100	1917	100	1917	100	1917
0	029K	192	29	100%	23	5759	23	5860	23	7859	0	8859	0	9359	0	9859
0	029L	193	29	100%	0	0	0	0	0	0	0	0	0	0	0	0
0	030A	194	30	100%	246	192	229	192	214	192	201	192	203	192	200	192
0	030B	195	30	100%	760	672	737	672	717	672	701	672	708	672	700	672
0	030C	196	30	100%	0	1632	0	1632	0	1632	0	1632	0	1632	0	1632
0	030D	197	30	100%	754	3137	767	3137	782	3137	802	3137	809	3137	800	3137
0	030E	198	30	100%	556	276	535	276	516	276	501	276	505	276	500	276
0	030F	199	30	100%	792	701	758	701	728	701	701	701	708	701	700	701

CITY OF WASHINGTON D.C. (continued)

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0	030G	200	30 100%	762	802	739	802	718	902	701	1005	708	1005	700	1005
0	030H	201	30 100%	303	3134	335	3134	367	3234	400	3335	404	3335	400	3335
0	030J	202	30 100%	134	1387	122	1387	110	1387	100	1387	101	1387	100	1387
0	031A	203	31 100%	1650	371	1594	371	1544	371	1503	371	1517	371	1501	371
0	031B	204	31 100%	592	1996	625	2396	662	2496	701	2496	708	2496	700	2496
0	031C	205	31 100%	403	56	401	56	399	254	400	354	404	455	400	455
0	031D	206	31 100%	626	997	615	997	607	997	601	997	607	997	600	997
0	031E	207	31 100%	115	1265	110	1565	104	1565	100	1565	101	1565	100	1565
0	032A	208	32 100%	459	10	436	10	417	10	400	10	404	10	400	10
0	032B	209	32 100%	127	95	116	95	108	95	100	95	101	95	100	95
0	032C	210	32 100%	0	14	0	14	0	14	0	14	0	14	0	14
0	032D	211	32 100%	100	22	99	22	99	22	100	22	101	22	100	22
0	032E	212	32 100%	1541	405	1523	405	1509	405	1503	405	1517	405	1501	405
0	032F	213	32 100%	846	336	829	336	813	336	802	336	809	336	800	336
0	032G	214	32 100%	251	345	234	345	216	345	201	345	203	345	200	345
0	032H	215	32 100%	1265	529	1239	529	1217	529	1202	529	1213	529	1200	529
0	032J	216	32 100%	778	123	749	123	723	123	701	123	708	123	700	123
0	032K	217	32 100%	611	211	605	211	601	211	601	211	607	211	600	211
0	032L	218	32 100%	0	0	0	0	0	0	0	0	0	0	0	0
0	032M	219	32 100%	106	23	103	23	101	23	100	23	101	23	100	23
0	032N	220	32 100%	0	0	0	0	0	0	0	0	0	0	0	0
0	032P	221	32 100%	1178	254	1149	254	1122	254	1103	254	1113	254	1101	254
0	032Q	222	32 100%	199	0	199	0	199	0	201	0	203	0	200	0
0	032R	223	32 100%	115	0	110	0	104	0	100	0	101	0	100	0
0	032S	224	32 100%	420	109	411	109	404	109	400	109	404	109	400	109
0	033A	225	33 100%	1130	139	1116	139	1106	139	1103	139	1113	139	1101	139
0	033B	226	33 100%	515	110	509	310	504	310	501	310	505	310	500	310
0	033C	227	33 100%	1157	165	1134	165	1115	165	1103	165	1113	165	1101	165
0	033D	228	33 100%	604	689	600	689	599	689	601	689	607	689	600	689
0	033E	229	33 100%	502	887	500	887	499	887	501	887	505	887	500	887
0	033F	230	33 100%	647	430	629	430	614	430	601	430	607	430	600	430
0	033G	231	33 100%	1465	591	1438	591	1417	652	1403	652	1416	652	1400	652
0	033H	232	33 100%	2027	314	1979	314	1935	352	1904	352	1922	352	1901	352
0	033J	233	33 100%	1190	111	1157	111	1126	111	1103	111	1113	111	1101	111
0	033K	234	33 100%	625	602	614	602	607	602	601	602	607	602	600	602
0	033L	235	33 100%	1277	1206	1247	1206	1221	1206	1202	1206	1213	1206	1200	1206
0	033M	236	33 100%	1711	630	1668	630	1631	689	1603	689	1618	689	1601	689
0	033N	237	33 100%	3415	325	3366	325	3328	365	3307	365	3338	365	3302	365
0	033P	238	33 100%	343	8061	328	8061	313	8460	301	8660	304	8761	301	8861
0	033Q	239	33 100%	437	54	424	54	410	54	400	54	404	54	400	54
0	033R	240	33 100%	310	214	306	214	302	214	301	214	304	214	301	214
0	033S	241	33 100%	1228	634	1214	634	1204	634	1202	634	1213	634	1200	634
0	033T	242	33 100%	809	1542	870	1542	934	1643	1002	1742	1012	1842	1001	1842
0	033U	243	33 100%	268	271	278	271	288	271	301	271	304	271	301	271
0	033V	244	33 100%	690	511	691	511	694	511	701	511	708	511	700	511
0	033W	245	33 100%	187	15	191	15	195	15	201	15	203	15	200	15
0	034A	246	34 100%	1188	86	1155	86	1126	86	1103	86	1113	86	1101	86
0	034B	247	34 100%	1801	543	1862	543	1927	543	2003	644	2022	695	2000	744
0	034C	248	34 100%	1583	300	1583	300	1589	300	1603	300	1618	300	1601	300
0	034D	249	34 100%	510	51	505	51	502	51	501	51	505	51	500	51

CITY OF WASHINGTON D.C. (continued)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0	034E	250	34 100%	1107	285	1168	285	1232	285	1302	285	1314	285	1300	285
0	034F	251	34 100%	451	1826	500	1826	548	1826	601	1826	607	1826	600	1826
0	034G	252	34 100%	575	477	581	477	590	477	601	477	607	477	600	477
0	034H	253	34 100%	333	209	321	209	309	209	301	209	304	209	301	209
0	034J	254	34 100%	515	463	542	463	569	463	601	565	607	764	600	1064
0	034K	255	34 100%	1131	369	1117	369	1107	369	1103	369	1113	369	1101	369
0	034L	256	34 100%	545	322	528	322	513	322	501	322	505	322	500	322
0	034M	257	34 100%	517	113	510	113	504	113	501	113	505	113	500	113
0	034N	258	34 100%	292	98	294	98	296	98	301	98	304	98	301	98
0	034P	259	34 100%	665	150	641	150	620	150	601	150	607	150	600	150
0	034Q	260	34 100%	215	387	209	387	204	387	201	387	203	387	200	387
0	034R	261	34 100%	927	241	915	241	906	241	902	241	910	241	901	241
0	034S	262	34 100%	312	563	307	563	303	563	301	663	304	865	301	1165
0	035A	263	35 100%	316	171	309	171	304	171	301	171	304	171	301	171
0	035B	264	35 100%	491	223	492	223	496	223	501	223	505	223	500	223
0	035C	265	35 100%	335	3530	322	3530	310	3530	301	3530	304	3829	301	4528
0	035D	266	35 100%	183	1777	188	1777	193	1777	201	1777	203	2078	200	2778
0	035E	267	35 100%	913	183	973	284	1034	383	1103	383	1113	383	1101	383
0	035F	268	35 100%	610	605	604	605	601	605	601	605	607	605	600	605
0	035G	269	35 100%	1113	1234	1939	1234	2767	1234	3607	1234	3640	1234	3601	1234
0	036A	270	36 100%	936	318	988	318	1042	318	1103	318	1113	318	1101	318
0	036B	271	36 100%	956	83	900	83	849	83	802	83	809	83	800	83
0	036C	272	36 100%	995	614	993	614	995	614	1002	614	1012	714	1001	813
0	036D	273	36 100%	1484	309	1519	309	1556	309	1603	309	1618	408	1601	509
0	036E	274	36 100%	905	784	900	784	898	784	902	784	910	784	901	784
0	036F	275	36 100%	499	238	498	238	498	238	501	238	505	238	500	238
0	036G	276	36 100%	618	72	644	72	671	72	701	72	708	72	700	72
0	036H	277	36 100%	1421	496	1409	496	1403	496	1403	496	1416	496	1400	496
0	036J	278	36 100%	3145	754	3121	754	3106	754	3106	754	3135	754	3101	754
0	036K	279	36 100%	1328	313	1314	313	1306	313	1302	313	1314	313	1300	313
0	036L	280	36 100%	835	119	820	119	809	119	802	119	809	119	800	119
0	036M	281	36 100%	1303	1666	1397	1666	1496	1666	1603	1666	1618	1765	1601	1866
0	037A	282	37 100%	1340	36	1323	36	1309	36	1302	36	1314	36	1300	36
0	037B	283	37 100%	747	170	729	170	713	170	701	170	708	170	700	170
0	037C	284	37 100%	773	109	780	109	788	109	802	109	809	109	800	109
0	037D	285	37 100%	747	397	762	397	780	397	802	397	809	397	800	397
0	037E	286	37 100%	1036	86	1021	86	1008	86	1002	86	1012	86	1001	86
0	037F	287	37 100%	1511	508	1469	508	1432	508	1403	508	1416	508	1400	508
0	037G	288	37 100%	2548	168	2624	168	2707	168	2805	168	2831	219	2801	267
0	037H	289	37 100%	2229	384	2211	384	2204	384	2204	384	2225	434	2201	484
0	037J	290	37 100%	1769	72	1774	72	1783	72	1804	72	1821	72	1801	72
0	037K	291	37 100%	1085	40	1086	40	1091	40	1103	40	1113	40	1101	40
0	038A	292	38 100%	1962	474	1934	474	1914	474	1904	474	1922	474	1901	474
0	038B	293	38 100%	4963	567	4928	567	4907	567	4910	567	4956	567	4902	567
0	038C	294	38 100%	1308	417	1369	417	1431	417	1503	417	1517	417	1501	417
0	038D	295	38 100%	218	133	211	133	205	133	201	133	203	133	200	133
0	038E	296	38 100%	1149	128	1128	128	1112	128	1103	128	1113	128	1101	128
0	038F	297	38 100%	76	2609	151	2609	225	2609	301	2609	304	2609	301	3608
0	038G	298	38 100%	1424	417	1546	417	1669	417	1804	618	1821	817	1801	1418
0	038H	299	38 100%	767	3023	775	3023	786	3023	802	3023	809	3123	800	3321

CITY OF WASHINGTON D.C. (continued)

COG ZONE	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
0 038J	300 38	100%	2420	105	2340	105	2266	105	2204	105	2225	105	2201	105
0 038K	301 38	100%	1354	644	1332	745	1313	745	1302	745	1314	745	1300	745
0 038L	302 38	100%	1229	58	1182	58	1139	58	1103	58	1113	58	1101	58
0 038M	303 38	100%	110	102	106	102	102	102	100	102	101	102	100	102
0 038N	304 38	100%	1894	649	1888	649	1891	649	1904	649	1922	649	1901	649
0 038P	305 38	100%	2352	388	2361	388	2377	388	2405	388	2427	388	2401	388
0 038Q	306 38	100%	1580	493	1548	493	1522	493	1503	493	1517	493	1501	493
0 038R	307 38	100%	100	797	99	797	99	797	100	797	101	797	100	2797
0 038S	308 38	100%	1162	158	1271	158	1384	158	1503	158	1517	158	1501	158
0 038T	309 38	100%	1820	156	1842	156	1868	156	1904	156	1922	156	1901	156
0 038U	310 38	100%	3143	571	3253	571	3371	571	3506	571	3539	571	3501	571
0 038V	311 38	100%	1416	485	1439	485	1467	485	1503	485	1517	485	1501	485
0 038W	312 38	100%	1641	207	1621	207	1609	207	1603	207	1618	207	1601	207
0 039B	314 39	100%	1759	904	1701	904	1648	904	1603	904	1618	1003	1601	1105
0 039C	315 39	100%	0	6840	0	6840	0	6840	0	6840	0	6840	0	6840
0 039D	316 39	100%	2272	146	2243	146	2227	146	2197	146	2218	146	2194	146
0 039E	317 39	100%	301	107	299	107	299	107	301	107	304	107	301	107
0 039F	318 39	100%	0	9330	0	9829	0	11329	0	11829	0	11829	0	11829
0 039G	319 39	100%	0	3815	0	3815	0	3815	0	3815	0	3815	0	3815

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

ARLINGTON COUNTY

COG ZONE	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
3 311A	835 311	100%	0	192	0	192	0	192	0	192	0	192	0	192
3 311B	836 311	100%	1385	159	1398	159	1476	159	1602	159	1724	159	1846	159
3 311C	837 311	100%	198	56	198	56	198	56	198	56	198	56	198	56
3 311D	838 311	100%	0	6808	0	7288	0	7888	0	7888	0	7888	0	7888
3 311E	839 311	100%	130	5157	130	5157	130	5157	129	5157	130	5157	130	5157
3 312A	840 312	100%	195	9608	195	10457	195	10497	195	10497	195	10497	195	10820
3 312B	841 312	100%	2232	16226	2935	18599	3013	18599	3139	18699	3260	18699	3383	19345
3 312C	842 312	100%	1177	5681	1381	6697	1458	6697	1584	6697	1706	6697	1828	6697
3 321A	844 321	100%	0	308	0	512	78	1612	199	2082	321	2082	447	3051
3 321B	845 321	100%	156	6805	231	8578	309	8578	435	10198	557	11813	679	15043
3 321C	846 321	100%	1276	30592	1622	37307	2203	38457	2329	38457	2451	38457	2573	38457
3 322A	847 322	100%	2499	784	2495	2729	2573	3169	2903	3169	3229	3169	3554	3169
3 322B	848 322	100%	126	1132	331	3263	408	3263	535	3263	657	4717	778	4717
3 322C	849 322	100%	2519	1280	2684	1480	2762	1480	3003	1480	3239	1480	3476	1480
3 322D	850 322	100%	674	154	687	154	687	154	687	154	687	154	687	154

ARLINGTON COUNTY (continued)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
3 322E	851 322	100%	2030	1082	2033	1247	2033	1247	2033	1247	2033	1247	2033	1247
3 322F	852 322	100%	425	969	427	969	427	969	427	969	427	969	427	969
3 322G	853 322	100%	550	1161	551	1161	551	1161	551	1161	551	1161	551	1161
3 323A	854 323	100%	4185	1303	4271	1303	4271	1303	4271	1303	4271	1303	4271	1303
3 324A	855 324	100%	2085	1814	2138	2902	2138	3742	2138	3742	2138	3742	2138	3742
3 324B	856 324	100%	1036	1095	1040	1095	1040	1095	1040	1095	1040	1095	1040	1095
3 325A	857 325	100%	1970	5180	2566	9240	2643	9510	3265	9700	3883	11014	4501	12306
3 325B	858 325	100%	1062	1280	1296	2970	1374	3820	1499	3820	1622	3820	1744	3820
3 325C	859 325	100%	639	112	635	112	713	112	839	112	961	112	1082	112
3 325D	860 325	100%	146	880	142	1660	219	1670	346	1670	465	2074	589	2074
3 325E	861 325	100%	79	1161	75	2039	152	2039	280	2199	401	2199	522	2684
3 325F	862 325	100%	1313	458	1313	458	1313	458	1313	458	1313	458	1313	458
3 325G	863 325	100%	889	252	899	252	899	252	899	252	899	252	899	252
3 325H	864 325	100%	749	1032	689	1148	766	1148	892	1468	1014	1791	1136	2033
3 325J	865 325	100%	397	846	393	991	470	991	597	1481	719	1966	840	2612
3 325K	866 325	100%	69	1284	65	2045	142	3715	269	5065	390	5065	512	5065
3 325L	867 325	100%	309	366	330	366	330	366	330	366	330	366	330	366
3 325M	868 325	100%	800	580	1343	1764	1421	1764	1628	2714	1832	2714	2034	2714
3 325N	869 325	100%	168	4438	1217	7190	2076	10460	2202	13500	2324	15467	2445	15467
3 325P	870 325	100%	1047	1527	1074	3266	1151	5216	1278	5216	1400	6670	1521	6670
3 326A	871 326	100%	280	334	282	334	282	334	282	334	282	334	282	334
3 326B	872 326	100%	1599	713	1612	713	1612	713	1612	713	1612	713	1612	713
3 327A	873 327	100%	467	34	470	34	470	34	470	34	470	34	470	34
3 327B	874 327	100%	540	376	544	376	544	376	544	376	544	376	544	376
3 327C	875 327	100%	283	13	321	13	321	13	321	13	321	13	321	13
3 327D	876 327	100%	1645	307	1648	307	1648	307	1648	307	1648	307	1648	307
3 327E	877 327	100%	616	778	694	778	694	1768	694	1848	694	1848	694	1848
3 330A	878 330	100%	3350	842	3350	842	3350	842	3350	842	3350	842	3350	842
3 330B	879 330	100%	3471	900	3471	966	3471	966	3471	966	3471	966	3471	966
3 330C	880 330	100%	3004	3247	3533	4609	3607	5749	3736	5749	3861	5749	3983	5749
3 330D	881 330	100%	1334	746	1345	836	1345	836	1345	836	1345	836	1345	836
3 330E	882 330	100%	1750	216	1750	216	1750	216	1750	216	1750	216	1750	216
3 331A	883 331	100%	713	876	729	876	729	876	729	876	729	876	729	876
3 331B	884 331	100%	2534	359	2537	359	2537	359	2537	359	2537	359	2537	359
3 331C	885 331	100%	1445	392	1466	392	1466	392	1466	392	1466	392	1466	392
3 331D	886 331	100%	17	2731	17	3492	17	3892	17	3892	17	3892	17	3892
3 331E	887 331	100%	593	480	657	541	657	541	657	541	657	541	657	541
3 332A	888 332	100%	2190	1592	2261	1592	2338	2742	2465	3062	2587	3062	2708	3870
3 332B	889 332	100%	201	1516	201	5003	615	5063	742	5413	864	5413	985	5898
3 332C	890 332	100%	302	98	303	119	303	119	303	119	303	119	303	119
3 332D	891 332	100%	756	310	773	368	773	368	773	368	773	368	773	368
3 332E	892 332	100%	1454	217	1454	217	1454	217	1454	217	1454	217	1454	217
3 332F	893 332	100%	540	118	545	118	545	118	545	118	545	118	545	118
3 332G	894 332	100%	621	79	622	79	622	79	622	79	622	79	622	79
3 332H	895 332	100%	693	249	694	284	694	284	694	284	694	284	694	446
3 332J	896 332	100%	120	215	121	215	121	215	121	215	121	538	121	538
3 333A	897 333	100%	505	179	507	179	507	179	507	179	507	179	507	179
3 333B	898 333	100%	873	742	877	787	877	787	877	787	877	787	877	787
3 333C	899 333	100%	631	616	638	616	638	616	638	616	638	616	638	616

ARLINGTON COUNTY (continued)

COG ZONE	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
3 333D	900 333	100%	440	28	479	28	479	28	479	28	479	28	479	28
3 333E	901 333	100%	635	211	635	211	635	211	635	211	635	211	635	211
3 333F	902 333	100%	1045	3019	1052	3019	1052	3019	1052	3019	1052	3019	1052	3019
3 333G	903 333	100%	322	225	322	225	322	225	322	225	322	225	322	225
3 333H	904 333	100%	931	59	939	59	939	59	939	59	939	59	939	59
3 333J	905 333	100%	253	70	253	70	253	70	253	70	253	70	253	70
3 333K	906 333	100%	371	90	378	90	378	90	378	90	378	90	378	90
3 333L	907 333	100%	1019	422	1026	422	1026	422	1026	422	1026	422	1026	422
3 333M	908 333	100%	1043	158	1044	158	1044	158	1044	158	1044	158	1044	158
3 333N	909 333	100%	939	342	970	342	970	342	970	342	970	342	970	342
3 334A	910 334	100%	1532	374	1545	374	1545	374	1545	374	1545	374	1545	374
3 334B	911 334	100%	786	578	788	578	788	578	788	578	788	578	788	578
3 334C	912 334	100%	380	27	382	27	382	27	382	27	382	27	382	27
3 334D	913 334	100%	513	46	515	46	515	46	515	46	515	46	515	46
3 334E	914 334	100%	312	21	315	21	315	21	315	21	315	21	315	21
3 334F	915 334	100%	502	58	511	58	511	58	511	58	511	58	511	58

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

CITY OF FALLS CHURCH AND TOWN OF VIENNA

COG ZONE	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5 544A	998 544	100%	581	622	588	622	641	622	681	622	714	622	738	622
5 544B	999 544	100%	1372	602	1522	702	1577	802	1618	802	1698	802	1758	802
5 544C	1000 544	100%	745	116	905	116	949	116	981	116	1029	116	1065	116
5 544D	1001 544	100%	2616	2733	2923	2733	3012	4333	3079	5933	3233	6933	3349	7433
5 544J	1006 544	100%	1025	1505	1042	1505	1118	1505	1174	1505	1231	1505	1274	1505
5 544K	1007 544	100%	335	552	350	600	365	615	380	630	388	645	388	660
5 544L	1008 544	100%	898	1748	938	1900	978	1948	1018	1995	1038	2043	1038	2090
5 544M	1009 544	100%	794	4140	829	4500	864	4612	900	4725	917	4837	918	4950
5 544N	1010 544	100%	549	460	573	500	598	513	622	525	634	538	634	550
5 544P	1011 544	100%	270	166	303	166	503	166	652	166	676	166	694	166
5 544Q	1012 544	100%	138	552	144	600	150	615	156	630	159	645	159	660
5 544R	1013 544	100%	1786	1748	1866	1900	1945	1947	2024	1995	2064	2042	2063	2090
5 544S	1014 544	100%	1117	917	1133	917	1149	917	1160	917	1218	817	1261	917
5 545A	1015 545	100%	2471	6659	2859	7959	2859	8159	2859	8459	3006	8459	3117	8459
5 545B	1016 545	100%	2613	1459	3068	1659	3410	1959	3667	2159	3839	2159	3969	2159
5 545C	1017 545	100%	2176	970	2193	970	2226	970	2250	970	2367	970	2451	970
5 545D	1018 545	100%	1171	365	1207	365	1229	365	1244	365	1306	365	1354	365
5 545E	1019 545	100%	202	0	211	0	232	0	249	0	260	0	269	0
5 545F	1020 545	100%	489	181	682	181	717	181	743	181	779	181	807	181
5 546A	1021 546	100%	635	291	728	291	774	291	809	291	848	291	878	291
5 546B	1022 546	100%	697	404	707	504	736	604	756	604	794	604	822	604
5 546C	1023 546	100%	284	2460	352	4960	429	4960	485	4960	507	4960	523	4960
5 546D	1024 546	100%	1261	6266	1344	6566	1486	6666	1591	6666	1667	6666	1722	6666
5 546E	1025 546	100%	596	1491	649	1491	659	1591	667	1691	702	1691	726	1691
5 546F	1026 546	100%	1662	1926	1703	1926	1754	1926	1794	1926	1882	1926	1950	1926
5 546G	1027 546	100%	1630	534	1666	534	1757	534	1825	534	1913	734	1981	834
5 546H	1028 546	100%	951	213	998	213	1148	213	1261	213	1319	213	1363	213
5 546J	1029 546	100%	707	198	777	198	821	198	855	198	897	198	927	198

CITY OF FALLS CHURCH AND TOWN OF VIENNA (continued)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5	546K	1030 546	100%	716	1215	935	1215	1050	1215	1136	1215	1189	1215	1229	1215
5	546L	1031 546	100%	197	5781	224	5781	368	5781	476	5781	493	5781	507	5781
5	556B	1065 556	100%	327	155	348	255	405	255	448	255	468	255	484	355
5	556C	1066 556	100%	1814	1462	2021	1562	2311	1662	2528	1862	2644	1962	2731	1962
5	556H	1071 556	100%	288	7937	288	8637	312	9337	330	9437	345	9437	357	9437
5	556J	1072 556	100%	1137	6240	1142	6540	1428	6540	1643	6740	1714	7340	1768	8940
5	556K	1073 556	100%	1050	643	1067	643	1148	643	1209	643	1267	643	1310	643
5	557A	1075 557	100%	769	1655	812	1855	818	2055	822	2055	864	2055	895	2055
5	557B	1076 557	100%	978	3134	1032	3234	1057	3434	1076	3434	1130	3434	1171	3434
5	557C	1077 557	100%	386	219	459	219	487	219	506	219	531	219	549	219
5	557D	1078 557	100%	613	1583	961	1583	1216	1583	1406	1583	1466	1583	1510	1583
5	557E	1079 557	100%	386	264	586	264	753	264	878	264	916	264	943	264
5	558C	1082 558	100%	0	13182	0	19382	0	21182	0	22382	0	23182	0	23882
5	567A	1135 567	100%	289	20	341	20	347	20	352	30	370	20	383	20
5	567C	1137 567	100%	1187	791	2066	791	2196	791	2295	791	2408	791	2491	791
5	567E	1139 567	100%	2114	2574	2146	2774	2171	2874	2190	2874	2301	2874	2386	2874
5	567F	1140 567	100%	732	2278	741	2278	741	2278	741	2278	778	2278	806	2278
5	568C	1143 568	100%	923	269	1017	269	1157	269	1263	269	1318	269	1362	269
5	568D	1144 568	100%	1199	94	1278	94	1360	94	1421	94	1492	94	1543	94

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

ANDREWS AIR FORCE BASE

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2	256B	728 256	100%	2233	15149	2233	15200	2233	15399	2233	15499	2233	15600	2278	15750

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

THE PENTAGON, ARLINGTON CEMETERY, AND FORT MYERS

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
3	310A	834 310	100%	0	26444	0	26444	0	31444	0	31444	0	31444	0	31444

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

NATIONAL AIRPORT

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
3	320A	843 320	100%	0	12380	0	12380	0	12380	0	12380	0	12380	0	12380

Appendix F - CAZs in FCWA's service area

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)
FAIRFAX COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5 540A	1 540	100%	648	8705	676	9505	690	9605	701	9805	736	9805	762	9805
5 540B	2 540	100%	520	834	540	934	565	1034	584	1034	613	1034	635	1034
5 540C	3 540	100%	1221	440	1245	440	1320	440	1375	440	1442	440	1493	440
5 540D	4 540	100%	1307	3384	1519	5584	1940	6484	2257	6984	2351	7084	2423	7184
5 540E	5 540	100%	0	1048	0	1048	0	1048	0	1048	0	1048	0	1048
5 541A	6 541	100%	1365	272	1408	372	1416	472	1423	472	1495	472	1551	472
5 541B	7 541	100%	1028	2015	1074	2115	1121	2215	1156	2415	1213	2415	1255	2415
5 541C	8 541	100%	1380	2446	1487	2446	1534	2446	1570	2546	1647	2546	1707	2546
5 541D	9 541	100%	261	349	430	649	510	649	570	949	595	949	614	1049
5 541E	10 541	100%	1045	728	1723	728	2040	728	2277	728	2380	728	2456	728
5 541F	11 541	100%	964	578	974	578	1032	578	1076	578	1129	578	1170	578
5 542A	12 542	100%	2261	2103	2319	2103	2542	2103	2710	2103	2839	2103	2935	2103
5 542B	13 542	100%	4937	2579	5168	2579	5170	2579	5171	2579	5438	2579	5636	2579
5 542C	14 542	100%	2229	1003	2246	1003	2278	1003	2301	1003	2417	1003	2504	1003
5 542D	15 542	100%	1003	715	1016	715	1038	715	1055	715	1108	715	1149	715
5 542E	16 542	100%	1926	1177	1978	1177	2002	1177	2019	1177	2122	1177	2199	1177
5 543A	17 543	100%	3405	2936	3472	3136	3506	3336	3534	3636	3713	3636	3846	3636
5 543B	18 543	100%	4670	8610	5243	9110	5402	9310	5522	9410	5798	9610	6005	9810
5 543C	19 543	100%	526	4054	552	4154	584	4154	608	4354	638	4354	660	4354
5 543D	20 543	100%	1864	2027	2036	2327	2102	2427	2151	2627	2259	2627	2339	2627
5 543E	21 543	100%	906	1454	950	1454	1085	1454	1186	1454	1240	1454	1280	1454
5 543F	22 543	100%	1365	1252	1196	1552	1322	1552	1416	1552	1483	1552	1533	1552
5 544E	23 544	100%	2293	1377	2664	1977	2755	4077	2822	5677	2964	6677	3069	7177
5 544F	24 544	100%	779	44	788	44	802	44	811	44	852	44	883	44
5 544G	25 544	100%	1308	766	1316	766	1321	766	1324	766	1391	766	1441	766
5 544H	26 544	100%	634	1590	641	1590	678	1590	706	1590	739	1590	766	1590
5 550A	27 550	100%	4038	1932	4518	1932	4520	2032	4524	2432	4755	2532	4929	2832
5 550B	28 550	100%	1097	983	1303	983	1325	983	1343	983	1410	983	1461	983
5 550C	29 550	100%	4229	2432	4286	2432	4404	2432	4493	2432	4718	2432	4888	2432
5 550D	30 550	100%	4423	1541	4525	1541	4712	1541	4853	1541	5094	1541	5274	1541
5 550E	31 550	100%	1865	608	1889	608	1908	608	1921	608	2019	608	2093	608
5 550F	32 550	100%	533	316	540	316	571	316	594	316	623	316	645	316
5 551A	33 551	100%	1100	353	1162	353	1428	353	1628	353	1700	353	1754	353
5 551B	34 551	100%	1217	528	1263	528	1368	528	1448	528	1517	528	1569	528
5 551C	35 551	100%	2484	1329	2740	1429	2838	1429	2914	1429	3059	1429	3165	1429
5 551D	36 551	100%	1863	370	2467	570	2788	570	3031	770	3171	770	3277	770
5 552A	37 552	100%	553	428	1074	428	1149	428	1205	428	1263	428	1306	428
5 552B	38 552	100%	527	372	573	372	647	372	702	372	735	372	759	372
5 552C	39 552	100%	190	1451	243	1451	410	1451	536	1451	555	1451	570	1451
5 552D	40 552	100%	143	389	247	389	1307	389	2100	389	2159	489	2204	489
5 552E	41 552	100%	759	105	905	505	2318	705	3375	705	3482	705	3563	705
5 552F	42 552	100%	1022	751	1802	951	2470	2051	2971	3551	3092	4951	3183	6751

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)
FAIRFAX COUNTY (continued)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5 552G	43 552	100%	62	27	119	27	128	927	133	1827	140	2327	145	2627
5 552H	44 552	100%	1126	444	1431	444	1696	444	1894	444	1979	644	2043	1044
5 553A	45 553	100%	2638	2785	2657	3385	2680	4085	2698	4885	2833	5285	2937	5685
5 553B	46 553	100%	1340	1435	1500	1735	1902	2035	2205	2735	2299	3335	2371	3935
5 553C	47 553	100%	206	6750	207	7950	393	9650	532	10650	550	11550	564	12450
5 553D	48 553	100%	1003	607	1008	607	1056	607	1093	607	1146	707	1186	807
5 554A	49 554	100%	974	328	1197	328	1221	328	1241	328	1303	328	1350	328
5 554B	50 554	100%	2031	1902	2359	1902	2389	1902	2413	1902	2535	1902	2626	1902
5 554C	51 554	100%	914	208	1149	208	1236	208	1302	508	1364	508	1412	508
5 554D	52 554	100%	1368	289	2140	289	2140	289	2140	289	2250	289	2332	289
5 554E	53 554	100%	3202	1009	3217	1109	3217	1209	3217	1309	3383	1409	3506	1509
5 555A	54 555	100%	799	155	809	155	818	155	826	155	868	155	900	155
5 555B	55 555	100%	3127	223	3181	323	3235	423	3277	423	3442	423	3566	423
5 555C	56 555	100%	615	1588	631	1588	677	1588	712	1588	747	1588	773	1588
5 555D	57 555	100%	1413	673	1419	673	1418	673	1419	673	1491	673	1545	673
5 555E	58 555	100%	1337	4737	1385	4737	1385	4737	1385	4737	1456	4737	1509	4737
5 556A	59 556	100%	533	136	627	136	698	1036	751	2036	786	2236	812	2536
5 556D	60 556	100%	564	194	584	194	616	194	639	194	670	194	693	194
5 556E	61 556	100%	1878	707	1987	707	2048	707	2094	707	2200	707	2279	707
5 556F	62 556	100%	970	399	1038	399	1161	399	1252	399	1312	399	1355	399
5 556G	63 556	100%	2011	5481	2033	8281	2203	9581	2330	10181	2443	10181	2527	10181
5 556L	64 556	100%	424	818	439	818	445	818	449	818	472	818	488	818
5 558A	65 558	100%	1124	5003	1130	5603	1249	6103	1338	6203	1401	6403	1449	6503
5 558B	66 558	100%	4	16787	1	21587	1	26187	1	29187	1	31287	1	33387
5 558D	67 558	100%	0	1121	0	4321	0	5621	0	6321	0	6321	0	6321
5 559A	68 559	100%	823	142	1010	142	1338	142	1583	142	1651	142	1699	142
5 559B	69 559	100%	67	20	83	20	117	20	142	20	148	20	152	20
5 559C	70 559	100%	162	68	163	68	163	68	163	68	171	68	178	68
5 559D	71 559	100%	938	93	1077	93	1448	93	1727	93	1798	93	1852	93
5 559E	72 559	100%	157	143	212	143	259	143	295	143	308	143	317	143
5 560A	73 560	100%	5005	1494	6579	2094	6653	2094	6707	2094	7048	2094	7304	2094
5 560B	74 560	100%	1527	665	1548	665	1639	665	1706	665	1790	665	1851	665
5 560C	75 560	100%	1321	616	1469	616	1666	616	1814	616	1896	616	1959	616
5 560D	76 560	100%	958	431	988	431	1091	431	1169	431	1225	431	1265	431
5 560E	77 560	100%	2401	219	2442	219	2465	219	2481	219	2609	219	2702	219
5 560F	78 560	100%	1414	1840	1533	2140	1680	2340	1789	2440	1874	2440	1938	2440
5 560G	79 560	100%	993	390	999	390	1029	390	1052	390	1105	390	1144	390
5 560H	80 560	100%	455	141	466	141	648	141	784	141	816	141	840	141
5 562A	81 562	100%	2344	484	3007	484	3221	484	3382	484	3545	484	3669	484
5 562B	82 562	100%	375	5386	813	7186	813	7786	813	8286	855	8586	886	8886
5 562C	83 562	100%	393	2393	442	2693	739	2993	961	3193	997	3293	1024	3393
5 562D	84 562	100%	939	503	1156	1203	2226	1503	3028	1803	3134	2103	3213	2403
5 562E	85 562	100%	276	1116	278	1916	278	2416	278	3116	292	3516	303	3916
5 563A	86 563	100%	2624	189	3304	189	3454	589	3567	589	3743	589	3876	589

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)
FAIRFAX COUNTY (continued)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5 563B	87 563	100%	145	0	667	0	1214	0	1625	0	1683	0	1726	0
5 563C	88 563	100%	129	0	132	100	668	200	1070	200	1100	200	1122	200
5 563D	89 563	100%	1957	126	2291	126	2480	126	2622	126	2747	126	2842	126
5 563E	90 563	100%	586	23	751	23	805	23	845	23	887	23	917	23
5 563F	91 563	100%	1160	114	1333	114	1355	114	1370	114	1440	114	1492	114
5 564A	92 564	100%	2426	487	2472	1187	2474	1287	2477	1487	2604	1487	2700	1487
5 564B	93 564	100%	98	13	157	13	275	113	364	313	377	413	387	513
5 564C	94 564	100%	217	34	771	34	771	34	771	34	810	34	840	34
5 564D	95 564	100%	906	131	1136	131	1313	131	1445	131	1511	131	1561	131
5 564E	96 564	100%	1057	731	1162	731	1168	731	1172	731	1232	731	1276	731
5 564F	97 564	100%	2528	1037	3895	1337	3932	1337	3962	1337	4163	1337	4314	1337
5 565B	98 565	100%	3750	2201	4181	2201	4194	2201	4207	2201	4422	2201	4582	2201
5 565C	99 565	100%	1437	31	1965	31	2055	31	2124	31	2228	31	2307	31
5 565D	100 565	100%	854	181	984	181	1004	181	1018	181	1070	181	1108	181
5 565E	101 565	100%	2218	1173	2484	1173	2484	1173	2484	1173	2612	1173	2708	1173
5 565F	102 565	100%	1389	448	1517	448	1574	448	1618	448	1698	448	1758	448
5 566A	103 566	50%	175	1485	397	2585	442	2585	476	2585	498	2585	515	2585
5 567A	104 567	50%	289	20	341	20	347	20	352	20	370	20	383	20
5 567B	105 567	100%	597	214	840	314	988	314	1098	314	1149	314	1186	314
5 567C	106 567	10%	210	88	230	88	244	88	255	88	268	88	277	88
5 567D	107 567	100%	1056	440	1401	440	1794	440	2089	540	2179	840	2245	1140
5 568A	108 568	100%	655	134	902	134	994	134	1063	134	1114	134	1151	134
5 568B	109 568	100%	423	103	502	103	563	103	608	103	637	103	658	103
5 568E	110 568	100%	245	460	252	460	346	460	417	460	434	460	447	460
5 569B	111 569	100%	629	571	646	571	802	571	919	571	958	571	988	571
5 569C	112 569	100%	1869	420	2023	1220	2087	2020	2137	2620	2243	3020	2323	3320
5 569D	113 569	100%	729	869	835	869	946	869	1028	869	1075	869	1111	869
5 570B	114 570	100%	97	103	100	103	136	103	163	103	170	103	175	103
5 570C	115 570	100%	738	110	1282	110	1390	110	1471	110	1541	110	1595	110
5 570D	116 570	100%	740	478	745	478	1545	878	2145	878	2218	978	2273	1078
5 570E	117 570	100%	661	419	847	419	1782	419	2482	419	2567	419	2629	419
5 572A	118 572	50%	170	36	247	36	320	36	373	36	389	36	401	36
5 572D	119 572	40%	360	156	535	156	594	156	639	156	669	156	691	156
5 572E	120 572	100%	702	468	1150	468	1919	468	2496	568	2589	568	2658	568
5 573A	121 573	50%	112	38	133	38	336	38	490	38	505	38	517	38
5 573B	122 573	50%	42	36	59	36	289	136	461	336	474	386	484	386
5 573D	123 573	100%	841	131	1042	431	3586	831	5490	1931	5654	2631	5777	3631
5 573E	124 573	100%	119	272	2570	972	4989	1472	6800	2172	7037	2472	7215	2672
5 573F	125 573	100%	118	215	186	415	526	515	778	1115	803	1315	820	1515
5 573G	126 573	100%	3	277	3	277	440	877	767	2377	786	3377	801	5377
5 573H	127 573	100%	2471	441	4603	441	6718	1641	8302	1941	8630	2041	8878	2141
5 573J	128 573	100%	387	112	984	112	1584	112	2034	112	2110	112	2167	112
5 574A	129 574	100%	849	280	2736	1080	3517	2380	4102	3280	4276	3880	4406	4480
5 574B	130 574	100%	2551	845	4203	3145	5191	7745	5932	12145	6190	16945	6384	20645
5 574C	131 574	100%	288	545	376	545	1928	1845	3090	4745	3176	7145	3241	8445

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)
FAIRFAX COUNTY (continued)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5 574D	132 574	100%	29	4588	26	7188	445	9288	758	12888	777	15588	792	16788
5 574E	133 574	100%	571	251	1146	251	2442	3451	3412	4451	3528	5151	3615	5651
5 574F	134 574	100%	749	109	792	109	1013	109	1177	109	1228	109	1265	109
5 574G	135 574	100%	934	136	1062	136	1107	136	1142	136	1198	136	1241	136
5 575A	136 575	100%	12	0	19	0	23	0	25	0	26	0	27	0
5 575B	137 575	100%	941	1132	1462	3132	1802	6532	2056	9932	2146	12632	2214	16532
5 575C	138 575	100%	1834	886	2320	2686	2479	6386	2598	10086	2724	12686	2819	16486
5 575D	139 575	100%	80	1609	162	3409	193	5409	218	7809	227	9609	234	12209
5 575E	140 575	100%	1575	819	2989	1119	3552	1119	3975	1119	4153	1119	4287	1119
5 576A	141 576	100%	3353	3389	3811	3689	4104	4189	4323	4189	4530	4189	4686	4289
5 576B	142 576	100%	2537	3446	3057	4146	3080	4546	3097	4546	3256	4546	3374	4546
5 576C	143 576	100%	2176	206	2450	206	2463	206	2472	206	2598	206	2692	206
5 576D	144 576	100%	681	74	738	74	760	74	777	74	815	74	844	74
5 576E	145 576	100%	2652	425	3186	2325	3210	3225	3228	3525	3392	3525	3516	3525
5 576F	146 576	100%	241	2020	294	2020	319	2020	338	2020	354	2020	366	2020
5 577C	147 577	100%	952	134	1017	1034	1141	1834	1233	2534	1291	3134	1334	3734
5 577D	148 577	100%	0	47	0	2947	0	5547	0	8447	0	10047	0	11447
5 577E	149 577	100%	58	73	52	2473	590	4873	992	8573	1018	9973	1038	11173
5 577F	150 577	100%	1472	659	2221	659	2466	659	2651	659	2775	659	2870	659
5 577G	151 577	100%	1963	5985	2123	5985	2294	6385	2423	6385	2539	6385	2626	6385
5 577J	152 577	100%	2	117	1	3017	1	6817	1	10517	1	12217	1	14317
5 578B	153 578	100%	1014	66	1388	66	1842	66	2182	66	2272	66	2341	66
5 578C	154 578	100%	741	946	3384	568	3775	1346	4068	1346	4259	1346	4402	1346
5 578D	155 578	100%	319	262	572	262	2006	262	3080	262	3172	262	3240	262
5 578E	156 578	100%	252	77	298	77	447	77	558	77	579	77	596	77

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

LOUNDOUN COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
6 671A	1 671	100%	14	356	14	565	14	817	14	1114	14	1806	14	2600
6 671B	2 671	100%	29	1295	29	1714	29	2215	29	2811	29	3502	29	4296
6 671C	3 671	100%	23	585	110	691	208	815	319	965	441	1137	574	1336
6 671D	4 671	100%	409	446	496	865	594	1367	705	1962	827	2654	960	3447
6 671E	5 671	100%	2431	1388	2518	1493	2616	1618	2727	1767	2849	1940	2982	2138
6 671F	6 671	100%	2326	1789	2673	2416	3067	3422	3177	4611	3299	5993	3433	7583
6 672A	7 672	100%	4241	749	6871	1377	8870	2634	10778	4118	12036	5848	13413	7834
6 680A	8 680	100%	155	61	190	82	229	107	273	137	322	310	376	508
6 680B	9 680	100%	91	60	100	81	110	106	121	136	133	170	146	210
6 680C	10 680	100%	217	158	226	367	236	618	247	916	259	1435	272	2030
6 681B	11 681	60%	97	81	118	94	141	244	167	422	417	630	930	868
6 681C	12 681	60%	44	18	50	31	56	46	62	64	289	167	778	286
6 681D	13 681	100%	66	251	92	668	122	1171	155	1766	191	2630	231	3623
6 681E	14 681	100%	72	30	419	135	813	386	1696	683	2673	1375	3742	2169
6 681F	15 681	100%	93	230	874	335	2253	712	3797	1157	5507	1675	6977	2271
6 681G	16 681	100%	71	350	852	769	2231	1398	3775	2139	5485	3005	6955	3997
6 682D	17 682	100%	4	487	351	907	745	1911	1186	3099	1553	4483	1954	6072

PRINCE WILLIAM COUNTY SERVICE AUTHORITY - EASTERN PW COUNTY SERVICE AREA

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
7 770A	1251	770	100%	2373	2389	2500	2989	2500	3190	2500	3348	2500	3513	2500	3689
7 770B	1252	770	100%	1698	2741	1751	3350	1751	3980	1751	4731	1751	5622	1751	6683
7 770C	1253	770	100%	1683	1803	2623	2403	3398	2503	3559	2504	3698	2714	3841	2968
7 770D	1254	770	100%	2401	2276	2401	2451	2401	2669	2602	2770	2776	2872	2956	2974
7 771A	1255	771	100%	1052	96	3147	566	5667	959	6227	1544	6412	2485	6412	4001
7 771B	1256	771	100%	2444	671	3738	1670	4112	1671	4596	2026	5012	3040	5444	4057
7 771C	1257	771	100%	178	507	187	3507	250	4117	250	4833	250	5676	250	6663
7 771D	1258	771	100%	1330	1047	2108	1348	2189	1346	2189	2500	2189	3666	2189	4835
7 771E	1259	771	100%	3765	185	4281	1186	4590	1414	4590	1485	4590	1559	4590	1637
7 772A	1260	772	100%	1003	168	1169	211	1794	309	2197	309	2544	309	2904	309
7 772C	1262	772	10%	267	50	438	65	558	87	678	97	693	107	708	117
7 772D	1263	772	10%	245	83	300	213	300	253	300	300	300	356	300	423
7 773C	1267	773	100%	422	111	688	115	1188	180	1590	196	1938	212	2298	227
7 773D	1268	773	100%	441	46	741	66	991	90	1393	190	1741	292	2101	394
7 780A	1286	780	100%	207	121	669	146	1111	201	1406	344	1450	486	1500	628
7 780B	1287	780	100%	931	789	1076	989	1604	989	1604	990	1604	1066	1604	1143
7 780D	1289	780	100%	2178	685	2554	706	2654	789	2754	789	2854	789	2954	789
7 780E	1290	780	100%	247	53	513	53	938	165	1563	214	2188	266	2813	316
7 780F	1291	780	100%	1142	54	1674	90	3113	117	4552	167	5991	218	7430	268
7 781B	1293	781	100%	226	76	376	76	556	76	576	76	590	76	608	76
7 781C	1294	781	100%	2487	58	5445	279	7477	278	7500	279	7520	279	7540	279

PRINCE WILLIAM COUNTY SERVICE AUTHORITY - WESTERN PW COUNTY SERVICE AREA

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
7	773A	1265 773	90%	168	60	273	60	441	85	622	130	779	176	941	222
7	773B	1266 773	40%	209	23	276	37	401	59	481	69	551	79	623	89
7	773E	1269 773	80%	717	167	1098	220	1498	336	1756	513	1978	784	2208	1200
7	774A	1270 774	100%	1198	582	1342	777	1635	887	1635	1064	1635	1242	1635	1420
7	774B	1271 774	100%	819	432	850	608	1500	771	1600	872	1650	974	1650	1076
7	775B	1282 775	100%	25	227	25	627	31	1050	31	1751	31	2900	31	4866
7	775C	1283 775	100%	1573	2922	2875	6523	3517	7257	4217	8075	4417	8986	4617	10000
7	775D	1284 775	100%	2174	1726	3313	2226	3313	2226	3313	2226	3313	2368	3313	2520
7	775E	1285 775	100%	2156	1703	2289	2203	2677	2303	2700	2303	2725	2303	2750	2303
7	782D	1298 782	40%	463	118	636	160	697	226	798	286	898	347	1000	408
7	783A	1300 783	100%	255	58	555	78	1150	201	1191	500	1225	1250	1261	2524
7	783C	1302 783	90%	399	33	639	33	1088	33	1178	33	1268	33	1358	33
7	783D	1303 783	100%	141	997	157	1559	743	2108	1329	3381	1915	4656	2501	5930
7	783E	1304 783	100%	83	1397	99	1442	130	1938	151	2603	168	3497	186	4302
7	784A	1305 784	100%	693	126	792	144	900	148	1000	148	1100	148	1200	148
7	784B	1306 784	100%	221	50	287	73	569	209	770	255	944	300	1124	346
7	784C	1307 784	100%	237	117	304	187	429	402	509	502	579	605	651	704
7	784D	1308 784	100%	458	353	700	395	900	532	1100	634	1300	734	1500	837
7	784E	1309 784	100%	312	184	600	236	800	318	1000	444	1200	572	1400	699
7	784F	1310 784	100%	36	14	36	654	36	1288	36	2367	36	4352	36	7927
7	784G	1311 784	100%	270	45	370	200	670	470	1070	1100	1220	2563	1370	5578
7	784H	1312 784	100%	430	13	568	35	700	35	800	35	900	35	1000	35
7	784J	1313 784	100%	222	48	255	69	380	97	501	122	605	148	712	173

VIRGINIA-AMERICAN WATER COMPANY - ALEXANDRIA SERVICE AREA

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
4 430A	916 430	121	1069	7146	1071	11209	1072	12498	1075	13553	1076	13553	1181	13729
4 430B	917 430	121	856	6094	887	6426	890	6427	892	6426	901	6427	903	6427
4 430C	918 430	121	795	2995	797	3375	883	4164	885	4165	887	4354	889	4794
4 430D	919 430	121	966	281	968	429	970	1153	972	1153	1070	1153	1072	1153
4 430E	920 430	121	1112	384	1115	383	1117	383	1118	383	1120	385	1122	384
4 431A	921 431	122	696	257	699	297	702	1211	704	1211	707	1211	710	1211
4 431B	922 431	122	124	465	243	1609	246	3586	249	4486	251	5146	254	5147
4 431C	923 431	122	448	397	453	396	456	397	459	657	462	658	465	657
4 431D	924 431	122	512	2218	515	2414	518	2414	521	2416	534	2415	546	2414
4 431E	925 431	122	700	1905	703	2743	706	3727	709	4940	712	4939	715	4940
4 431F	926 431	122	355	1354	355	4613	355	5893	355	5893	355	5893	355	5892
4 431G	927 431	122	0	1010	0	1009	0	2571	0	4331	0	5095	0	5094
4 431H	928 431	122	417	1269	420	1634	422	1663	425	1664	428	1664	431	1665
4 431J	929 431	122	292	306	294	307	293	306	299	306	302	306	305	306
4 431K	930 431	122	540	351	543	351	546	351	549	351	552	352	554	351
4 432A	931 432	123	2255	201	2269	998	2273	998	2277	998	2280	998	2284	997
4 432B	932 432	123	1587	1340	1685	1340	1688	1340	1690	1340	1694	1340	1697	1340
4 432C	933 432	123	447	612	450	612	453	1313	1034	2012	1037	2012	1040	2012
4 432D	934 432	123	769	49	772	49	776	49	780	49	784	49	788	49
4 432E	935 432	123	1384	311	1387	311	1390	312	1392	311	1396	312	1399	311
4 432F	936 432	123	1225	578	1237	778	1249	776	1262	777	1274	777	1287	777
4 432G	937 432	123	1126	1419	1138	1420	1150	1440	1163	1442	1176	1440	1188	1441
4 432H	938 432	123	1066	469	1078	577	1091	577	1103	578	1116	578	1129	577
4 432J	939 432	123	436	122	440	122	444	122	447	123	451	123	453	123
4 432K	940 432	123	760	1229	764	1230	1059	1409	1063	1409	1067	1793	1070	1792
4 432L	941 432	123	387	90	401	89	404	90	408	90	412	90	416	90
4 432M	942 432	123	396	345	400	345	404	345	408	345	412	345	416	345
4 432N	943 432	123	757	54	760	53	762	54	775	55	778	54	781	53
4 432P	944 432	123	338	626	351	627	364	626	376	626	388	626	401	625
4 432Q	945 432	123	538	735	538	1491	538	6026	538	10563	538	12363	538	14163
4 432R	946 432	123	1014	33	1017	33	1020	33	1023	33	1026	33	1029	33
4 440A	947 440	124	962	970	991	970	1013	971	1034	970	1055	970	1077	970
4 440B	948 440	124	585	566	606	567	628	566	649	566	670	566	692	566
4 440C	949 440	124	440	515	444	515	448	515	452	515	455	516	459	516
4 440D	950 440	124	1734	332	1737	515	1804	515	1808	515	1812	515	1815	515
4 440E	951 440	124	6	1776	6	1776	6	3212	6	3682	6	4882	483	6082
4 440F	952 440	124	4	5212	4	5212	4	6842	4	9015	4	11147	4	11146
4 440G	953 440	124	0	141	0	1556	0	3049	0	3919	478	5360	478	5359
4 440H	954 440	124	12	1077	12	1104	12	1104	12	2301	12	3500	12	4698
4 440J	955 440	124	0	80	0	1167	0	2256	0	3344	0	3344	0	3344

VIRGINIA-AMERICAN WATER COMPANY - ALEXANDRIA SERVICE AREA (continued)

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
4 440K	956 440	124	1208	1569	1229	1604	1251	1603	1272	1603	1293	1602	1315	1603
4 440L	957 440	124	711	414	742	414	764	910	786	910	807	910	829	910
4 441A	958 441	125	2633	1186	2655	1315	2677	1316	2698	1317	2720	1316	2742	1316
4 441B	959 441	125	3125	2330	3147	2329	3168	2329	3190	2330	3211	2330	3233	2331
4 441C	960 441	125	22	2797	26	3178	30	3178	34	3178	38	3178	43	3177
4 441D	961 441	125	2415	743	2419	743	3033	743	3037	743	3041	743	3045	743
4 441E	962 441	125	3450	2562	3720	3102	3720	3102	3720	3101	3720	3102	3720	3103
4 441F	963 441	125	2093	1183	2201	1683	2550	3337	2550	3337	2550	3337	2550	3338
4 441G	964 441	125	773	1872	773	1872	773	1872	773	2420	773	2420	773	2420
4 441H	965 441	125	15	847	15	846	15	848	15	2260	15	3250	15	3251
4 441J	966 441	125	15	3367	15	3367	15	3367	15	3367	15	3367	15	3367
4 441K	967 441	125	16	3944	37	3944	57	3944	78	3943	98	3944	119	3944
4 441L	968 441	125	0	679	21	861	41	1582	62	2195	82	4608	103	4609
4 442A	969 442	126	434	1804	455	1803	477	1803	498	1804	520	1805	541	1804
4 442B	970 442	126	1663	1562	1685	1562	1707	1562	1728	1563	1750	1562	1772	1562
4 442C	971 442	126	1702	1423	2032	2761	2302	5599	2573	7898	2925	7897	2925	7897
4 442D	972 442	126	2782	469	2790	469	2790	2269	2790	4070	2790	4068	2790	4069
4 442E	973 442	126	1279	839	1279	1612	1279	2908	1279	4204	1512	5500	1745	5500
4 442F	974 442	126	2544	371	2549	531	2549	531	2887	530	2887	531	2887	531
4 442G	975 442	126	218	25	240	25	261	25	282	25	303	25	325	25

VIRGINIA-AMERICAN WATER COMPANY - DALE CITY SERVICE AREA

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

COG ZONE	COG NAME	DIST	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
7 772B	1261	772	184	2325	235	3136	337	3636	390	4200	543	4686	695	5328	848
7 772C	1262	772	90%	2400	446	3945	582	5025	779	6105	871	6240	962	6375	1054
7 772D	1263	772	90%	2203	745	2700	1915	2700	2274	2700	2698	2700	3206	2700	3806
7 772E	1264	772	183	3154	875	3353	1375	3853	1721	4336	2154	4753	2696	5185	3375

TOWN OF HERNDON

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5	577A	1195 577	164	918	389	1148	389	1425	389	1633	489	1704	689	1757	789
5	577B	1196 577	164	1390	1159	1732	1159	1852	1159	1943	1159	2037	1159	2107	1159
5	577H	1202 577	164	1390	738	1732	2938	1852	3538	1943	4038	2037	4438	2107	4738
5	577K	1204 577	164	918	1681	1148	1981	1425	1981	1633	1981	1704	1981	1757	1981

FORT BELVOIR

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5	561A	1097 561	145	247	2205	382	2205	588	2205	742	2205	771	2205	793	2205
5	561B	1098 561	145	0	0	0	0	0	0	0	0	0	0	0	0
5	561C	1099 561	145	0	12856	0	12856	0	12856	0	12856	0	12856	0	12856

DULLES AIRPORT

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
5	575A	1184 575	162	0	662	0	1062	0	1562	0	2162	0	2662	0	3462
6	670A	1212 670	167	0	5553	0	8588	0	10474	0	12702	0	13739	0	14929

LORTON CORRECTIONAL FACILITY

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (CAZ)

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 POP	1985 EMPLOY	1990 POP	1990 EMPLOY	1995 POP	1995 EMPLOY	2000 POP	2000 EMPLOY	2005 POP	2005 EMPLOY	2010 POP	2010 EMPLOY
5	570A	1151 570	155	3543	1033	4642	1033	4631	1033	4621	1033	4588	1033	4587	1033

Appendix G - CAZs in WSSC's service area

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE
MONTGOMERY COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1 140A	1 140	100%	955	174	981	198	996	210	996	227	1006	245	1026	261
1 140B	2 140	100%	669	104	672	120	672	125	672	135	672	145	672	154
1 140C	3 140	100%	517	87	518	99	518	104	518	113	518	122	518	128
1 140D	4 140	100%	1040	3563	1071	4093	1086	4286	1086	4619	1091	4943	1101	5230
1 140E	5 140	100%	1422	4107	1427	4760	1457	5039	1457	5488	1462	5907	1472	6284
1 140F	6 140	100%	1001	217	1065	257	1075	281	1075	313	1075	343	1075	367
1 140G	7 140	100%	731	111	806	127	821	135	821	146	831	158	853	168
1 140H	8 140	100%	466	218	516	250	566	263	566	287	566	307	566	325
1 140J	9 140	100%	831	257	856	298	886	315	886	343	886	370	888	394
1 141A	10 141	100%	824	407	829	471	829	498	829	542	829	583	831	619
1 141B	11 141	100%	3742	9375	3742	10997	3777	11731	3827	12831	3827	13827	3829	14718
1 141C	12 141	100%	961	403	961	461	961	486	961	529	961	570	961	609
1 141D	13 141	100%	428	538	428	634	428	676	428	737	428	792	430	840
1 141E	14 141	100%	808	949	810	1087	815	1139	815	1231	815	1320	820	1402
1 141F	15 141	100%	1468	332	1473	381	1473	400	1473	434	1473	468	1473	496
1 142A	16 142	100%	398	109	415	126	428	131	428	143	428	153	430	162
1 142B	17 142	100%	1123	550	1138	629	1158	659	1158	713	1170	765	1172	812
1 142C	18 142	100%	1393	516	1423	592	1433	620	1433	671	1433	719	1435	763
1 142D	19 142	100%	747	1443	752	1654	754	1738	754	1882	754	2023	756	2150
1 142E	20 142	100%	445	133	448	153	448	160	448	174	448	188	449	199
1 142F	21 142	100%	297	89	299	101	299	107	299	117	299	125	300	134
1 142G	22 142	100%	1757	2399	1767	2790	1767	2944	1767	3188	1767	3417	1769	3615
1 142H	23 142	100%	1901	464	1916	538	1921	568	1921	617	1921	663	1923	705
1 143A	24 143	100%	1916	6795	2016	7817	2121	8200	2121	8852	2121	9482	2121	10042
1 143B	25 143	100%	1062	14112	1537	17902	1777	20068	2127	22600	2327	24641	2327	26391
1 143C	26 143	100%	2157	9537	2157	11537	2157	12531	2157	13835	2265	14956	2265	15917
1 144A	27 144	100%	298	14035	303	16084	303	16880	303	18271	303	19623	303	20839
1 144B	28 144	100%	79	4129	79	4731	79	4964	79	5373	79	5770	79	6126
1 144C	29 144	100%	2483	1650	2608	1890	2653	1984	2653	2146	2653	2305	2653	2447
1 144D	30 144	100%	334	181	334	207	334	218	334	235	334	251	334	268
1 144E	31 144	100%	657	591	662	680	663	716	663	777	663	835	665	887
1 144F	32 144	100%	1155	292	1206	339	1210	360	1210	395	1210	427	1219	454
1 145A	33 145	100%	605	557	645	638	665	669	670	724	670	777	670	825
1 145B	34 145	100%	2564	571	2587	681	2593	747	2602	835	2614	914	2635	985
1 145C	35 145	100%	1710	381	1724	455	1728	497	1734	558	1742	610	1756	656
1 145D	36 145	100%	96	2028	106	2352	106	2495	106	2723	106	2937	106	3128
1 145E	37 145	100%	816	1706	846	1987	846	2114	856	2313	856	2495	858	2660
1 145F	38 145	100%	1128	1416	1171	1639	1176	1733	1176	1885	1176	2026	1176	2153
1 145G	39 145	100%	134	165	164	190	169	200	169	218	169	236	171	251
1 145H	40 145	100%	868	651	878	808	883	900	883	1010	883	1105	885	1187
1 146A	41 146	100%	2768	6453	2770	7713	3170	8495	3770	9586	5270	10553	5820	11432
1 146B	42 146	100%	2264	15523	2266	18578	2466	20262	2766	22580	3566	24612	4066	26411
1 146C	43 146	100%	106	6329	107	7503	207	8229	1307	9274	1707	10196	1707	11044
1 147A	44 147	100%	2132	725	2167	839	2172	900	2187	995	2192	1083	2199	1165
1 147B	45 147	100%	810	803	820	927	820	976	825	1059	825	1138	827	1209
1 147C	46 147	100%	2240	746	2260	854	2265	897	2275	971	2278	1043	2281	1108
1 147D	47 147	100%	1289	444	1296	511	1301	543	1301	594	1304	642	1307	686
1 147E	48 147	100%	1524	573	1537	657	1542	693	1552	755	1555	813	1558	865
1 147F	49 147	100%	2757	2038	2762	2347	2762	2471	2762	2681	2765	2880	2768	3059

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
MONTGOMERY COUNTY

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1	147G	50 147	100%	332	97	335	111	335	117	385	127	425	136	425	145
1	147H	51 147	100%	656	186	658	214	663	224	673	243	673	261	673	277
1	147J	52 147	100%	2453	353	2528	405	2543	425	2543	458	2543	493	2543	522
1	147K	53 147	100%	1405	397	1488	456	1508	481	1528	524	1528	564	1528	600
1	147L	54 147	100%	1479	259	1481	298	1486	312	1496	339	1501	365	1501	386
1	147M	55 147	100%	2095	262	2100	302	2105	317	2110	345	2113	371	2116	394
1	150A	56 150	100%	362	347	387	417	402	457	412	508	462	552	467	592
1	150B	57 150	100%	431	462	631	530	981	557	1381	604	1381	648	1381	688
1	150C	58 150	100%	436	442	461	506	481	530	521	573	531	613	616	652
1	150D	59 150	100%	554	55	779	62	829	66	924	70	934	76	934	81
1	150E	60 150	100%	80	1657	210	1898	410	1995	450	2162	450	2324	450	2470
1	151A	61 151	100%	1219	341	1359	390	1559	410	1579	445	1599	479	1599	507
1	151B	62 151	100%	502	390	607	446	782	470	782	509	787	547	787	580
1	151C	63 151	100%	1122	480	1212	549	1312	575	1377	622	1402	667	1532	708
1	151D	64 151	100%	1699	4156	1749	4845	1759	5145	1759	5609	1764	6039	1784	6420
1	151E	65 151	100%	451	210	526	239	526	251	526	271	531	292	531	309
1	151F	66 151	100%	451	124	501	141	621	149	661	160	666	171	671	182
1	151G	67 151	100%	1351	116	1581	133	1596	139	1626	151	1636	161	1641	171
1	151H	68 151	100%	209	276	299	335	434	369	434	410	434	448	434	481
1	151J	69 151	100%	1333	1111	1348	1368	1358	1509	1368	1684	1373	1831	1373	1956
1	151K	70 151	100%	502	918	552	1062	552	1123	552	1220	552	1312	552	1396
1	152A	71 152	100%	8	11024	8	13925	8	15661	233	17737	368	19410	1143	20857
1	152B	72 152	100%	1051	368	1056	424	1166	448	1361	486	2161	522	2181	554
1	152C	73 152	100%	742	985	750	1138	800	1201	800	1304	810	1401	810	1488
1	152D	74 152	100%	581	349	581	400	586	418	586	453	586	486	586	516
1	152E	75 152	100%	1120	1776	1130	2266	1140	2556	1150	2895	1160	3164	1165	3387
1	152F	76 152	100%	520	4201	525	4923	530	5240	530	5719	530	6150	530	6537
1	152G	77 152	100%	338	2721	340	3244	342	3503	342	3866	342	4185	342	4463
1	152H	78 152	100%	508	4082	511	4865	514	5255	514	5798	514	6276	514	6695
1	152J	79 152	100%	1250	928	1761	1155	2061	1281	2261	1433	2261	1555	2261	1657
1	152K	80 152	100%	1250	928	1761	1155	2061	1281	2261	1433	2261	1555	2261	1657
1	152L	81 152	100%	1256	484	1281	576	1281	620	1301	681	1306	733	1306	781
1	152M	82 152	100%	27	9048	477	11018	487	12187	487	13721	562	15034	562	16198
1	152N	83 152	100%	264	3061	264	3624	269	3903	419	4306	584	4664	784	4981
1	152P	84 152	100%	1621	3374	1641	3912	1656	4154	1656	4537	1656	4897	1656	5220
1	153D	85 153	100%	314	1631	334	2450	334	3999	358	6851	658	7192	658	8835
1	153F	86 153	100%	815	3896	1565	4808	1600	5322	1600	5966	1600	6505	1600	6982
1	153G	87 153	100%	1960	12472	1960	14400	1960	15210	1960	16542	1960	17803	1960	18935
1	153J	88 153	0.4	755	469	755	364	755	624	755	555	755	557	755	399
1	154A	89 154	100%	1541	1871	1546	2165	1546	2286	1546	2485	1546	2674	1546	2844
1	154B	90 154	100%	598	106	603	121	603	128	603	138	603	148	603	157
1	154C	91 154	100%	1085	1199	1095	1412	1110	1509	1110	1654	1110	1784	1110	1899
1	154D	92 154	100%	659	759	709	930	719	1027	719	1151	719	1254	719	1345
1	154E	93 154	100%	806	499	817	575	832	605	835	657	835	707	860	751
1	154F	94 154	100%	492	7784	587	9020	637	9707	762	10793	962	11800	962	12729
1	154G	95 154	100%	1953	168	1973	194	1977	202	1978	220	1990	236	1990	250
1	154H	96 154	100%	488	43	493	48	494	51	495	54	498	59	498	63
1	154J	97 154	100%	1108	2675	1158	3093	1263	3269	1263	3556	1263	3825	1263	4067
1	154K	98 154	100%	1800	346	1815	402	1871	430	1965	471	2006	509	2055	545
1	154L	99 154	100%	600	116	605	134	624	144	655	157	669	170	685	181

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
MONTGOMERY COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1 155A	100 155	100%	1341	268	1344	309	1344	326	1344	352	1344	379	1344	403
1 155B	101 155	100%	1239	1018	1239	1242	1244	1367	1244	1526	1244	1663	1244	1783
1 155C	102 155	100%	1648	758	1723	890	1738	954	1743	1048	1763	1133	1768	1210
1 155D	103 155	100%	2676	400	2684	482	2689	522	2693	578	2697	622	2701	663
1 155E	104 155	100%	1512	2359	1517	2854	1532	3095	1532	3410	1532	3667	1532	3895
1 155F	105 155	100%	1250	253	1252	289	1258	303	1258	328	1258	351	1258	374
1 155G	106 155	100%	834	168	834	193	838	202	838	219	838	235	838	249
1 155H	107 155	100%	472	71	474	86	474	92	475	101	476	109	477	117
1 155J	108 155	100%	541	280	553	322	563	338	571	364	573	391	573	416
1 155K	109 155	100%	1130	460	1143	544	1148	584	1148	640	1148	689	1148	734
1 155L	110 155	100%	1130	460	1143	544	1148	584	1148	640	1148	689	1148	734
1 155M	111 155	100%	541	280	553	322	563	338	571	364	573	391	573	416
1 155N	112 155	100%	673	476	1003	550	1340	581	1340	631	1340	679	1340	721
1 155P	113 155	100%	730	169	805	193	817	202	829	219	829	235	829	249
1 155Q	114 155	100%	487	112	537	129	545	135	553	146	553	156	553	167
1 155R	115 155	100%	673	476	1003	550	1340	581	1340	631	1340	679	1340	721
1 156A	116 156	100%	1742	1073	1922	1244	1962	1317	2067	1434	2067	1544	2067	1643
1 156B	117 156	100%	631	113	666	129	666	136	671	145	671	156	671	167
1 156C	118 156	100%	1092	354	1097	406	1157	427	1157	465	1157	500	1157	533
1 156D	119 156	100%	1296	540	1411	618	1516	648	1516	702	1516	756	1516	801
1 156E	120 156	100%	1084	330	1084	380	1084	412	1084	462	1089	510	1089	554
1 157A	121 157	100%	817	344	1112	400	1312	423	1362	461	1397	497	1412	529
1 157B	122 157	100%	1015	349	1265	403	1315	425	1315	462	1315	497	1315	529
1 157C	123 157	100%	463	1345	468	1623	468	1764	508	1953	508	2113	508	2252
1 157D	124 157	100%	1680	763	1685	938	1695	1032	1695	1152	1705	1251	1705	1339
1 157E	125 157	100%	908	684	913	813	928	880	933	971	1143	1053	1168	1125
1 157F	126 157	100%	447	1237	470	1450	470	1546	470	1689	480	1816	480	1930
1 157G	127 157	100%	0	2339	0	2681	0	2820	0	3060	0	3291	0	3502
1 157H	128 157	100%	2476	2134	3226	2485	3276	2645	3501	2899	3501	3131	3501	3340
1 157J	129 157	100%	545	188	565	215	615	226	615	245	655	262	665	279
1 157K	130 157	100%	1317	345	1539	394	1654	414	1654	450	1654	482	1654	513
1 157L	131 157	100%	967	271	1042	315	1102	335	1132	364	1177	393	1277	418
1 157M	132 157	100%	1064	3002	1214	3719	1939	4128	2039	4639	2039	5044	2089	5405
1 157N	133 157	100%	206	287	306	372	406	446	456	540	556	615	606	685
1 157P	134 157	100%	456	4411	856	5922	1156	6960	1356	8120	1356	9038	1356	9842
1 157Q	135 157	100%	1152	1110	2152	1338	2552	1501	2852	1723	2852	1917	2852	2097
1 160A	136 160	100%	2	7964	2	9795	402	13182	838	13394	838	13431	838	13437
1 160D	137 160	100%	1202	84	1202	94	1202	99	1202	107	1202	114	1202	122
1 160E	138 160	80%	410	1219	559	1413	559	1530	559	1518	559	1521	559	1525
1 161A	139 161	100%	7	1967	7	2344	7	2641	17	3073	17	3324	67	3550
1 161C	140 161	50%	978	1049	978	1351	978	1375	978	1379	978	1391	978	1396
1 161G	141 161	100%	75	2853	75	3771	131	3898	136	3707	136	3868	136	3894
1 161H	142 161	100%	3	2528	3	3336	3	3825	40	3514	53	3512	53	3524
1 161J	143 161	100%	7	1967	7	2344	7	2641	17	3073	17	3324	67	3550
1 161K	144 161	100%	99	185	99	214	99	232	99	259	99	284	99	309
1 161L	145 161	100%	416	3037	771	3986	971	4575	1021	5234	1021	5740	1026	6172
1 161M	146 161	100%	4	1902	4	2094	16	2930	16	2250	16	2275	16	2344
1 161N	147 161	100%	190	25	225	29	275	36	340	44	340	53	345	61
1 161P	148 161	100%	347	212	397	261	457	290	457	325	457	354	462	380
1 161Q	149 161	100%	149	278	149	322	149	347	149	388	149	427	149	463

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
MONTGOMERY COUNTY

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1	161R	150 161	100%	199	93	224	106	239	112	249	119	249	128	249	136
1	162A	151 162	100%	894	156	1039	179	1234	188	1234	203	1234	217	1234	231
1	162B	152 162	100%	1394	632	1394	728	1394	767	1394	832	1394	894	1394	949
1	162C	153 162	100%	666	694	671	798	671	853	671	941	676	1024	676	1101
1	162D	154 162	100%	1998	207	2000	237	2000	250	2000	269	2000	289	2000	307
1	162E	155 162	100%	784	521	786	621	786	671	786	739	786	801	786	856
1	162F	156 162	100%	1204	4703	1205	5387	1205	5649	1205	6109	1205	6555	1205	6958
1	162G	157 162	100%	396	128	521	146	526	154	526	166	531	179	531	190
1	163A	158 163	100%	3398	1301	5218	1556	6068	1689	7068	1871	7683	2030	7983	2168
1	163B	159 163	100%	5272	761	5922	875	6172	924	6197	1009	6247	1090	6297	1163
1	163C	160 163	100%	1056	374	1356	458	1756	502	2031	558	2106	604	2206	644
1	164A	161 164	100%	289	606	339	723	464	781	539	860	589	932	689	997
1	164B	162 164	100%	147	165	192	197	192	214	242	236	342	256	492	273
1	164C	163 164	100%	1322	182	1502	209	1827	220	1987	239	1987	257	1987	274
1	164D	164 164	100%	1779	106	2504	120	2929	127	2929	138	2929	149	2929	160
1	164E	165 164	100%	1647	333	1747	383	1772	406	1887	444	2037	480	2037	511
1	164F	166 164	100%	510	234	550	277	560	309	595	353	605	393	625	430
1	164G	167 164	100%	233	265	243	304	253	322	283	348	308	375	323	399
1	164H	168 164	100%	637	449	1187	654	1587	801	1787	955	1787	1070	1787	1171
1	164J	169 164	100%	2608	1472	7708	1970	10983	2303	12733	2673	12733	2961	12733	3214
1	164K	170 164	100%	52	262	57	335	72	391	82	460	107	515	127	567
1	170A	171 170	70%	319	10	357	12	361	13	382	18	382	20	385	23
1	170B	172 170	70%	55	3	90	6	108	10	136	14	150	17	216	18
1	170C	173 170	70%	52	43	69	49	83	52	94	57	108	61	122	65
1	170D	174 170	100%	169	96	319	116	369	126	379	140	399	153	424	163
1	170E	175 170	100%	71	1	121	1	171	1	171	1	171	1	171	1
1	170F	176 170	100%	175	42	350	49	450	53	625	58	735	62	790	66
1	170G	177 170	100%	902	57	1647	80	2297	96	2487	113	2487	125	2512	136
1	170H	178 170	100%	829	91	1359	104	1459	108	1459	118	1459	126	1459	134
1	170J	179 170	100%	283	107	1908	137	2858	155	3158	176	3458	193	3683	208
1	170K	180 170	100%	94	152	119	180	139	211	189	258	224	299	304	340
1	170L	181 170	100%	166	107	266	122	326	128	391	139	416	147	456	157
1	170M	182 170	100%	177	46	192	53	207	57	217	62	227	68	247	73
1	170N	183 170	100%	259	62	279	70	284	73	294	79	304	86	349	91
1	170P	184 170	100%	157	193	192	263	292	416	497	626	697	805	812	983
1	171A	185 171	100%	1156	1546	1181	2253	1181	2889	1181	3603	1211	4171	1311	4685
1	171B	186 171	100%	2457	4230	2657	5371	2657	6042	2907	6834	3007	7469	3007	8029
1	171C	187 171	100%	355	58	805	76	905	89	980	106	980	120	980	133
1	171D	188 171	100%	383	2045	808	3960	1108	5581	1858	7176	3558	8351	4873	9378
1	171E	189 171	100%	259	3367	359	4878	359	5980	1109	7140	1434	8014	1584	8771
1	171F	190 171	100%	1924	867	2074	1864	2324	2742	3199	3608	3624	4242	4424	4799
1	171G	191 171	100%	0	3346	0	3851	0	4066	0	4425	0	4769	0	5079
1	172A	192 172	100%	1028	159	1108	185	1458	198	1458	218	1458	238	1458	255
1	172B	193 172	100%	1481	1286	1506	1533	1706	1657	1706	1831	1706	1985	1706	2121
1	172C	194 172	100%	1738	4622	3038	5967	3138	6805	3138	7774	3138	8537	3138	9194
1	172D	195 172	100%	2877	7515	3362	9064	3712	9884	3762	10981	3762	11920	3762	12757
1	172E	196 172	100%	1521	480	1671	555	1871	588	2396	641	2396	688	2396	732
1	172F	197 172	100%	915	100	995	146	1195	183	1195	222	1195	251	1195	278
1	172G	198 172	100%	1594	99	2744	115	3494	132	3969	156	4019	178	4019	198
1	172H	199 172	100%	2390	699	2690	907	2990	1037	3215	1186	3735	1305	3875	1409

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
MONTGOMERY AND PRINCE GEORGE'S COUNTIES

COG ZONE NAME		COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1	172J	200 172	100%	726	2749	766	3284	1016	3566	1016	3955	1016	4292	1036	4592
1	172K	201 172	100%	3269	1960	3594	2394	3644	2632	3644	2938	3644	3192	3644	3418
1	172L	202 172	100%	73	5007	93	6151	128	6813	178	7654	228	8372	278	9008
1	172M	203 172	100%	1502	551	2027	733	2327	925	2327	1163	2327	1360	2327	1541
1	172N	204 172	100%	645	130	845	156	845	175	845	200	870	223	895	243
1	173A	205 173	100%	86	0	96	0	96	0	996	0	2296	0	2946	0
1	173B	206 173	100%	1030	57	1845	66	2070	70	3070	80	3520	87	3620	94
1	173C	207 173	100%	1433	186	1733	233	1808	261	2108	295	2308	322	2308	346
1	173D	208 173	100%	2300	2553	4050	3733	5000	4562	5000	5411	5050	6056	5150	6610
1	173E	209 173	100%	712	2134	974	2763	1224	3172	1424	3643	1574	4018	1774	4345
1	173F	210 173	100%	677	282	2577	358	3527	410	3527	472	3602	523	3602	566
1	173G	211 173	100%	85	35	135	2396	985	4461	2835	6312	3435	7585	3435	8670
1	173H	212 173	100%	2376	2899	4539	3871	5489	4750	5989	5810	6164	6678	6364	7481
1	173J	213 173	100%	331	49	681	59	2231	71	2281	90	2481	105	2481	121
1	174A	214 174	100%	722	4429	2292	6152	4257	7344	4887	8625	5237	9607	5537	10460
1	174B	215 174	90%	111	82	165	226	183	363	187	496	255	594	259	682
1	174C	216 174	100%	122	139	167	159	207	167	212	180	222	193	227	205
1	174D	217 174	40%	126	30	158	42	184	58	250	80	336	99	406	116
1	175C	218 175	100%	1911	186	2061	228	2116	253	2116	284	2116	310	2116	333
1	175D	219 175	100%	659	348	749	416	1149	449	1399	496	1499	535	1624	573
1	175E	220 175	100%	1253	335	2153	410	2178	468	2178	542	2188	608	2213	666
1	175F	221 175	100%	645	160	720	188	745	200	765	219	815	237	865	253
1	175G	222 175	100%	192	249	312	286	462	300	557	324	557	347	607	370
1	175H	223 175	100%	396	414	821	554	906	644	976	747	1016	827	1066	896
1	175J	224 175	50%	79	1008	479	1189	916	1274	1166	1399	1166	1511	1329	1612
1	181G	225 181	20%	43	1	57	10	63	27	223	80	353	124	443	170
1	181H	226 181	20%	23	4	25	9	26	27	28	52	30	74	31	95
1	182A	227 182	20%	85	85	89	98	90	106	92	118	95	129	97	139
1	182B	228 182	80%	113	1641	137	2241	153	2725	1993	3281	4633	3720	5913	4121
1	182C	229 182	80%	115	59	275	68	355	71	435	78	455	83	475	90
1	182D	230 182	80%	461	117	541	133	701	139	801	151	881	162	953	171
1	182E	231 182	40%	270	27	360	31	420	33	470	36	510	39	524	42
1	182F	232 182	40%	46	47	62	54	78	57	92	62	100	66	104	71
1	182G	233 182	100%	1366	810	1891	937	2216	1001	2591	1103	2991	1200	3291	1287
1	182H	234 182	100%	416	368	516	441	641	483	641	537	641	585	641	628
1	182J	235 182	40%	138	10	147	11	153	13	157	14	161	16	165	18
2	240A	236 240	100%	479	20	481	20	481	20	610	30	717	30	717	30
2	240B	237 240	100%	3172	810	3371	820	3429	830	3515	841	3575	851	3575	861
2	240C	238 240	100%	4899	1900	4901	1920	4901	1930	4915	1940	4915	1950	4915	1950
2	240D	239 240	100%	414	70	460	170	460	170	460	181	561	181	561	190
2	240E	240 240	100%	396	150	441	160	441	170	540	169	540	169	540	180
2	240F	241 240	100%	494	270	494	290	494	299	494	319	494	330	597	350
2	240G	242 240	100%	1117	780	1119	900	1119	1201	1119	1401	1139	1500	1336	1600
2	240H	243 240	100%	52	8549	52	8800	52	9400	92	9900	96	10299	194	10501
2	241A	244 241	100%	932	750	940	760	940	760	985	759	985	771	1344	780
2	241B	245 241	100%	2595	2100	2596	2150	2596	2180	2596	2200	2596	2250	2689	2299
2	241C	246 241	100%	2249	1500	2249	1670	2249	1720	2249	1800	2249	1880	2353	1950
2	241D	247 241	100%	2326	610	2326	630	2326	640	2338	641	2361	650	2361	660
2	241E	248 241	100%	718	149	718	160	718	160	718	169	718	180	718	190
2	241F	249 241	100%	1630	370	1441	420	1441	429	1441	459	1441	480	1441	500

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
PRINCE GEORGE'S COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2 241G	250 241	100%	1027	650	1029	749	1130	810	1167	900	1167	950	1296	1039
2 242A	251 242	100%	1231	70	1231	70	1231	81	1231	81	1231	81	1231	89
2 242B	252 242	100%	1093	900	1100	921	1100	931	1100	941	1100	960	1178	980
2 242C	253 242	100%	493	110	497	119	497	149	497	171	497	199	548	229
2 242D	254 242	100%	960	290	960	320	960	350	960	401	960	549	1451	649
2 242E	255 242	100%	289	8119	289	8199	289	8600	289	8800	289	8999	289	9201
2 242F	256 242	100%	245	910	247	940	247	950	247	980	247	1000	355	1200
2 242G	257 242	100%	900	60	933	60	933	61	945	61	945	70	945	70
2 242H	258 242	100%	942	2000	943	2030	943	2050	943	2079	943	2101	963	2151
2 242J	259 242	100%	1251	2970	1253	3100	1258	2700	1258	2701	1258	2799	1330	3000
2 242K	260 242	100%	945	519	953	540	953	551	953	550	953	559	1001	571
2 242L	261 242	100%	944	550	945	560	945	560	945	570	945	580	988	590
2 242M	262 242	100%	2502	400	2503	420	2503	430	2503	441	2503	451	2562	471
2 242N	263 242	100%	48	270	48	290	48	300	48	309	48	310	48	319
2 242P	264 242	100%	654	501	654	510	654	600	654	700	654	850	700	1000
2 242Q	265 242	100%	1928	1600	1929	1630	1929	1680	1929	1750	1929	1930	1929	2200
2 242R	266 242	100%	403	600	407	600	409	600	409	600	409	601	409	601
2 243A	267 243	100%	1350	2450	1372	2500	1372	2530	1464	2580	1464	2640	1563	2750
2 243B	268 243	100%	379	90	379	250	381	351	381	400	381	451	381	500
2 243C	269 243	100%	2	1851	2	1879	2	2010	100	2960	100	4270	241	5570
2 243D	270 243	100%	459	820	460	600	460	500	460	500	460	399	510	399
2 243E	271 243	100%	430	1800	465	1901	465	2100	476	2300	476	2701	523	2999
2 243F	272 243	100%	13	450	14	550	14	750	14	950	14	1100	233	1399
2 243G	273 243	100%	1295	890	1300	900	1300	909	1300	929	1300	949	1396	990
2 243H	274 243	100%	821	19	821	120	821	150	821	170	821	200	1263	250
2 243J	275 243	100%	0	900	0	1600	0	2800	0	3900	0	4999	0	5499
2 243K	276 243	100%	2882	1950	2882	2201	2882	2500	2882	2700	2882	2900	3142	3000
2 243L	277 243	100%	0	651	0	660	0	690	0	710	0	750	0	799
2 243M	278 243	100%	1303	430	1312	440	1317	450	1445	460	1445	470	1642	490
2 243N	279 243	100%	795	740	799	769	799	800	937	840	937	880	1075	950
2 243P	280 243	100%	961	771	1074	880	1081	901	1081	931	1081	989	1081	1051
2 244A	281 244	100%	908	3100	1040	3300	1040	3399	1184	3450	1184	3499	1311	3800
2 244B	282 244	100%	407	450	409	549	409	590	409	651	409	700	409	770
2 244C	283 244	100%	1462	4101	1464	4201	1464	4280	1464	4390	1464	4500	1623	4700
2 244D	284 244	100%	1732	3180	1761	3230	1761	3281	1771	3330	1771	3410	1883	3481
2 244E	285 244	100%	4107	1400	4122	1440	4122	1491	4227	1500	4227	1551	4456	1600
2 244F	286 244	100%	1780	1690	1828	1730	1828	1750	1850	1770	1895	1800	1971	1849
2 245A	287 245	100%	0	3899	0	4600	0	4999	0	5801	0	6499	0	7199
2 245B	288 245	100%	1332	1199	1333	1310	1452	1390	1592	1480	1677	1571	1994	1700
2 245C	289 245	100%	1610	1400	1610	1440	1610	1471	1610	1499	1610	1519	1610	1550
2 245D	290 245	100%	684	40	686	40	686	40	686	40	686	50	686	61
2 245E	291 245	100%	1379	390	1390	419	1390	450	1390	480	1390	519	1439	580
2 245F	292 245	100%	2038	921	2039	1100	2039	1200	2039	1249	2039	1350	2185	1450
2 245G	293 245	100%	2540	2141	2555	2300	2555	2350	2581	2399	2632	2450	2709	2500
2 245H	294 245	100%	2200	920	2200	1000	2200	1100	2200	1150	2200	1200	2200	1300
2 245J	295 245	100%	524	459	527	500	527	521	588	550	588	569	882	600
2 245K	296 245	100%	1367	159	1438	171	1438	169	1565	180	1624	190	1709	200
2 245L	297 245	100%	556	279	568	290	568	300	577	311	607	319	730	329
2 245M	298 245	100%	82	2979	82	3101	82	3120	82	3151	82	3181	82	3200
2 245N	299 245	100%	154	4751	154	5100	154	5500	154	5651	154	5800	154	6001

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
PRINCE GEORGE'S COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2 246A	300 246	100%	40	1029	40	1050	40	1060	40	1080	40	1100	40	1119
2 246B	301 246	100%	655	500	662	510	662	510	662	520	662	530	724	550
2 246C	302 246	100%	401	1511	403	1539	403	1550	403	1570	403	1600	499	1649
2 246D	303 246	100%	1	660	1	669	1	681	1	691	1	701	1	719
2 246E	304 246	100%	659	2010	659	2200	659	2300	659	2401	659	2499	659	2600
2 246F	305 246	100%	200	6220	271	7000	271	7500	281	8000	281	8600	281	9300
2 246G	306 246	100%	790	520	815	541	815	550	830	570	868	600	868	650
2 246H	307 246	100%	709	200	712	210	712	209	712	220	712	230	712	250
2 246J	308 246	100%	883	170	915	189	915	190	929	200	958	200	1051	220
2 246K	309 246	100%	717	570	723	670	723	730	723	849	723	1020	1011	1201
2 246L	310 246	100%	813	299	815	320	817	330	817	350	817	370	817	400
2 246M	311 246	100%	964	90	966	100	1288	100	1393	110	1412	120	1603	130
2 246N	312 246	100%	814	500	925	1001	1249	1600	1459	2000	1668	2500	1882	3000
2 246P	313 246	100%	1191	511	1472	600	1472	650	1578	699	1858	790	2067	860
2 246Q	314 246	100%	2040	140	2227	150	2227	160	2288	200	2504	201	2504	249
2 246R	315 246	100%	1874	450	1910	460	1911	470	1927	480	2022	499	2022	499
2 246S	316 246	100%	516	3351	516	3700	516	3900	516	4100	516	4400	516	4800
2 246T	317 246	100%	1132	851	1132	870	1132	880	1132	891	1132	901	1368	919
2 246U	318 246	100%	618	4650	618	4759	618	4830	618	4940	618	5020	618	5080
2 246V	319 246	100%	1514	4360	1602	4501	1602	4561	1655	4620	1710	4691	1757	4801
2 247A	320 247	100%	2466	1180	2501	1199	2532	1220	2556	1250	2580	1299	2628	1400
2 247B	321 247	100%	1224	410	1240	429	1240	430	1240	430	1240	439	1240	460
2 247C	322 247	100%	1256	320	1339	340	1419	350	1483	360	1558	380	1632	400
2 247D	323 247	100%	117	40	118	40	118	40	118	40	118	40	118	40
2 247E	324 247	100%	84	200	84	220	84	250	84	300	84	350	84	500
2 247F	325 247	100%	205	70	515	90	746	110	1002	210	1166	309	1262	610
2 247G	326 247	100%	1143	139	1192	150	1192	150	1209	170	1287	200	1383	301
2 247H	327 247	100%	228	110	228	119	228	120	228	130	252	141	252	150
2 247J	328 247	100%	1780	830	1781	860	1781	880	1781	900	1781	920	1925	950
2 247K	329 247	100%	946	1960	946	2199	946	2240	946	2290	946	2340	946	2400
2 247L	330 247	100%	1653	400	1654	420	1654	419	1654	431	1654	439	1654	450
2 247M	331 247	100%	377	2600	442	2850	442	2901	474	3000	548	3100	644	3300
2 247N	332 247	100%	759	700	883	801	883	800	1061	821	1109	850	1359	900
2 247P	333 247	100%	526	7000	545	8499	545	9500	570	10501	666	11500	740	12000
2 247Q	334 247	100%	3296	350	3454	360	3454	370	3551	370	3696	381	3841	400
2 248A	335 248	100%	1172	580	1172	689	1172	750	1172	800	1172	850	1208	950
2 248B	336 248	100%	1795	211	1801	251	2027	260	2098	270	2098	281	2098	300
2 248C	337 248	100%	0	4100	0	4500	0	5000	0	5499	0	6000	0	6500
2 248D	338 248	100%	1523	1000	1524	1100	1524	1149	1524	1201	1524	1250	1524	1299
2 248E	339 248	100%	861	410	1272	450	1369	480	1540	500	1817	550	1913	600
2 248F	340 248	100%	1324	450	1331	470	1331	489	1331	520	1345	550	1360	600
2 248G	341 248	100%	1065	621	1065	650	1065	670	1065	700	1065	739	1084	790
2 248H	342 248	100%	6	530	6	589	6	650	6	750	6	900	6	1100
2 248J	343 248	100%	1175	530	1175	550	1216	580	1271	600	1388	750	1632	1000
2 248K	344 248	100%	120	60	121	70	121	81	121	100	121	120	240	150
2 248L	345 248	100%	49	2099	49	3000	49	3500	49	4000	49	4501	49	5000
2 248M	346 248	100%	462	320	464	419	464	449	467	481	467	500	583	550
2 248N	347 248	100%	298	200	372	229	372	250	418	300	478	450	576	500
2 248P	348 248	100%	949	120	949	210	949	260	974	300	1218	320	1409	350
2 248Q	349 248	100%	2732	110	2766	140	2766	140	2808	150	3000	160	3222	180

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
PRINCE GEORGE'S COUNTY

	COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2	248R	350 248	100%	1008	1500	1124	1681	1124	1801	1124	2000	1159	2100	1194	2200
2	248S	351 248	100%	947	230	947	260	947	271	947	270	947	280	947	300
2	249A	352 249	100%	377	3000	377	3149	377	3300	377	3401	377	3600	377	4200
2	249B	353 249	100%	2822	3800	2822	3889	2834	3950	2834	4000	2834	4100	2834	4200
2	249C	354 249	100%	1189	2291	1189	2350	1189	2380	1253	2420	1253	2501	1390	2600
2	249D	355 249	100%	1616	370	1616	391	1616	411	1616	449	1616	550	1616	699
2	249E	356 249	100%	1988	330	2082	380	2084	420	2084	459	2524	550	2671	650
2	249F	357 249	100%	164	50	166	50	166	49	166	49	166	49	312	49
2	249G	358 249	100%	105	350	105	390	162	420	188	450	188	480	189	550
2	249H	359 249	100%	953	60	978	71	1093	80	1142	80	1231	90	1231	100
2	249J	360 249	100%	587	60	596	70	596	69	630	70	728	80	728	80
2	249K	361 249	100%	3451	500	3452	520	3452	550	3452	601	3452	651	3767	699
2	249L	362 249	100%	523	199	524	229	524	250	524	259	524	270	524	290
2	249M	363 249	100%	1636	150	1636	201	1755	220	1755	249	1780	300	1780	350
2	249N	364 249	100%	686	110	687	131	731	150	731	170	1011	200	1011	250
2	249P	365 249	100%	570	900	570	940	570	1040	570	1100	570	1150	570	1201
2	249Q	366 249	100%	0	0	0	0	0	0	0	0	0	0	0	0
2	250A	367 250	100%	1499	1770	1519	1840	1593	1890	1593	1950	1605	2010	1605	2120
2	250B	368 250	100%	2110	2100	2329	2830	2752	3500	2752	4499	2858	5501	2858	6000
2	250C	369 250	100%	999	700	1213	700	1213	700	1370	800	1370	800	1729	800
2	250D	370 250	100%	880	2231	881	2550	892	2670	896	2800	896	2930	994	3050
2	251A	371 251	100%	2058	620	2059	630	2059	630	2059	641	2059	650	2156	670
2	251B	372 251	100%	1583	120	1590	140	1596	160	1693	179	1693	200	1693	241
2	251C	373 251	100%	0	1679	0	3400	0	4400	0	5500	0	5999	0	6300
2	251D	374 251	100%	216	4770	216	5200	216	5251	216	5279	216	5300	216	5350
2	251E	375 251	100%	31	0	31	0	31	0	31	0	31	0	31	0
2	252A	376 252	100%	5	0	5	0	5	0	5	0	5	0	5	0
2	252B	377 252	50%	1	60	1	70	1	70	1	75	1	81	1	85
2	252C	378 252	50%	593	2700	695	3210	695	3565	695	3820	734	4076	734	4386
2	252D	379 252	100%	2761	2600	3519	3800	3519	4501	3519	5300	3959	6000	3959	6500
2	252E	380 252	100%	1054	1500	1128	1600	1128	1700	1192	1800	1289	1900	1387	2000
2	252F	381 252	100%	3039	1500	3079	1601	3079	1700	3256	1900	3434	2000	3571	2100
2	252G	382 252	100%	522	1301	545	1800	806	2201	806	2600	806	2999	806	3300
2	253A	383 253	100%	1668	3800	1674	5501	1792	6501	1838	7099	1838	7700	2082	7999
2	253B	384 253	100%	326	1901	710	3200	1000	4500	1000	5200	1000	6000	1000	6801
2	253C	385 253	100%	297	101	312	120	395	120	461	130	656	140	855	150
2	253D	386 253	100%	756	1200	756	1501	758	1699	764	2001	907	2201	907	2500
2	253E	387 253	100%	584	880	806	920	806	950	905	979	1023	1001	1292	1029
2	254A	388 254	100%	554	150	649	159	691	160	754	171	912	180	1159	191
2	254B	389 254	100%	389	91	477	190	554	200	631	210	809	220	809	240
2	254C	390 254	100%	461	100	763	150	1182	250	1775	400	2308	500	2308	700
2	254D	391 254	100%	0	2500	0	3500	479	4500	639	5500	639	6499	741	7500
2	254E	392 254	100%	381	100	1365	130	1365	140	1841	150	1841	150	1841	160
2	255A	393 255	100%	350	90	350	99	599	100	599	110	599	120	599	130
2	255B	394 255	100%	938	900	1601	1099	1915	1201	1915	1299	1915	1400	1915	1499
2	255C	395 255	100%	1982	2600	2586	2899	2652	3300	2699	3500	2699	4000	2699	5000
2	255D	396 255	100%	738	80	1028	120	1159	250	1447	299	1759	350	1949	601
2	255E	397 255	100%	675	121	739	130	740	141	759	151	778	170	778	199
2	255F	398 255	100%	124	179	129	221	129	230	133	240	133	250	228	270
2	255G	399 255	100%	75	30	99	40	100	40	113	50	140	50	346	60

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
PRINCE GEORGE'S COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2 255H	400 255	100%	410	10	413	10	413	10	413	10	413	10	413	10
2 255J	401 255	100%	53	229	55	349	55	1350	55	1999	55	3000	194	4499
2 256A	402 256	100%	27	900	27	1160	27	1250	27	1400	27	1499	27	1700
2 256C	403 256	100%	822	2200	823	2600	823	2999	823	3299	823	3601	871	4200
2 256D	404 256	100%	892	1450	902	1569	1197	1720	1442	1880	1587	1980	1660	2090
2 256E	405 256	100%	274	560	278	679	347	800	375	931	444	1051	444	1100
2 257A	406 257	100%	34	40	35	40	35	40	35	50	35	150	35	250
2 257B	407 257	100%	460	240	476	270	615	280	669	290	669	300	669	299
2 257C	408 257	100%	425	89	432	101	439	110	453	120	550	119	755	130
2 257D	409 257	100%	855	99	860	110	934	120	991	149	1106	200	1202	250
2 257E	410 257	100%	297	30	355	30	400	30	462	30	586	30	665	30
2 257F	411 257	100%	1025	299	1040	330	1087	341	1125	359	1204	380	1284	410
2 257G	412 257	100%	1481	2900	1836	3150	1836	3500	2014	3700	2207	4001	2304	4400
2 257H	413 257	100%	1165	2119	1170	2290	1182	2390	1192	2500	1230	2640	1326	2700
2 257J	414 257	100%	439	130	452	150	461	201	470	250	483	279	483	301
2 257K	415 257	100%	1817	540	1841	559	1870	571	1890	581	1974	600	2057	650
2 258A	416 258	100%	1301	2300	1314	2960	1329	4000	1345	4999	1441	5999	1598	7000
2 258B	417 258	100%	1650	399	2032	461	2277	500	2519	550	2711	600	2807	651
2 258C	418 258	100%	1659	589	1860	640	2221	700	2450	750	2546	801	2546	800
2 258D	419 258	100%	958	400	958	420	958	451	958	551	958	749	1370	1000
2 258E	420 258	100%	864	141	879	169	879	180	900	190	996	200	996	350
2 258F	421 258	100%	1411	70	1752	80	1752	89	1763	100	1958	121	2201	201
2 258G	422 258	100%	1161	129	1198	130	1201	139	1211	139	1220	150	1230	150
2 259A	423 259	100%	174	30	190	150	481	950	870	1900	1358	2999	1845	5001
2 259B	424 259	100%	1736	30	1741	90	1829	249	1829	500	1829	1000	1829	1500
2 259C	425 259	100%	1869	569	2069	609	2069	621	2187	640	2333	699	2478	799
2 259D	426 259	100%	723	1649	966	1900	966	2200	1080	2501	1274	2800	1420	3200
2 259E	427 259	100%	2092	301	2134	320	2134	329	2231	339	2231	361	2329	380
2 260A	428 260	100%	950	206	962	221	990	230	1030	251	1125	271	1452	300
2 260B	429 260	100%	895	720	933	1450	933	2049	954	2300	1033	2501	1157	2799
2 260C	430 260	100%	108	549	109	1661	109	2880	308	4101	321	5400	321	7701
2 260D	431 260	100%	155	1699	2311	3400	3362	5500	3560	7001	4505	8499	4505	11000
2 260E	432 260	100%	16	900	16	1500	16	2499	41	4801	41	7000	200	10000
2 261A	433 261	100%	1363	249	1403	289	1407	350	1407	400	1489	450	1489	500
2 261B	434 261	100%	3023	1799	3590	1930	3590	2051	3626	2401	3626	2750	3946	3000
2 261C	435 261	100%	2667	4501	2734	4701	2734	4699	2782	4800	2782	4900	3296	5000
2 262A	436 262	100%	224	4201	415	4500	415	5000	542	5300	669	5500	766	6100
2 262B	437 262	100%	0	720	258	850	258	1000	258	1400	258	1500	258	1600
2 262C	438 262	100%	3790	900	3808	1100	4452	2201	5315	2400	5315	2899	5315	3000
2 262D	439 262	100%	4489	3100	5344	4260	5344	4391	5344	4440	5561	5050	5659	5700
2 262E	440 262	100%	85	2020	88	2119	88	2211	88	2330	88	2400	88	2480
2 263A	441 263	100%	364	260	401	300	412	311	491	380	588	510	753	610
2 263B	442 263	80%	834	12	834	16	834	16	834	24	834	24	1147	32
2 263C	443 263	100%	186	100	387	110	610	120	710	130	887	140	887	150
2 263D	444 263	100%	39	10	44	10	44	20	44	20	106	30	106	30
2 264A	445 264	100%	72	40	99	50	399	50	649	49	849	50	1048	61
2 264B	446 264	100%	57	60	399	109	549	120	649	130	742	150	795	161
2 264D	447 264	50%	53	20	55	220	56	1025	56	1525	56	2030	73	3031
2 264E	448 264	100%	62	91	177	100	220	111	255	90	354	89	454	89
2 264G	449 264	100%	622	230	978	251	1160	381	1260	470	1260	571	1312	689

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE (continued)
PRINCE GEORGE'S COUNTY

COG ZONE NAME	COG DIST NAME	% OF CAZ	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
2 264H	450 264	100%	101	10	260	10	774	20	1245	20	1342	30	1342	40
2 264J	451 264	100%	273	110	291	121	295	120	308	149	336	201	336	300
2 264K	452 264	100%	16	0	265	0	325	0	343	0	482	0	632	0
2 264L	453 264	100%	68	720	69	761	499	790	936	870	1085	920	1085	1030
2 265A	454 265	100%	95	80	296	80	489	90	682	99	682	110	682	121
2 265B	455 265	100%	101	19	274	21	563	30	853	41	853	80	853	100
a7265C	456 265	100%	16	454	77	500	125	511	154	520	178	529	203	550
2 265D	457 265	100%	26	10	441	10	826	10	971	20	1116	20	1247	20
2 265E	458 265	100%	29	10	113	20	256	30	449	30	546	39	642	39
2 265F	459 265	100%	954	200	1863	549	3122	1651	3853	2801	4448	4000	4448	5650
2 265G	460 265	100%	326	90	327	160	327	500	327	800	327	1500	327	2000
2 265H	461 265	60%	23	60	34	72	45	119	59	181	73	240	87	301
2 265J	462 265	100%	1888	450	2192	501	2311	651	2401	849	2458	1000	2519	1099
2 266A	463 266	100%	839	131	937	151	1081	199	1105	250	1129	301	1154	350
2 266B	464 266	100%	282	80	289	90	575	90	1022	101	1022	110	1022	121
2 266C	465 266	100%	236	121	406	130	406	130	524	140	608	149	608	170
2 266D	466 266	100%	13	100	41	121	41	130	51	151	114	180	114	220
2 266E	467 266	100%	38	10	427	10	1057	10	1786	10	2526	10	2985	10
2 266F	468 266	100%	51	330	107	390	107	430	125	450	314	500	314	600
2 266G	469 266	100%	28	0	34	0	35	0	38	0	112	0	112	0
2 266H	470 266	100%	251	6399	328	6900	328	7500	389	8099	511	8600	727	9000
2 266J	471 266	100%	67	300	69	330	69	350	69	371	69	400	69	451
2 266K	472 266	100%	12	290	12	360	12	379	12	400	12	420	12	450
2 266L	473 266	100%	19	40	33	40	33	40	39	40	39	40	49	40
2 266M	474 266	100%	27	480	27	1500	27	2499	27	5500	27	6500	123	7001
2 266N	475 266	100%	20	0	117	0	406	0	580	0	652	0	724	0
2 267B	476 267	70%	532	49	578	63	578	63	618	70	751	76	885	83
2 267C	477 267	70%	74	84	75	90	76	90	76	91	76	97	76	106
2 268A	478 268	100%	833	2000	991	2201	1088	2300	1175	2550	1349	2800	1542	3000
2 268B	479 268	100%	1085	60	1441	120	1441	150	1692	180	1897	200	2000	219
2 268C	480 268	100%	265	149	273	159	273	169	321	180	409	180	409	200
2 268D	481 268	100%	240	100	333	109	333	110	333	120	422	119	422	130
2 269A	482 269	100%	1456	360	2102	400	2219	431	2586	490	2938	561	3132	670
2 269B	483 269	100%	983	479	1033	491	1062	491	1082	499	1130	520	1263	520
2 270A	484 270	100%	1515	140	1671	160	2082	171	2808	241	3430	310	4052	370
2 270B	485 270	50%	26	300	29	341	29	360	35	380	49	400	62	425
2 271A	486 271	100%	508	869	565	979	565	1031	722	1101	939	1170	1056	1251
2 271B	487 271	100%	123	170	123	180	123	190	123	201	123	500	182	1000
2 272A	488 272	100%	159	150	187	151	187	159	201	170	260	180	260	201
2 272B	489 272	100%	199	10	201	10	201	10	203	10	203	10	203	10
2 272D	490 272	50%	20	50	20	55	20	75	68	100	117	150	214	250
2 273A	491 273	100%	504	31	552	31	552	31	647	30	787	29	787	30
2 273B	492 273	100%	698	139	701	149	701	149	721	159	721	169	961	180
2 273C	493 273	100%	317	39	389	55	389	55	459	60	746	80	896	100
2 273E	494 273	100%	118	100	122	111	122	109	134	120	144	139	153	160
2 273F	495 273	100%	468	0	499	0	499	0	538	0	735	0	932	0
2 274A	496 274	50%	69	41	73	57	77	64	81	72	160	80	160	120
2 274B	497 274	50%	202	96	214	103	214	112	221	113	383	120	383	136
2 274C	498 274	50%	217	73	228	80	234	88	248	96	323	104	423	120
2 274D	499 274	100%	201	59	209	70	486	80	586	91	871	111	1309	150

Appendix H - CAZs in Rockville's and Leesburg's service areas

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

CITY OF ROCKVILLE, MARYLAND

R	CAZ	TAZ	CAD	TAD	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
1	153A	404	153	100%	95	1298	105	1756	185	2257	185	2392	185	2400	185	2403
1	153B	405	153	100%	642	554	660	750	736	966	786	1025	786	1030	786	1030
1	153C	406	153	100%	962	831	991	1126	1105	1449	1180	1537	1180	1544	1180	1546
1	153E	408	153	100%	2301	6846	2637	9306	3597	13510	4557	16335	4557	19449	4557	22514
1	153H	411	153	100%	1351	816	1367	937	1367	1012	1367	1128	1367	1157	1367	1185
1	153J	412	153	60%	1133	704	1133	546	1133	937	1133	833	1133	836	1133	599
1	153K	413	153	100%	450	271	456	311	456	338	456	376	456	385	456	395
1	153L	414	153	100%	142	1947	157	2635	277	3386	277	3588	277	3600	277	3604
1	160B	463	160	100%	1032	1926	1196	1574	1228	2258	1228	2254	1228	2254	1228	1674
1	160C	464	160	100%	755	154	780	179	780	575	780	189	780	194	780	176
1	160E	466	160	20%	102	305	140	353	140	383	140	379	140	380	140	381
1	161B	468	161	100%	3	2528	3	3336	3	3825	40	3514	53	3512	53	3524
1	161C	469	161	50%	978	1049	978	1351	978	1375	978	1379	978	1391	978	1396
1	161D	470	161	100%	843	447	898	509	898	503	898	524	898	529	898	535
1	161E	471	161	100%	671	8882	671	11411	671	14203	671	17052	671	17800	671	18510
1	161F	472	161	100%	1384	887	1404	1019	1404	1099	1404	1163	1404	1197	1404	1232

ROUND IV HOUSEHOLD AND EMPLOYMENT TOTALS FOR 1985 - 2010 BY COG ANALYSIS ZONE

TOWN OF LEESBURG, VIRGINIA

R	CAZ	TAZ	CAD	TAD	1985 HOUSE	1985 EMPLOY	1990 HOUSE	1990 EMPLOY	1995 HOUSE	1995 EMPLOY	2000 HOUSE	2000 EMPLOY	2005 HOUSE	2005 EMPLOY	2010 HOUSE	2010 EMPLOY
6	682C	1232	682	100%	129	322	563	636	1055	1011	1607	1458	2095	2149	2630	2945
6	682E	1234	682	100%	363	1135	450	1450	548	1827	659	2272	781	2963	914	3758
6	682F	1235	682	100%	224	139	745	349	1336	600	1997	897	2730	1244	3532	1640
6	682G	1236	682	100%	1387	2167	1647	2796	1943	3299	2274	3893	2640	4411	3041	5007
6	682H	1237	682	100%	1833	2630	2093	3259	2389	3763	2720	4356	3086	4875	3487	5470

Appendix I - Disaggregated Forecast of Water Supply Demands for WAD

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY WAD FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in the District of Columbia	257810	259311	261620	265235	267709	264823
Total number of single family in the District of Columbia	97680	98249	99124	100493	101431	100337
Total number of multi-family in the District of Columbia	160130	161062	162496	164742	166278	164486
Total number of households in Arlington County	76065	81360	84760	88559	92260	95959
Total number of single family households in Arlington County	32097	33218	34607	36158	37669	39179
Total number of multi-family households in Arlington County	43968	48142	50153	52401	54591	56780
Total number of households in City of Falls Church and town of Vienna	44876	49724	53411	56220	58779	60623
Total number of single family households in City of Falls Church and town of Vienna	25107	27820	29882	31454	32886	33917
Total number of multi-family households in City of Falls Church and town of Vienna	19769	21904	23529	24766	25893	26706

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY WAD FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
Total number of households in Andrews Air Force Base	2233	2233	2233	2233	2233	2278
Total number of single family households in Andrews Air Force Base	1326	1378	1406	1433	1450	1498
Total number of multi-family households in Andrews Air Force Base	907	855	827	800	783	780
Total number of employees in the District of Columbia	685922	718034	779823	816532	851040	885837
Total number of employees in Arlington County	136765	175795	191725	201165	210504	219792
Total number of employees in City of Falls Church and town of Vienna	88774	101974	107824	111984	114824	118174
Total number of employees in Andrews Air Force Base	15149	15200	15399	15499	15600	15750
Total number of employees in Pentagon, Arlington Cemetery, and Fort Myer	26444	26444	31444	31444	31444	31444
Total number of employees in National Airport	12380	12380	12380	12380	12380	12380

ANNUAL WATER DEMANDS BY CATEGORY AND JURSIDICTION FOR WAD FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day for the District of Columbia	31.7	31.9	32.2	32.7	33.0	32.6
Total demand from multi-family households in millions of gallons per day for the District of Columbia	50.4	50.7	51.2	51.9	52.4	51.8
Total demand from employees in millions of gallons per day for the District of Columbia	34.3	35.9	39.0	40.8	42.6	44.3
Total demand from single family households in millions of gallons per day for Arlington County	7.3	7.5	7.8	8.2	8.5	8.9
Total demand from multi-family households in millions of gallons per day for Arlington County	8.0	8.8	9.2	9.6	10.0	10.4
Total demand from employees in millions of gallons per day for Arlington County	6.8	8.8	9.6	10.1	10.5	11.0

ANNUAL WATER DEMANDS BY CATEGORY AND JURSIDICTION FOR WAD FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day for City of Falls Church and Town of Vienna	5.7	6.3	6.8	7.1	7.4	7.7
Total demand from multi-family households in millions of gallons per day for City of Falls Church and Town of Vienna	3.6	4.0	4.3	4.5	4.7	4.9
Total demand from employees in millions of gallons per day for City of Falls Church and Town of Vienna	4.4	5.1	5.4	5.6	5.7	5.9
Total demand from single family households in millions of gallons per day for Andrews Air Force Base	0.4	0.4	0.5	0.5	0.5	0.5
Total demand from multi-family households in millions of gallons per day for Andrews Air Force Base	0.3	0.3	0.3	0.3	0.2	0.2
Total demand from employees in millions of gallons per day for Andrews Air Force Base	1.5	1.5	1.6	1.6	1.6	1.6

ANNUAL WATER DEMANDS BY CATEGORY AND JURSIDICTION FOR WAD FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
Total demand from employees in millions of gallons per day for the Penatgon, Arlington Cemetery, and Fort Myers	2.7	2.7	3.2	3.2	3.2	3.2
Total demand from employees in millions of gallons per day for National Airport	2.2	2.2	2.2	2.2	2.2	2.2

TOTAL ANNUAL WATER DEMANDS BY JURSIDICTION AND FOR WHOLE WAD SYSTEM FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from the District of Columbia in millions of gallons per day	116.5	118.6	122.4	125.4	127.9	128.7
Total demand from Arlington County in millions of gallons per day	22.1	25.1	26.6	27.8	29.0	30.2
Total demand from the City of Falls Church and the Town of Vienna in millions of gallons per day	13.7	15.4	16.5	17.2	17.9	18.5
Total demand from Andrews Air Force Base in millions of gallons per day	2.2	2.3	2.3	2.3	2.3	2.3
Total demand from Penatgon, Arlington Cemetery, and Fort Myers in millions of gallons per day	2.7	2.7	3.2	3.2	3.2	3.2
Total demand from National Airport in millions of gallons per day	2.2	2.2	2.2	2.2	2.2	2.2
Total demand from Blue Plains Sewage Treatment Plant in millions of gallons per day	0.6	0.6	0.6	0.6	0.6	0.6
Total demand from unaccounted water use in millions of gallons per day	35.1	36.6	38.1	39.2	40.2	40.8
Total demand from process water use in millions of gallons per day	0.0	0.0	0.0	0.0	0.0	0.0
Total annual average demand in millions of gallons per day	195.2	203.4	211.8	217.9	223.3	226.5

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
January demands						
Average monthly	183.5	191.2	199.1	204.9	209.9	212.9
Peak day	196.4	204.6	213.0	219.2	224.6	227.8
Peak 7 day	189.0	196.9	205.1	211.0	216.2	219.3
February demands						
Average monthly	181.6	189.2	197.0	202.7	207.7	210.6
Peak day	194.3	202.4	210.8	216.9	222.2	225.4
Peak 7 day	187.0	194.9	202.9	208.8	213.9	217.0
March demands						
Average monthly	177.7	185.1	192.8	198.3	203.2	206.1
Peak day	191.9	199.9	208.2	214.2	219.5	222.6
Peak 7 day	181.2	188.8	196.6	202.3	207.3	210.2
April demands						
Average monthly	183.5	191.2	199.1	204.9	209.9	212.9
Peak day	201.9	210.3	219.0	225.3	230.9	234.2
Peak 7 day	190.8	198.9	207.1	213.1	218.3	221.4
May demands						
Average monthly	191.3	199.3	207.6	213.6	218.8	222.0
Peak day	212.4	221.3	230.4	237.1	242.9	246.4
Peak 7 day	200.9	209.3	218.0	224.3	229.8	233.1
June demands						
Average monthly	208.9	217.7	226.6	233.2	238.9	242.3
Peak day	236.0	246.0	256.1	263.5	270.0	273.8
Peak 7 day	221.4	230.7	240.2	247.2	253.3	256.9
July demands						
Average monthly	222.6	231.9	241.5	248.4	254.6	258.2
Peak day	249.3	259.7	270.4	278.3	285.1	289.2
Peak 7 day	235.9	245.8	256.0	263.4	269.8	273.7

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
August demands						
Average monthly	220.6	229.9	239.4	246.3	252.3	255.9
Peak day	244.9	255.1	265.7	273.4	280.1	284.1
Peak 7 day	229.4	239.1	248.9	256.1	262.4	266.2
September demands						
Average monthly	210.8	219.7	228.8	235.4	241.2	244.6
Peak day	234.0	243.9	253.9	261.3	267.7	271.5
Peak 7 day	221.4	230.7	240.2	247.1	253.2	256.8
October demands						
Average monthly	195.2	203.4	211.8	217.9	223.3	226.5
Peak day	210.8	219.7	228.8	235.4	241.2	244.6
Peak 7 day	201.1	209.5	218.2	224.5	230.0	233.3
November demands						
Average monthly	183.5	191.2	199.1	204.9	209.9	212.9
Peak day	196.4	204.6	213.0	219.2	224.6	227.8
Peak 7 day	189.0	196.9	205.1	211.0	216.2	219.3
December demands						
Average monthly	181.6	189.2	197.0	202.7	207.7	210.6
Peak day	196.1	204.3	212.7	218.9	224.3	227.5
Peak 7 day	187.0	194.9	202.9	208.8	213.9	217.0
Peak 30 day demand	228.4	238.0	247.8	255.0	261.3	265.0
Peak 60 day demand	224.5	233.9	243.6	250.6	256.8	260.5
Peak 90 day demand	220.6	229.9	239.4	246.3	252.3	255.9
Peak 120 day demand	216.7	225.8	235.1	241.9	247.9	251.4
Peak 180 day demand	208.9	217.7	226.6	233.2	238.9	242.3

WATER CONSERVATION SCENARIOS - This method seperates water use into base level (mainly indoor and nonseasonal employment-related) water use and seasonal (mainly outdoor and seasonal employment-related) water use. It assumes base level water use can be determined from the lowest monthly demand factor (February). This method reduces base level was use from 5 - 10% and seasonal water use from 25 - 50%.

WATER CONSERVATION FACTORS

	Scenario 1	Scenario 2
percentage of annual average demand devoted to base level water use	0.91	0.91
percent reduction in base level water use	5	10
percent reduction in seasonal water use	25	50

ANNUAL WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 1
(conservation scenario 1 assumes a 5% reduction in base level water demand and a 25% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	8.9	9.3	9.6	9.9	10.2	10.3
Annual average reduction in seasonal water use	4.4	4.6	4.8	4.9	5.0	5.1
Annual average demand with reductions in water use	181.9	189.6	197.4	203.1	208.1	211.1

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 1
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	1.5	1.5	1.6	1.6	1.7	1.7
Average monthly	173.2	180.4	187.9	193.3	198.1	200.9
February demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	1.0	1.0	1.1	1.1	1.1	1.1
Average monthly	171.7	178.9	186.3	191.7	196.4	199.2
March demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	168.8	175.9	183.1	188.4	193.1	195.8

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	1.5	1.5	1.6	1.6	1.7	1.7
Average monthly	173.2	180.4	187.9	193.3	198.1	200.9
May demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	3.4	3.6	3.7	3.8	3.9	4.0
Average monthly	179.0	186.5	194.2	199.8	204.8	207.7
June demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	7.8	8.1	8.5	8.7	8.9	9.1
Average monthly	192.2	200.3	208.5	214.6	219.8	223.0
July demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	11.2	11.7	12.2	12.5	12.8	13.0
Average monthly	202.4	210.9	219.7	226.0	231.6	234.9
August demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	10.7	11.2	11.6	12.0	12.3	12.5
Average monthly	201.0	209.4	218.1	224.4	229.9	233.2
September demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	8.3	8.6	9.0	9.3	9.5	9.6
Average monthly	193.7	201.8	210.1	216.2	221.5	224.7
October demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	4.4	4.6	4.8	4.9	5.0	5.1
Average monthly	181.9	189.6	197.4	203.1	208.1	211.1

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	1.5	1.5	1.6	1.6	1.7	1.7
Average monthly	173.2	180.4	187.9	193.3	198.1	200.9
December demands						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	1.0	1.0	1.1	1.1	1.1	1.1
Average monthly	171.7	178.9	186.3	191.7	196.4	199.2
Peak 30 day demand						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	12.7	13.2	13.8	14.2	14.5	14.7
Average	206.8	215.5	224.4	230.9	236.6	240.0
Peak 60 day demand						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	11.7	12.2	12.7	13.1	13.4	13.6
Average	203.9	212.5	221.2	227.6	233.2	236.6
Peak 90 day demand						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	10.7	11.2	11.6	12.0	12.3	12.5
Average	201.0	209.4	218.1	224.4	229.9	233.2
Peak 120 day demand						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	9.8	10.2	10.6	10.9	11.2	11.3
Average	198.1	206.4	214.9	221.1	226.5	229.8
Peak 180 day demand						
SBW	8.9	9.3	9.6	9.9	10.2	10.3
SSW	7.8	8.1	8.5	8.7	8.9	9.1
Average	192.2	200.3	208.5	214.6	219.8	223.0

ANNUAL WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 2
(conservation scenario 1 assumes a 10% reduction in base level water demand and a 50% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	17.8	18.5	19.3	19.8	20.3	20.6
Annual average reduction in seasonal water use	8.8	9.2	9.5	9.8	10.0	10.2
Annual average demand with reductions in water use	168.7	175.8	183.0	188.3	192.9	195.7

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 2
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	2.9	3.1	3.2	3.3	3.3	3.4
Average monthly	162.8	169.7	176.7	181.8	186.2	188.9
February demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	2.0	2.0	2.1	2.2	2.2	2.3
Average monthly	161.8	168.6	175.6	180.7	185.1	187.8
March demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	159.9	166.6	173.5	178.5	182.9	185.5

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	2.9	3.1	3.2	3.3	3.3	3.4
Average monthly	162.8	169.7	176.7	181.8	186.2	188.9
May demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	6.8	7.1	7.4	7.6	7.8	7.9
Average monthly	166.7	173.7	180.9	186.1	190.7	193.4
June demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	15.6	16.3	16.9	17.4	17.9	18.1
Average monthly	175.5	182.9	190.4	195.9	200.8	203.6
July demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	22.5	23.4	24.4	25.1	25.7	26.0
Average monthly	182.3	190.0	197.8	203.6	208.6	211.5
August demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	21.5	22.4	23.3	24.0	24.6	24.9
Average monthly	181.4	189.0	196.8	202.5	207.5	210.4
September demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	16.6	17.3	18.0	18.5	19.0	19.3
Average monthly	176.5	183.9	191.5	197.0	201.9	204.7
October demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	8.8	9.2	9.5	9.8	10.0	10.2
Average monthly	168.7	175.8	183.0	188.3	192.9	195.7

MONTHLY WATER DEMANDS FOR WAD FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	2.9	3.1	3.2	3.3	3.3	3.4
Average monthly	162.8	169.7	176.7	181.8	186.2	188.9
December demands						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	2.0	2.0	2.1	2.2	2.2	2.3
Average monthly	161.8	168.6	175.6	180.7	185.1	187.8
Peak 30 day demand						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	25.4	26.4	27.5	28.3	29.0	29.4
Average	185.3	193.0	201.0	206.8	211.9	214.9
Peak 60 day demand						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	23.4	24.4	25.4	26.2	26.8	27.2
Average	183.3	191.0	198.9	204.6	209.7	212.7
Peak 90 day demand						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	21.5	22.4	23.3	24.0	24.6	24.9
Average	181.4	189.0	196.8	202.5	207.5	210.4
Peak 120 day demand						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	19.5	20.3	21.2	21.8	22.3	22.6
Average	179.4	186.9	194.7	200.3	205.2	208.1
Peak 180 day demand						
SBW	17.8	18.5	19.3	19.8	20.3	20.6
SSW	15.6	16.3	16.9	17.4	17.9	18.1
Average	175.5	182.9	190.4	195.9	200.8	203.6

Appendix J - Disaggregated Forecast of Water Supply Demands for FCWA

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY FCWA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in Fairfax County	182844	222653	259520	287160	300181	309948
Total number of single family households in Fairfax County	139310	169641	197136	214828	217940	218787
Total number of multi-family households in Fairfax County	43534	53012	62384	72332	82241	91161
Total number of employees in Fairfax County	180465	232687	291265	347265	383415	420115

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY LCSA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in Loudoun County	10383	15983	22334	29228	36324	43766
Total number of single family households in Loudoun County	8307	12787	17868	23383	29060	35013
Total number of multi-family households in Loudoun County	2076	3196	4466	5845	7264	8753
Total number of employees in Loudoun County	8334	12590	19587	27867	38760	51268

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY PWCSA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in eastern Prince William County	26720	38379	49142	54377	58591	62693
Total number of single family households in eastern Prince William County	22672	32288	41006	44970	47977	50775
Total number of multi-family households in eastern Prince William County	4048	6091	8136	9407	10614	11918
Total number of employees in eastern Prince William County	14009	22479	25383	29692	35603	42476
Total number of households in western Prince William County	13259	18339	24205	27788	30437	33067
Total number of single family households in western Prince William County	11251	15429	20198	22981	24924	26781
Total number of multi-family households in western Prince William County	2008	2910	4007	4807	5513	6286
Total number of employees in western Prince William County	11395	18546	22979	29413	39052	53340

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY VAWC FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in Alexandria	54208	55580	57615	59183	60728	61925
Total number of single family households in Alexandria	18070	18527	19205	19728	20243	20642
Total number of multi-family households in Alexandria	36138	37053	38410	39455	40485	41283
Total number of employees in Alexandria	75300	94673	124112	148311	162779	167588
Total number of households in Dale City	10082	13134	15214	17341	18379	19588
Total number of single family households in Dale City	7682	10007	11557	12973	13344	13827
Total number of multi-family households in Dale City	2400	3127	3657	4368	5035	5761
Total number of employees in Dale City	2301	4209	5164	6266	7559	9083

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES FOR HERNDON, FORT BELVOIR DULLES AIRPORT AND LORTON CORRECTIONAL FACILITY FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in town of Herndon	4616	5760	6554	7152	7482	7728
Total number of single family households in town of Herndon	3517	4389	4979	5351	5433	5456
Total number of multi-family households in town of Herndon	1099	1371	1575	1801	2049	2272
Total number of employees in town of Herndon	3967	6467	7067	7667	8267	8667
Total number of households in Fort Belvoir	247	382	588	742	771	793
Total number of single family households in Fort Belvoir	189	292	447	556	560	560
Total number of multi-family households in Fort Belvoir	58	90	141	186	211	233
Total number of employees in Fort Belvoir	15061	15061	15061	15061	15061	15061
Total number of employees in Dulles Airport	6215	9650	12036	14864	16401	18391
Total number of people in Lorton	3543	4642	4631	4621	4588	4587

ANNUAL WATER DEMANDS FOR LCSA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day	2.1	3.3	4.6	6.0	7.4	9.0
Total demand from multi-family households in millions of gallons per day	0.4	0.6	0.8	1.0	1.3	1.5
Total demand from employees in millions of gallons per day	0.4	0.6	0.9	1.2	1.7	2.3
Total demand from unaccounted water use in millions of gallons per day	0.4	0.6	0.8	1.1	1.4	1.7
Total demand from process water use in millions of gallons per day	0.0	0.0	0.0	0.0	0.0	0.0
Total annual average demand for LCSA service area in millions of gallons per day	3.3	5.0	7.1	9.4	11.9	14.5

ANNUAL WATER DEMANDS FOR PWCSA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day for eastern PW County	5.7	8.1	10.3	11.2	12.0	12.7
Total demand from multi-family households in millions of gallons per day for eastern PW County	1.0	1.5	2.0	2.4	2.7	3.0
Total demand from employees in millions of gallons per day for eastern PW County	0.6	1.0	1.1	1.3	1.6	1.9
Total demand from unaccounted water use in millions of gallons per day for eastern PW County	1.0	1.4	1.8	2.0	2.2	2.4
Total demand from process water use in millions of gallons per day for eastern PW County	0.5	0.8	1.0	1.1	1.2	1.3
Total annual average demand for eastern PWCSA service area in millions of gallons per day	8.8	12.8	16.2	18.1	19.6	21.3

Total demand from single family households in millions of gallons per day for western PW County	2.8	3.9	5.0	5.7	6.2	6.7
Total demand from multi-family households in millions of gallons per day for western PW County	0.5	0.7	1.0	1.2	1.4	1.6
Total demand from employees in millions of gallons per day for western PW County	0.5	0.8	1.0	1.3	1.7	2.3
Total demand from unaccounted water use in millions of gallons per day for western PW County	0.5	0.7	1.0	1.1	1.3	1.4
Total demand from process water use in millions of gallons per day for western PW County	0.0	0.0	0.0	0.0	0.0	0.0
Total annual average demand for western PWCSA service area in millions of gallons per day	4.3	6.1	8.0	9.4	10.6	12.1
Total annual average demand for both western and eastern PWCSA service area in millions of gallons per day	13.2	19.0	24.3	27.4	30.2	33.3

ANNUAL WATER DEMANDS FOR VAWC FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day for Alexandria	3.8	3.9	4.1	4.2	4.3	4.4
Total demand from multi-family households in millions of gallons per day for Alexandria	6.4	6.6	6.8	7.0	7.2	7.3
Total demand from employees in millions of gallons per day for Alexandria	3.3	4.2	5.5	6.5	7.2	7.4
Total demand from unaccounted water use in millions of gallons per day for Alexandria	1.8	2.0	2.2	2.4	2.5	2.6
Total demand from process water use in millions of gallons per day for Alexandria	1.0	1.1	1.2	1.3	1.4	1.4
Total annual average demand for Alexandria service area in millions of gallons per day	16.4	17.8	19.8	21.4	22.6	23.1

Total demand from single family households in millions of gallons per day for Dale City	1.7	2.2	2.6	2.9	3.0	3.1
Total demand from multi-family households in millions of gallons per day for Dale City	0.4	0.6	0.6	0.8	0.9	1.0
Total demand from employees in millions of gallons per day for Dale City	0.1	0.2	0.2	0.3	0.3	0.4
Total demand from unaccounted water use in millions of gallons per day for Dale City	0.3	0.4	0.5	0.5	0.6	0.6
Total demand from process water use in millions of gallons per day for Dale City	0.2	0.2	0.3	0.3	0.3	0.3
Total annual average demand for Dale City service area in millions of gallons per day	2.7	3.6	4.2	4.8	5.1	5.4
Total annual average demand for both Alexandria and Dale City service area in millions of gallons per day	19.1	21.3	24.0	26.2	27.6	28.5

ANNUAL WATER DEMANDS FOR HERNDON, FORT BELVOIR, DULLES AIRPORT AND LORTON CORRECTIONAL FACILITY FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day for Herndon	0.7	0.9	1.1	1.1	1.2	1.2
Total demand from multi-family households in millions of gallons per day for Herndon	0.2	0.2	0.3	0.3	0.4	0.4
Total demand from employees in millions of gallons per day for Herndon	0.2	0.3	0.3	0.3	0.4	0.4
Total annual average demand for Herndon service area in millions of gallons per day	1.1	1.5	1.6	1.8	1.9	1.9
Total demand from single family households in millions of gallons per day for Fort Belvoir	0.0	0.1	0.1	0.1	0.1	0.1
Total demand from multi-family households in millions of gallons per day for Fort Belvoir	0.0	0.0	0.0	0.0	0.0	0.0

Total demand from employees in millions of gallons per day for Fort Belvoir	2.8	2.8	2.8	2.8	2.8	2.8
Total annual average demand for Fort Belvoir service area in millions of gallons per day	2.8	2.9	2.9	2.9	2.9	2.9
Total demand from employees in millions of gallons per day for Dulles Airport	0.3	0.5	0.7	0.8	0.9	1.0
Total per capita demand in millions of gallons per day for Lorton	0.9	1.2	1.2	1.2	1.2	1.2
Total demand from unaccounted water use for above users in millions of gallons per day	0.6	0.8	0.9	0.9	0.9	1.0
Total demand from process water use for above users in millions of gallons per day	0.1	0.2	0.2	0.2	0.3	0.3
Total untreated water demand from Vulcan Materials in millions of gallons per day	0.5	0.5	0.5	0.5	0.5	0.5
Total demand from Herndon, Fort Belvoir, Dulles Airport, Lorton and Vulcan Materials in millions of gallons per day*	5.3	7.6	8.0	8.4	8.6	8.8

Total annual average demand for LCSA service area in millions of gallons per day	3.3	5.0	7.1	9.4	11.9	14.5
Total annual average demand for eastern PWCSA service area in millions of gallons per day	8.8	12.8	16.2	18.1	19.6	21.3
Total annual average demand for western PWCSA service area in millions of gallons per day	4.3	6.1	8.0	9.4	10.6	12.1
Total annual average demand for both VAWC's Alexandria and Dale City service area in millions of gallons per day	19.1	21.3	24.0	26.2	27.6	28.5
Total annual average demand for all of FCWA's indirect service area in millions of gallons per day**	33.3	41.8	63.3	71.4	78.4	85.2

*note: Herdon is not included in 1985 forecast - not served by FCWA in 1985

**note: LCSA and western PWCSA are not included in the 1985 and 1990 forecast - not served by FCWA until 1995 forecast

ANNUAL WATER DEMANDS FOR FCWA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total demand from single family households in millions of gallons per day	33.4	40.7	47.3	51.6	52.3	52.5
Total demand from multi-family households in millions of gallons per day	7.7	9.4	11.0	12.8	14.6	16.1
Total demand from employees in millions of gallons per day	7.9	10.2	12.8	15.3	16.9	18.5
Total demand from unaccounted water use in millions of gallons per day	6.7	8.2	9.7	10.9	11.4	11.9
Total demand from process water use in millions of gallons per day	1.8	2.2	2.6	2.9	3.0	3.2
Total annual average demand for FCWA's direct service area in millions of gallons per day	57.6	70.8	83.5	93.4	98.2	102.2
Total annual average demand for FCWA's indirect service area in millions of gallons per day	33.3	41.8	63.3	71.4	78.4	85.2
Total annual average demand for FCWA's total service area in millions of gallons per day	90.9	112.6	146.8	164.8	176.6	187.4

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
January demands						
Average monthly	80.9	100.2	130.6	146.7	157.2	166.8
Peak day	88.9	110.2	143.7	161.3	172.9	183.4
Peak 7 day	83.3	103.2	134.5	151.1	161.9	171.8
February demands						
Average monthly	78.1	96.8	126.2	141.7	151.9	161.1
Peak day	85.9	106.5	138.8	155.9	167.1	177.3
Peak 7 day	80.5	99.7	130.0	146.0	156.4	166.0
March demands						
Average monthly	80.9	100.2	130.6	146.7	157.2	166.8
Peak day	88.9	110.2	143.7	161.3	172.9	183.4
Peak 7 day	84.1	104.2	135.8	152.5	163.4	173.4
April demands						
Average monthly	85.4	105.8	138.0	154.9	166.0	176.1
Peak day	99.1	122.7	160.0	179.7	192.6	204.3
Peak 7 day	91.4	113.2	147.6	165.7	177.6	188.5
May demands						
Average monthly	95.4	118.2	154.1	173.0	185.4	196.7
Peak day	116.4	144.2	188.0	211.1	226.2	240.0
Peak 7 day	104.9	130.0	169.5	190.3	204.0	216.4
June demands						
Average monthly	103.6	128.3	167.3	187.9	201.3	213.6
Peak day	126.4	156.5	204.1	229.2	245.6	260.6
Peak 7 day	115.0	142.4	185.7	208.5	223.5	237.1
July demands						
Average monthly	108.1	133.9	174.6	196.1	210.1	223.0
Peak day	134.1	166.1	216.6	243.2	260.6	276.5
Peak 7 day	122.2	151.3	197.3	221.6	237.5	252.0

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
August demands						
Average monthly	102.7	127.2	165.8	186.2	199.5	211.7
Peak day	123.2	152.6	199.0	223.5	239.5	254.1
Peak 7 day	111.9	138.6	180.8	203.0	217.5	230.8
September demands						
Average monthly	98.1	121.6	158.5	178.0	190.7	202.4
Peak day	118.7	147.1	191.8	215.3	230.8	244.9
Peak 7 day	107.0	132.5	172.8	194.0	207.9	220.6
October demands						
Average monthly	89.9	111.4	145.3	163.1	174.8	185.5
Peak day	99.8	123.7	161.3	181.1	194.1	205.9
Peak 7 day	93.5	115.9	151.1	169.7	181.8	192.9
November demands						
Average monthly	83.6	103.5	135.0	151.6	162.5	172.4
Peak day	91.1	112.9	147.2	165.3	177.1	187.9
Peak 7 day	86.1	106.7	139.1	156.2	167.3	177.6
December demands						
Average monthly	82.7	102.4	133.5	150.0	160.7	170.5
Peak day	90.1	111.6	145.6	163.5	175.2	185.9
Peak 7 day	85.2	105.5	137.6	154.5	165.5	175.6
Peak 30 day demand	114.5	141.8	184.9	207.6	222.5	236.1
Peak 60 day demand	109.0	135.1	176.1	197.7	211.9	224.8
Peak 90 day demand	107.2	132.8	173.2	194.5	208.4	221.1
Peak 120 day demand	104.5	129.4	168.8	189.5	203.1	215.5
Peak 180 day demand	99.9	123.8	161.4	181.3	194.2	206.1

WATER CONSERVATION SCENARIOS - This method seperates water use into base level (mainly indoor and nonseasonal employment-related) water use and seasonal (mainly outdoor and seasonal employment-related) water use. It assumes base level water use can be determined from the lowest monthly demand factor (February). This method reduces base level was use from 5 - 10% and seasonal water use from 25 - 50%.

WATER CONSERVATION FACTORS

	Scenario 1	Scenario 2
percentage of annual average demand devoted to base level water use	0.86	0.86
percent reduction in base level water use	5	10
percent reduction in seasonal water use	25	50

ANNUAL WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 1
(conservation scenario 1 assumes a 5% reduction in base level water demand and a 25% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	3.9	4.8	6.3	7.1	7.6	8.1
Annual average reduction in seasonal water use	3.2	3.9	5.1	5.8	6.2	6.6
Annual average demand with reductions in water use	83.8	103.8	135.3	151.9	162.8	172.8

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 1
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	0.7	0.8	1.1	1.2	1.3	1.4
Average monthly	76.3	94.5	123.2	138.3	148.2	157.3
February demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	74.2	92.0	119.9	134.6	144.3	153.1
March demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	0.7	0.8	1.1	1.2	1.3	1.4
Average monthly	76.3	94.5	123.2	138.3	148.2	157.3

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	1.8	2.3	2.9	3.3	3.5	3.7
Average monthly	79.7	98.7	128.7	144.5	154.9	164.3
May demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	4.3	5.3	7.0	7.8	8.4	8.9
Average monthly	87.2	108.0	140.8	158.1	169.4	179.8
June demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	6.4	7.9	10.3	11.5	12.4	13.1
Average monthly	93.3	115.6	150.7	169.2	181.4	192.4
July demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	7.5	9.3	12.1	13.6	14.6	15.5
Average monthly	96.7	119.8	156.2	175.4	188.0	199.5
August demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	6.1	7.6	9.9	11.1	11.9	12.6
Average monthly	92.6	114.7	149.6	168.0	180.0	191.0
September demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	5.0	6.2	8.1	9.1	9.7	10.3
Average monthly	89.2	110.5	144.1	161.8	173.4	184.0
October demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	3.0	3.7	4.8	5.4	5.7	6.1
Average monthly	83.1	102.9	134.2	150.7	161.5	171.4

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	1.4	1.7	2.2	2.5	2.6	2.8
Average monthly	78.3	97.0	126.5	142.0	152.2	161.5
December demands						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	1.1	1.4	1.8	2.1	2.2	2.3
Average monthly	77.6	96.2	125.4	140.8	150.9	160.1
Peak 30 day demand						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	9.1	11.3	14.7	16.5	17.7	18.7
Average	101.5	125.7	163.9	184.1	197.2	209.3
Peak 60 day demand						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	7.7	9.6	12.5	14.0	15.0	15.9
Average	97.4	120.7	157.3	176.7	189.3	200.9
Peak 90 day demand						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	7.3	9.0	11.7	13.2	14.1	15.0
Average	96.0	119.0	155.1	174.2	186.7	198.1
Peak 120 day demand						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	6.6	8.2	10.6	11.9	12.8	13.6
Average	94.0	116.4	151.8	170.5	182.7	193.8
Peak 180 day demand						
SBW	3.9	4.8	6.3	7.1	7.6	8.1
SSW	5.5	6.8	8.8	9.9	10.6	11.2
Average	90.6	112.2	146.3	164.3	176.1	186.8

ANNUAL WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 2
(conservation scenario 1 assumes a 10% reduction in base level water demand and a 50% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	7.8	9.7	12.6	14.2	15.2	16.1
Annual average reduction in seasonal water use	6.4	7.9	10.3	11.5	12.4	13.1
Annual average demand with reductions in water use	76.7	95.0	123.9	139.1	149.0	158.1

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 2
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	1.4	1.7	2.2	2.5	2.6	2.8
Average monthly	71.7	88.8	115.8	130.0	139.3	147.8
February demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	70.3	87.1	113.6	127.5	136.7	145.0
March demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	1.4	1.7	2.2	2.5	2.6	2.8
Average monthly	71.7	88.8	115.8	130.0	139.3	147.8

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	3.6	4.5	5.9	6.6	7.1	7.5
Average monthly	74.0	91.6	119.5	134.1	143.7	152.5
May demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	8.6	10.7	13.9	15.7	16.8	17.8
Average monthly	79.0	97.8	127.5	143.2	153.5	162.8
June demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	12.7	15.8	20.5	23.1	24.7	26.2
Average monthly	83.0	102.9	134.1	150.6	161.4	171.3
July demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	15.0	18.6	24.2	27.2	29.1	30.9
Average monthly	85.3	105.7	137.8	154.7	165.8	175.9
August demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	12.3	15.2	19.8	22.2	23.8	25.3
Average monthly	82.6	102.3	133.4	149.8	160.5	170.3
September demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	10.0	12.4	16.1	18.1	19.4	20.6
Average monthly	80.3	99.5	129.7	145.7	156.1	165.6
October demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	5.9	7.3	9.5	10.7	11.5	12.2
Average monthly	76.2	94.4	123.1	138.3	148.2	157.2

MONTHLY WATER DEMANDS FOR FCWA FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	2.7	3.4	4.4	4.9	5.3	5.6
Average monthly	73.0	90.5	118.0	132.5	142.0	150.6
December demands						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	2.3	2.8	3.7	4.1	4.4	4.7
Average monthly	72.6	89.9	117.3	131.7	141.1	149.7
Peak 30 day demand						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	18.2	22.5	29.4	33.0	35.3	37.5
Average	88.5	109.6	142.9	160.5	172.0	182.5
Peak 60 day demand						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	15.4	19.1	24.9	28.0	30.0	31.9
Average	85.8	106.2	138.5	155.6	166.7	176.9
Peak 90 day demand						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	14.5	18.0	23.5	26.4	28.3	30.0
Average	84.9	105.1	137.1	153.9	164.9	175.0
Peak 120 day demand						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	13.2	16.3	21.3	23.9	25.6	27.2
Average	83.5	103.4	134.9	151.4	162.3	172.2
Peak 180 day demand						
SBW	7.8	9.7	12.6	14.2	15.2	16.1
SSW	10.9	13.5	17.6	19.8	21.2	22.5
Average	81.2	100.6	131.2	147.3	157.9	167.5

Appendix K - Disaggregated Forecast of Water Supply Demands for WSSC

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY WSSC FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in Montgomery County	217440	260255	290095	314110	331976	342853
Total number of single family households in Montgomery County	150741	183257	207447	226125	238725	247351
Total number of multi-family households in Montgomery County	66699	76998	82648	87985	93251	95502
Total number of households in Prince George's County	228012	249065	264228	280662	298095	319896
Total number of single family households in Prince George's County	92687	95427	97862	100595	104594	109553
Total number of multi-family households in Prince George's County	135325	153638	166366	180067	193501	210343
Total number of employees in Montgomery and Prince George's counties	588993	700586	782650	874181	957550	1043860

ANNUAL WATER DEMANDS FOR WSSC FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
single family households in millions of gallons per day	58.7	67.2	73.6	78.7	82.7	86.0
Total demand from multi-family households in millions of gallons per day	45.3	51.7	55.8	60.0	64.2	68.5
Total demand from employees in millions of gallons per day	34.2	40.6	45.4	50.7	55.5	60.5
Total demand from unaccounted water use in millions of gallons per day	18.6	21.5	23.6	25.6	27.3	29.0
Total demand from process water use in millions of gallons per day	0.0	0.0	0.0	0.0	0.0	0.0
Total demand from long term contracts (7.5 mgd from Howard and 3.1 mgd from Charles counties ultimately)	1	1.4	3.7	6	8.3	10.6
Total annual average demand in millions of gallons per day	157.7	182.4	202.0	221.1	238.1	254.7

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
January demands						
Average monthly	146.7	169.6	187.9	205.6	221.5	236.9
Peak day	161.3	186.6	206.7	226.2	243.6	260.6
Peak 7 day	151.1	174.7	193.5	211.8	228.1	244.0
February demands						
Average monthly	145.1	167.8	185.9	203.4	219.1	234.3
Peak day	158.2	182.9	202.6	221.7	238.8	255.4
Peak 7 day	148.0	171.2	189.6	207.4	223.5	239.0
March demands						
Average monthly	143.5	166.0	183.9	201.2	216.7	231.8
Peak day	155.0	179.2	198.6	217.3	234.1	250.3
Peak 7 day	146.4	169.3	187.5	205.2	221.1	236.4
April demands						
Average monthly	148.3	171.4	189.9	207.8	223.9	239.4
Peak day	169.0	195.4	216.5	236.9	255.2	272.9
Peak 7 day	157.2	181.7	201.3	220.3	237.3	253.8
May demands						
Average monthly	159.3	184.2	204.1	223.3	240.5	257.2
Peak day	188.0	217.4	240.8	263.5	283.8	303.6
Peak 7 day	172.0	198.9	220.4	241.1	259.8	277.8
June demands						
Average monthly	171.9	198.8	220.2	241.0	259.6	277.6
Peak day	204.6	236.6	262.1	286.7	308.9	330.4
Peak 7 day	189.1	218.7	242.3	265.1	285.5	305.4
July demands						
Average monthly	179.8	207.9	230.3	252.0	271.5	290.4
Peak day	214.0	247.4	274.1	299.9	323.1	345.5
Peak 7 day	197.8	228.7	253.4	277.2	298.6	319.4
August demands						
Average monthly	173.5	200.6	222.2	243.2	262.0	280.2
Peak day	199.5	230.7	255.6	279.6	301.3	322.2
Peak 7 day	183.9	212.7	235.6	257.8	277.7	297.0

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
September demands						
Average monthly	167.2	193.3	214.2	234.3	252.4	270.0
Peak day	188.9	218.5	242.0	264.8	285.3	305.1
Peak 7 day	178.9	206.9	229.2	250.7	270.1	288.9
October demands						
Average monthly	156.1	180.6	200.0	218.9	235.8	252.2
Peak day	171.8	198.6	220.0	240.7	259.3	277.4
Peak 7 day	160.8	186.0	206.0	225.4	242.8	259.7
November demands						
Average monthly	151.4	175.1	194.0	212.2	228.6	244.5
Peak day	165.0	190.8	211.4	231.3	249.2	266.5
Peak 7 day	154.4	178.6	197.8	216.5	233.2	249.4
December demands						
Average monthly	148.3	171.4	189.9	207.8	223.9	239.4
Peak day	164.6	190.3	210.8	230.7	248.5	265.8
Peak 7 day	152.7	176.6	195.6	214.0	230.6	246.6
Peak 30 day demand	187.7	217.0	240.4	263.1	283.4	303.1
Peak 60 day demand	181.4	209.7	232.4	254.2	273.9	292.9
Peak 90 day demand	176.6	204.3	226.3	247.6	266.7	285.3
Peak 120 day demand	173.5	200.6	222.2	243.2	262.0	280.2
Peak 180 day demand	168.8	195.2	216.2	236.5	254.8	272.5

WATER CONSERVATION SCENARIOS - This method seperates water use into base level (mainly indoor and nonseasonal employment-related) water use and seasonal (mainly outdoor and seasonal employment-related) water use. It assumes base level water use can be determined from the lowest monthly demand factor (March). This method reduces base level was use from 5 - 10% and seasonal water use from 25 - 50%.

WATER CONSERVATION FACTORS

	Scenario 1	Scenario 2
percentage of annual average demand devoted to base level water use	0.91	0.91
percent reduction in base level water use	5	10
percent reduction in seasonal water use	25	50

ANNUAL WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 1
(conservation scenario 1 assumes a 5% reduction in base level water demand and a 25% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	7.2	8.3	9.2	10.1	10.8	11.6
Annual average reduction in seasonal water use	3.5	4.1	4.5	5.0	5.4	5.7
Annual average demand with reductions in water use	147.0	170.0	188.3	206.0	222.0	237.4

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 1
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	0.8	0.9	1.0	1.1	1.2	1.3
Average monthly	138.7	160.4	177.7	194.4	209.5	224.0
February demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	0.4	0.5	0.5	0.6	0.6	0.6
Average monthly	137.5	159.0	176.2	192.8	207.7	222.1
March demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	136.4	157.7	174.7	191.1	205.9	220.2

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	1.2	1.4	1.5	1.7	1.8	1.9
Average monthly	139.9	161.8	179.2	196.1	211.2	225.9
May demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	3.9	4.6	5.1	5.5	6.0	6.4
Average monthly	148.2	171.4	189.8	207.7	223.7	239.3
June demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	7.1	8.2	9.1	9.9	10.7	11.5
Average monthly	157.6	182.3	201.9	221.0	238.0	254.6
July demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	9.1	10.5	11.6	12.7	13.7	14.6
Average monthly	163.6	189.1	209.5	229.2	247.0	264.1
August demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	7.5	8.7	9.6	10.5	11.3	12.1
Average monthly	158.8	183.7	203.5	222.6	239.8	256.5
September demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	5.9	6.8	7.6	8.3	8.9	9.6
Average monthly	154.1	178.2	197.4	216.0	232.7	248.8
October demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	3.2	3.6	4.0	4.4	4.8	5.1
Average monthly	145.8	168.6	186.8	204.4	220.2	235.5

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	2.0	2.3	2.5	2.8	3.0	3.2
Average monthly	142.3	164.5	182.2	199.4	214.8	229.7
December demands						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	1.2	1.4	1.5	1.7	1.8	1.9
Average monthly	139.9	161.8	179.2	196.1	211.2	225.9
Peak 30 day demand						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	11.0	12.8	14.1	15.5	16.7	17.8
Average	169.5	196.0	217.1	237.5	255.9	273.7
Peak 60 day demand						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	9.5	10.9	12.1	13.3	14.3	15.3
Average	164.7	190.5	211.0	230.9	248.7	266.0
Peak 90 day demand						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	8.3	9.6	10.6	11.6	12.5	13.4
Average	161.2	186.4	206.5	225.9	243.4	260.3
Peak 120 day demand						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	7.5	8.7	9.6	10.5	11.3	12.1
Average	158.8	183.7	203.5	222.6	239.8	256.5
Peak 180 day demand						
SBW	7.2	8.3	9.2	10.1	10.8	11.6
SSW	6.3	7.3	8.1	8.8	9.5	10.2
Average	155.3	179.6	198.9	217.6	234.5	250.8

ANNUAL WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 2
(conservation scenario 1 assumes a 10% reduction in base level water demand and a 50% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	14.4	16.6	18.4	20.1	21.7	23.2
Annual average reduction in seasonal water use	7.1	8.2	9.1	9.9	10.7	11.5
Annual average demand with reductions in water use	136.3	157.6	174.6	191.0	205.8	220.1

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 2
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	1.6	1.8	2.0	2.2	2.4	2.5
Average monthly	130.8	151.2	167.5	183.3	197.4	211.1
February demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	0.8	0.9	1.0	1.1	1.2	1.3
Average monthly	130.0	150.3	166.5	182.2	196.2	209.9
March demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	129.2	149.4	165.5	181.1	195.0	208.6

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	2.4	2.7	3.0	3.3	3.6	3.8
Average monthly	131.5	152.1	168.5	184.4	198.6	212.4
May demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	7.9	9.1	10.1	11.1	11.9	12.7
Average monthly	137.1	158.5	175.6	192.1	207.0	221.3
June demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	14.2	16.4	18.2	19.9	21.4	22.9
Average monthly	143.4	165.8	183.7	200.9	216.5	231.5
July demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	18.1	21.0	23.2	25.4	27.4	29.3
Average monthly	147.3	170.3	188.7	206.5	222.4	237.9
August demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	15.0	17.3	19.2	21.0	22.6	24.2
Average monthly	144.2	166.7	184.7	202.1	217.7	232.8
September demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	11.8	13.7	15.2	16.6	17.9	19.1
Average monthly	141.0	163.1	180.6	197.6	212.9	227.7
October demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	6.3	7.3	8.1	8.8	9.5	10.2
Average monthly	135.5	156.7	173.6	189.9	204.6	218.8

MONTHLY WATER DEMANDS FOR WSSC FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	3.9	4.6	5.1	5.5	6.0	6.4
Average monthly	133.1	153.9	170.5	186.6	201.0	215.0
December demands						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	2.4	2.7	3.0	3.3	3.6	3.8
Average monthly	131.5	152.1	168.5	184.4	198.6	212.4
Peak 30 day demand						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	22.1	25.5	28.3	30.9	33.3	35.7
Average	151.3	174.9	193.8	212.0	228.4	244.3
Peak 60 day demand						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	18.9	21.9	24.2	26.5	28.6	30.6
Average	148.1	171.3	189.7	207.6	223.6	239.2
Peak 90 day demand						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	16.6	19.2	21.2	23.2	25.0	26.7
Average	145.7	168.5	186.7	204.3	220.0	235.3
Peak 120 day demand						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	15.0	17.3	19.2	21.0	22.6	24.2
Average	144.2	166.7	184.7	202.1	217.7	232.8
Peak 180 day demand						
SBW	14.4	16.6	18.4	20.1	21.7	23.2
SSW	12.6	14.6	16.2	17.7	19.1	20.4
Average	141.8	164.0	181.6	198.7	214.1	229.0

Appendix L - Disaggregated Forecast of Water Supply Demands for Rockville, Maryland and Leesburg, Virginia

LONG TERM WATER DEMAND MODEL FOR OTHER SERVICE AREAS BESIDES CO-OP (FCWA, WSSC, AND WAD) UTILITIES - this model covers the city of Rockville, Maryland and the town of Leesburg, Virginia, both of which obtain their raw water from the Potomac River and maintain their own treatment facilities.

CITY OF ROCKVILLE WATER
DEMAND FORCAST FOR 1985 - 2010

CONSUMPTION AND DEMOGRAPHIC FACTORS

YEAR	1985	1990	1995	2000	2005	2010
average water consumption per single family household in gallons per day	241	241	241	241	241	241
average water consumption per multi-family household in gallons per day	224	224	224	224	224	224
average water consumption per employee in gallons per day	58	58	58	58	58	58
single family to multi-family dwelling unit ratio for the city of Rockville	2.71	2.7	2.39	2.12	2.02	2.02
unaccounted water use in percent of total	13.5	13.5	13.5	13.5	13.5	13.5
process water use in percent of total	0	0	0	0	0	0

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY ROCKVILLE FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in City of Rockville	12844	13576	14958	16080	16093	16093
Total number of single family households in City of Rockville	9383	9907	10546	10927	10765	10765
Total number of multi-family households in City of Rockville	3461	3669	4412	5153	5328	5328
Total number of employees in City of Rockville	29445	37099	48076	53668	57658	60704

ANNUAL WATER DEMANDS FOR ROCKVILLE FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
single family households in millions of gallons per day	2.3	2.4	2.5	2.6	2.6	2.6
Total demand from multi-family households in millions of gallons per day	0.8	0.8	1.0	1.2	1.2	1.2
Total demand from employees in millions of gallons per day	1.7	2.2	2.8	3.1	3.3	3.5
Total demand from unaccounted water use in millions of gallons per day	0.7	0.8	1.0	1.1	1.1	1.1
Total demand from process water use in millions of gallons per day	0.0	0.0	0.0	0.0	0.0	0.0
Total annual average demand in millions of	5.5	6.2	7.3	8.0	8.2	8.4

TOWN OF LEESBURG WATER
DEMAND FORCAST FOR 1985 - 2010

CONSUMPTION AND DEMOGRAPHIC FACTORS

YEAR	1985	1990	1995	2000	2005	2010
average water consumption per single family household in gallons per day	256	256	256	256	256	256
average water consumption per multi-family household in gallons per day	177	177	177	177	177	177
average water consumption per employee in gallons per day	44	44	44	44	44	44
single family to multi-family dwelling unit ratio for town of Leesburg	4	4	4	4	4	4
unaccounted water use in percent of total	15	15	15	15	15	15
process water use in percent of total	0	0	0	0	0	0

TOTAL NUMBER OF HOUSEHOLDS AND EMPLOYEES SERVED BY LEESBURG FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total number of households in Town of Leesburg	3936	5498	7271	9257	11332	13604
Total number of single family households in Town of Leesburg	3149	4399	5817	7406	9066	10884
Total number of multi-family households in Town of Leesburg	787	1099	1454	1851	2266	2720
Total number of employees in Town of Leesburg	6393	8490	10500	12876	15642	18820

ANNUAL WATER DEMANDS FOR LEESBURG FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
single family households in millions of gallons per day	0.8	1.1	1.5	1.9	2.3	2.8
Total demand from multi-family households in millions of gallons per day	0.1	0.2	0.3	0.3	0.4	0.5
Total demand from employees in millions of gallons per day	0.3	0.4	0.5	0.6	0.7	0.8
Total demand from unaccounted water use in millions of gallons per day	0.2	0.3	0.4	0.5	0.6	0.7
Total demand from process water use in millions of gallons per day	0.0	0.0	0.0	0.0	0.0	0.0
Total annual average demand in millions of gallons per day	1.4	2.0	2.6	3.3	4.0	4.8

Appendix M - Disaggregated Forecast of Water Supply Demands for System

WASHINGTON METROPOLITAN AREA LONG TERM
WATER SUPPLY DEMAND FORCAST FOR 1985 - 2010
The service area covered in this forecasts includes all of the metropolitan water supply utilities dependant on the Potomac River for a significant portion of their supply. This encompasses the Washington Aqueduct Division (WAD), the Washington Suburban Sanitary Commission (WSSC), and the Fairfax County Water Authority (FCWA) along with the town of Leesburg, Virginia and the city of Rockville, Maryland.

ANNUAL WATER DEMANDS FOR THE WASHINGTON METROPOLITAN AREA (WMA) FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
Total annual average demand for WAD in millions of gallons per day	195.2	203.4	211.8	217.9	223.3	226.5
Total annual average demand for WSSC in millions of gallons per day	157.7	182.4	202.0	221.1	238.1	254.7
Total annual average demand for FCWA in millions of gallons per day	90.9	112.6	146.8	164.8	176.6	187.4
Total annual average demand for the city of Rockville in millions of gallons per day	5.5	6.2	7.3	8.0	8.2	8.4
Total annual average demand for the town of Leesburg in millions of gallons per day	1.4	2.0	2.6	3.3	4.0	4.8
Total annual average demand the Washington Metropolitan water utilities in millions of gallons per day	450.7	506.6	570.5	615.1	650.2	681.8

MEAN 1 DAY, 7 DAY, AND MONTHLY PRODUCTION FACTORS - DERIVED FROM 1974-1988 PRODUCTION DATA
(held constant for the 1985 - 2010 time period)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
monthly average/ annual average production	0.93	0.91	0.91	0.94	1.00	1.09	1.15	1.12	1.07	1.00	0.94	0.93
peak day/ monthly average production	1.06	1.05	1.05	1.09	1.14	1.14	1.14	1.11	1.11	1.07	1.06	1.06
peak 7 day/ monthly average production	1.03	1.02	1.02	1.04	1.07	1.08	1.08	1.05	1.06	1.03	1.02	1.02

MEAN 30, 60, 90, 120, AND 180 PEAK PRODUCTION FACTORS - DERIVED FROM 1974-1988 PRODUCTION DATA
(held constant for the 1985 - 2010 time period)

	PEAK 30 DAY	PEAK 60 DAY	PEAK 90 DAY	PEAK 120 DAY	PEAK 180 DAY
peak/annual average production	1.19	1.15	1.13	1.11	1.08

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010

Year	1985	1990	1995	2000	2005	2010
January demands						
Average monthly	419.2	471.1	530.6	572.0	604.7	634.1
Peak day	444.3	499.4	562.4	606.4	641.0	672.1
Peak 7 day	431.7	485.3	546.5	589.2	622.8	653.1
February demands						
Average monthly	410.1	461.0	519.2	559.7	591.7	620.4
Peak day	430.6	484.1	545.1	587.7	621.3	651.5
Peak 7 day	418.3	470.2	529.5	570.9	603.5	632.8
March demands						
Average monthly	410.1	461.0	519.2	559.7	591.7	620.4
Peak day	430.6	484.1	545.1	587.7	621.3	651.5
Peak 7 day	418.3	470.2	529.5	570.9	603.5	632.8
April demands						
Average monthly	423.7	476.2	536.3	578.2	611.2	640.9
Peak day	461.8	519.1	584.5	630.2	666.2	698.6
Peak 7 day	440.6	495.3	557.7	601.3	635.6	666.5
May demands						
Average monthly	450.7	506.6	570.5	615.1	650.2	681.8
Peak day	513.8	577.5	650.4	701.2	741.2	777.3
Peak 7 day	482.2	542.1	610.4	658.2	695.7	729.5
June demands						
Average monthly	491.3	552.2	621.8	670.5	708.7	743.2
Peak day	560.0	629.5	708.9	764.3	807.9	847.2
Peak 7 day	530.6	596.4	671.6	724.1	765.4	802.6
July demands						
Average monthly	518.3	582.6	656.1	707.4	747.7	784.1
Peak day	590.9	664.2	747.9	806.4	852.4	893.8
Peak 7 day	559.8	629.2	708.6	764.0	807.5	846.8
August demands						
Average monthly	504.8	567.4	639.0	688.9	728.2	763.6
Peak day	560.3	629.8	709.2	764.7	808.3	847.6
Peak 7 day	530.0	595.8	670.9	723.4	764.6	801.8

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010 (continued)

Year	1985	1990	1995	2000	2005	2010
September demands						
Average monthly	482.2	542.1	610.4	658.2	695.7	729.5
Peak day	535.3	601.7	677.6	730.6	772.2	809.8
Peak 7 day	511.2	574.6	647.1	697.6	737.5	773.3
October demands						
Average monthly	450.7	506.6	570.5	615.1	650.2	681.8
Peak day	482.2	542.1	610.4	658.2	695.7	729.5
Peak 7 day	464.2	521.8	587.6	633.6	669.7	702.3
November demands						
Average monthly	423.7	476.2	536.3	578.2	611.2	640.9
Peak day	449.1	504.8	568.4	612.9	647.9	679.3
Peak 7 day	432.1	485.7	547.0	589.8	623.4	653.7
December demands						
Average monthly	419.2	471.1	530.6	572.0	604.7	634.1
Peak day	444.3	499.4	562.4	606.4	641.0	672.1
Peak 7 day	427.5	480.6	541.2	583.5	616.8	646.8
Peak 30 day demand	536.3	602.9	678.9	732.0	773.7	811.3
Peak 60 day demand	518.3	582.6	656.1	707.4	747.7	784.1
Peak 90 day demand	509.3	572.5	644.7	695.1	734.7	770.4
Peak 120 day demand	500.3	562.3	633.3	682.8	721.7	756.8
Peak 180 day demand	486.8	547.1	616.1	664.3	702.2	736.3

WATER CONSERVATION SCENARIOS - This method seperates water use into base level (mainly indoor and nonseasonal employment-related) water use and seasonal (mainly outdoor and seasonal employment-related) water use. It assumes base level water use can be determined from the lowest monthly demand factor (February). This method reduces base level was use from 5 - 10% and seasonal water use from 25 - 50%.

WATER CONSERVATION FACTORS

	Scenario 1	Scenario 2
percentage of annual average demand devoted to base level water use	0.91	0.91
percent reduction in base level water use	5	10
percent reduction in seasonal water use	25	50

ANNUAL WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 1
(conservation scenario 1 assumes a 5% reduction in base level water demand and a 25% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	20.5	23.1	26.0	28.0	29.6	31.0
Annual average reduction in seasonal water use	10.1	11.4	12.8	13.8	14.6	15.3
Annual average demand with reductions in water use	420.1	472.2	531.7	573.3	606.0	635.4

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 1
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	2.3	2.5	2.9	3.1	3.3	3.4
Average monthly	396.4	445.6	501.8	541.0	571.9	599.6
February demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	389.6	438.0	493.2	531.8	562.1	589.4
March demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	389.6	438.0	493.2	531.8	562.1	589.4

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	3.4	3.8	4.3	4.6	4.9	5.1
Average monthly	399.8	449.4	506.0	545.6	576.7	604.8
May demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	10.1	11.4	12.8	13.8	14.6	15.3
Average monthly	420.1	472.2	531.7	573.3	606.0	635.4
June demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	20.3	22.8	25.7	27.7	29.3	30.7
Average monthly	450.5	506.3	570.2	614.8	649.9	681.5
July demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	27.0	30.4	34.2	36.9	39.0	40.9
Average monthly	470.8	529.1	595.9	642.5	679.1	712.1
August demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	23.7	26.6	30.0	32.3	34.1	35.8
Average monthly	460.6	517.7	583.1	628.6	664.5	696.8
September demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	18.0	20.3	22.8	24.6	26.0	27.3
Average monthly	443.7	498.7	561.7	605.6	640.1	671.2
October demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	10.1	11.4	12.8	13.8	14.6	15.3
Average monthly	420.1	472.2	531.7	573.3	606.0	635.4

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 1 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	3.4	3.8	4.3	4.6	4.9	5.1
Average monthly	399.8	449.4	506.0	545.6	576.7	604.8
December demands						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	2.3	2.5	2.9	3.1	3.3	3.4
Average monthly	396.4	445.6	501.8	541.0	571.9	599.6
Peak 30 day demand						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	31.5	35.5	39.9	43.1	45.5	47.7
Average	484.3	544.3	613.0	660.9	698.6	732.6
Peak 60 day demand						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	27.0	30.4	34.2	36.9	39.0	40.9
Average	470.8	529.1	595.9	642.5	679.1	712.1
Peak 90 day demand						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	24.8	27.9	31.4	33.8	35.8	37.5
Average	464.0	521.5	587.3	633.2	669.4	701.9
Peak 120 day demand						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	22.5	25.3	28.5	30.8	32.5	34.1
Average	457.2	513.9	578.8	624.0	659.6	691.7
Peak 180 day demand						
SBW	20.5	23.1	26.0	28.0	29.6	31.0
SSW	19.2	21.5	24.2	26.1	27.6	29.0
Average	447.1	502.5	565.9	610.2	645.0	676.3

ANNUAL WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 2
(conservation scenario 1 assumes a 10% reduction in base level water demand and a 50% reduction in seasonal water use)

Year	1985	1990	1995	2000	2005	2010
Annual average reduction in base level water use	41.0	46.1	51.9	56.0	59.2	62.0
Annual average reduction in seasonal water use	20.3	22.8	25.7	27.7	29.3	30.7
Annual average demand with reductions in water use	389.4	437.7	492.9	531.4	561.8	589.1

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 2
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
January demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	4.5	5.1	5.7	6.2	6.5	6.8
Average monthly	373.6	420.0	472.9	509.9	539.0	565.2
February demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	369.1	414.9	467.2	503.8	532.5	558.4
March demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0
Average monthly	369.1	414.9	467.2	503.8	532.5	558.4

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
April demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	6.8	7.6	8.6	9.2	9.8	10.2
Average monthly	375.9	422.5	475.8	513.0	542.3	568.6
May demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	20.3	22.8	25.7	27.7	29.3	30.7
Average monthly	389.4	437.7	492.9	531.4	561.8	589.1
June demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	40.6	45.6	51.3	55.4	58.5	61.4
Average monthly	409.7	460.5	518.6	559.1	591.0	619.8
July demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	54.1	60.8	68.5	73.8	78.0	81.8
Average monthly	423.2	475.7	535.7	577.6	610.5	640.2
August demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	47.3	53.2	59.9	64.6	68.3	71.6
Average monthly	416.4	468.1	527.1	568.4	600.8	630.0
September demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	36.1	40.5	45.6	49.2	52.0	54.5
Average monthly	405.2	455.4	512.9	553.0	584.5	612.9
October demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	20.3	22.8	25.7	27.7	29.3	30.7
Average monthly	389.4	437.7	492.9	531.4	561.8	589.1

MONTHLY WATER DEMANDS FOR WMA FOR 1985 - 2010
CONSERVATION SCENARIO 2 (continued)
Note: SBW means savings in base level water use and
SSW means savings in seasonal water use

Year	1985	1990	1995	2000	2005	2010
November demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	6.8	7.6	8.6	9.2	9.8	10.2
Average monthly	375.9	422.5	475.8	513.0	542.3	568.6
December demands						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	4.5	5.1	5.7	6.2	6.5	6.8
Average monthly	373.6	420.0	472.9	509.9	539.0	565.2
Peak 30 day demand						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	63.1	70.9	79.9	86.1	91.0	95.5
Average	432.2	485.8	547.1	589.9	623.5	653.8
Peak 60 day demand						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	54.1	60.8	68.5	73.8	78.0	81.8
Average	423.2	475.7	535.7	577.6	610.5	640.2
Peak 90 day demand						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	49.6	55.7	62.8	67.7	71.5	75.0
Average	418.7	470.6	530.0	571.4	604.0	633.4
Peak 120 day demand						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	45.1	50.7	57.1	61.5	65.0	68.2
Average	414.2	465.6	524.3	565.3	597.5	626.6
Peak 180 day demand						
SBW	41.0	46.1	51.9	56.0	59.2	62.0
SSW	38.3	43.1	48.5	52.3	55.3	58.0
Average	407.4	458.0	515.7	556.1	587.8	616.3