MWMC Eugene-Springfield WPCF Facility Plan—Flow and Load Projections

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Executive Summary

This technical memorandum summarizes the projected Metropolitan Wastewater Management Commission (MWMC) population, wastewater flows, and wastewater loads contributing to the Eugene-Springfield Water Pollution Control Facility (E-S WPCF). The analysis focuses on flow and load projections through the year 2025, which is the facility planning horizon for this project. Long-term population growth and its impact on the service area flows and loads up to build-out are also developed so that buildout conveyance and treatment needs can be determined. Population data obtained from the Lane Council of Governments and influent wastewater flow and load data obtained from the E-S WPCF from May 1990 through May 2003 serve as the basis for the flow and load projections provided in this memorandum.

Historical population growth trends have been used to predict future populations for the MWMC service area through build-out (approximately 2050). Table 1 summarizes these population projections for the design year 2025 and build-out. It has been assumed that the year 2050 will represent the ultimate build-out condition for the MWMC service area, at which time the anticipated population density will be approximately 18.1 persons per acre. These population projections represent an average annual growth rate of approximately 1.6 percent per year. A letter from the state Department of Land Conservation and Development (DLCD) approving the 2025 population projection is included as an appendix to this Facilities Plan.

TABLE 1
E-S WPCF—Population Projections MWMC Service Area
MWMC Facility Plan, Eugene-Springfield

Year	MWMC Service Area
2025	297,585
Build-out	383,135

Total wastewater flows reaching the E-S WPCF from the service area consist of residential, commercial, industrial, and infiltration and inflow (I/I) components. Residential, commercial, and I/I make up the domestic portion of the flows. Industrial wastewater flows are monitored individually prior to discharge into the collection system and can be separated out from the other components. The residential, commercial, and I/I flow components are not individually monitored and are more difficult to quantify. For the E-S WPCF, the I/I component has a significant impact on domestic wastewater flows. Its effects are more pronounced in the winter months. The flow and load analysis is separated into two distinct flow and load seasons: a dry weather season extending from May 1 through October 31, and a wet season extending from November 1 through April 30, which aligns with the NPDES permit.

Wastewater flow measurements (24-hour composite) recorded at the influent Parshall flume of the E-S WPCF were used to calculate historical average annual wet and dry season flows. Industrial flows were separated out to capture only the residential and commercial components of the flow. Flow and population data were used to calculate the historical average annual wet and dry season per capita flows. Table 2 shows the per capita flows obtained from the historical analysis and those recommended for planning purposes.

E-S WPCF plant personnel measure and record the influent wastewater characteristics at the facility. Influent constituents reviewed in this memorandum include carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), ammonia and phosphorus. These constituents are measured from 24-hour composite samples collected by automatic flow-paced samplers. CBOD is measured 3 days a week, and TSS is measured 5 days a week. Ammonia is measured once a week; phosphorus is measured once a month in the dry weather months. The industrial portions of the loads were separated out to capture only the residential and commercial load components. Constituent load and population data were used to calculate the historical average wet and dry season per capita loads. Table 2 summarizes the per capita loads obtained from historical analysis and those recommended for use in planning.

TABLE 2
E-S WPCF—Recommended Average Per Capita Flows and Loads (Residential and Commercial Only)
MWMC Facility Plan, Eugene-Springfield

Parameter	Dry Weather Value	Wet Weather Value
Flow (gpcd)	129	229
CBOD (ppcd)	0.185	0.185
TSS (ppcd)	0.205	0.26
NH_3-N (ppcd)	0.020	0.022
Phosphorus (ppcd)	0.008	0.011

BOD – Biochemical Oxygen Demand
TSS – Total Suspended Solids
gpcd – Gallons/Capita/Day
ppcd – Pounds/Capita/Day

Daily wastewater flow data were also used to calculate the historical flow peaking factors for peak month, peak week, peak day, and peak hour (dry season only) flow events. These historical peaking factors were then used to establish a range of likely and potential future flows for the various time durations (maximum month, maximum week, maximum day, and peak hour dry weather only). The lower limit of each flow peaking factor range equals the average of the individual annual historical data values over the evaluation period. The upper limit of each flow peaking factor range equals the maximum value seen in the historical data for each peak flow period. Sanitary sewer overflows (SSOs) have resulted because overall system capacities have been exceeded. Limited capacities that contributed to causing these overflows have been in collection system conveyance, pump stations in the collection system, and the plant influent pump station. Wet weather peak hour flow projections are based on collection system modeling as presented in the *Wet Weather Peak Flow* technical memorandum. Table 3 summarizes the range of various peak flow factors recommended for planning purposes. Peak flow factors are relative to their respective seasonal averages.

TABLE 3
E-S WPCF—Recommended Flow Peaking Factor Ranges (Residential and Commercial Only)
MWMC Facility Plan, Eugene-Springfield

Flow Condition	Dry Weather		Wet Weather Value
	With May	***Without May***	
Maximum Month	1.3 - 1.5	1.2 - 1.3	1.4 - 1.6
Maximum Week	1.7 - 2.2	1.6 - 1.9	1.9 - 2.4
Maximum Day	2.3 - 3.2	2.0 - 2.8	2.8 - 3.3
Peak Hour	2.8 – 4.0		*

* Wet weather peak hour flow projections are based on collection system modeling (see the *Wet Weather Peak Flow* technical memorandum).

Load peaking factors were also developed from the historical data, including peaking factors for peak month, peak week, and peak day events. Load peaking factors to be applied to the projected seasonal average constituent loads were selected from the historical load data using best professional judgement. Table 4 summarizes the various peak load factors recommended for planning purposes. Peak load factors are relative to their respective seasonal averages.

TABLE 4
E-S WPCF—Recommended Constituent Load Peaking Factors (Residential and Commercial Only)
MWMC Facility Plan, Eugene-Springfield

Flow Condition	CBOD	TSS	NH_3-N	Phosphorus
Maximum Month Dry Weather	1.3	1.4	1.3	1.4
Maximum Week Dry Weather	1.5	1.8	1.5	1.4
Maximum Day Dry Weather	2.0	2.5	1.5	1.4
Maximum Month Wet Weather	1.3	1.3	1.3	1.4
Maximum Week Wet Weather	1.6	2.0	1.5	1.4
Maximum Day Wet Weather	2.3	3.0	1.5	1.4

Using the projected E-S WPCF service area population, the recommended per capita flows, the recommended per capita loads, and the flow and load peaking factors shown in Tables 1 through 4, the projected flows and loads for the E-S WPCF were estimated for 2005, 2010, 2015, 2020, 2025, and build-out.

Projected seasonal average flows were developed using the historical flow per capita data for the residential and commercial flow components, along with future population projections. Future anticipated industrial flows were then added to the residential, commercial, and I/I flow components to obtain the total projected flows.

Projected seasonal average constituent loads were developed using historical per capita data, along with future population projections. The industrial load component was added to the residential and commercial load components to obtain the total projected loads.

Flow and load peaking factors were applied to the projected seasonal averages to obtain the ranges of projected flows and loads. Table 5 summarizes the seasonal average and seasonal maximum month projected total flow ranges and loads for the E-S WPCF. The upper end of the flow projections are used for planning purposes.

These projections are for the year 2025 -a 20-year planning horizon. If MWMC applies for state revolving loan fund (SRF) funding for a project then the planning period will need to be 20 years from the completion of the project. For example, if an SRF funded project will be placed on-line in 2008 then projections will have to be estimated for the year 2028.

TABLE 5
E-S WPCF—Projected Flows and Loads for Design Year 2025 (Residential, Commercial, and Industrial)
MWMC Facility Plan, Eugene-Springfield

	Wastewater Flow Projection (mgd)	CBOD Projection (lb/day)	TSS Projection (lb/day)	Ammonia Load Projection (lb/day)	Phosphorus Load Projection (lb/day)
Average Dry Weather	38.4	55,000	61,000	5,800	2,400
Maximum Month Dry Weather	51.6 – 59.3	74,000	87,600	8,200	3,300
Average Wet Weather	68.2	55,000	77,400	6,400	3,300
Maximum Month Wet Weather	97.2 – 110.8	74,000	102,800	8,900	4,600
Peak Hour Wet Weather*	277				

* Peak hour wet weather projection are based on collection system modeling. These modeling results (see the *Wet Weather Peak Flow* technical memorandum) indicate a 5-year, 24-hour peak flow in 2025 of 277 mgd. A peak hour flow of 300 mgd was used for initial planning evaluations that were conducted before the completion of collection system modeling efforts.

Introduction

This technical memorandum has been prepared as part of the 2003 MWMC E-S WPCF Master Plan Update (MWMC Project No. 80010) and includes a detailed description of the historical population, wastewater flow, and wastewater load analysis. Historical trends were evaluated to project future population growth and select per capita and peaking factors. These in turn were used to project future MWMC service area flows and loads.

Planning/Design Period

The typical time period for wastewater facility planning is 20 years. Projected flows and loads based on the Eugene and Springfield areas served by MWMC were developed for years 2005, 2010, 2015, 2020, 2025, and build-out. For the purpose of this study, build-out is defined as approximately the year 2050 and is included to assess long-term wastewater facility requirements for the MWMC.

Historical Population

Populations from the City of Eugene, the City of Springfield, and Santa Clara/River Road contribute to the E-S WPCF. Historical population data were obtained from the Lane Council of Governments for both Eugene and Springfield for the years 1990 through 2002. The Santa Clara/River Road area has connected 15 percent of their total population to the E-S WPCF collection system each year, beginning in 1991. The total Santa Clara River Road population of 21,400 was connected as of 1997. Historical population data are summarized in Table 6. Total MWMC service area population equals the sum of the Eugene-Springfield and Santa Clara/River Road populations.

TABLE 6
Historical Population Data for the Eugene-Springfield Service Area, 1990-2002
MWMC Facility Plan, Eugene-Springfield

Year	Eugene-Springfield Population	Santa Clara/River Road Population	Total Population Served
1990	157,352	0	157,352
1996	176,465	19,260	195,725
1997	179,970	21,400	201,370
1998	185,160	21,400	206,560
1999	189,435	21,400	210,835
2000	190,919	21,400	212,319
2001	194,054	21,400	215,454
2002	196,337	21,400	217,737

Population Projections

Historical population data are used to forecast the future E-S WPCF service area population. Assuming that population growth will continue at a rate similar to that between 1990 and 2002, a linear fit to the historical data presented in Table 6 and projected forward to build-out (approximately 2050) provides an estimate of future populations within Eugene-Springfield. Figure 1 illustrates the projected population trends for the Eugene-Springfield service area. The population for any year can be estimated using the best fit linear trend equations shown in Figure 1. The build-out service area population is assumed to occur in year 2050, resulting in a population density of 18.1 persons per acre. A letter from the Division of Land Conservation and Development (DLCD) indicating that they approve the use of these projections in this 2004 MWMC Facilities Plan is provided in Attachment B.

Table 7 presents a summary of the population growth statistics resulting from the trends shown in Figure 1. These statistics are annual averages over the entire study period and have been calculated using 2002 as the base year. Table 8 summarizes the population projections for Eugene-Springfield, Santa Clara/River Road, and the combined MWMC service area at 5-year intervals over the study period.

Within the service area, there are approximately 11,300 people that are currently on septic systems. The 11,300 people are located throughout the service area. They have been included in the population projections and will be absorbed into the system as they convert to sewer.

TABLE 7
Population Growth Data for Eugene-Springfield
MWMC Facility Plan, Eugene-Springfield

Year	Total Increase (%)	Annualized Average Increase (%)	Total Increase in Population
2025	36.7	1.59	79,895
Build-out (2050)	76.0	1.58	165,445

The statistics in this table were calculated using 2002 as the base year.

FIGURE 1
Population Projections Using Historical Data
MWMC Facility Plan, Eugene-Springfield

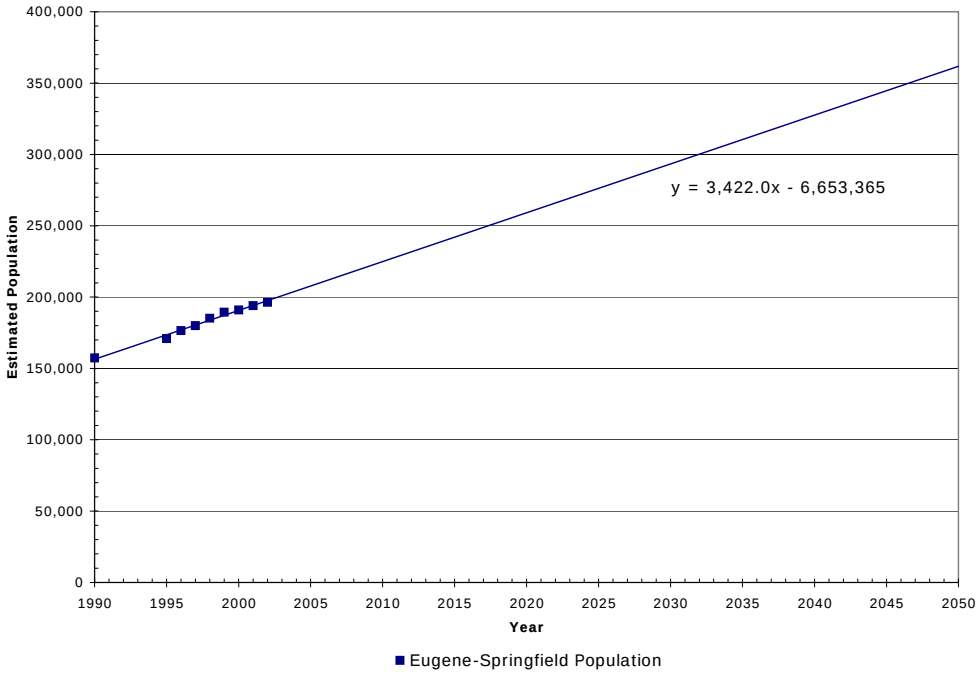


TABLE 8
Population Projection Data for Eugene-Springfield Metropolitan Area
MWMC Facility Plan, Eugene-Springfield

Year	Eugene-Springfield Population Projections	Santa Clara/River Road Population	Estimated MWMC Service Area Population Projections
2005	207,745	21,400	229,145
2010	224,855	21,400	246,255
2015	241,965	21,400	263,365
2020	259,075	21,400	280,475
2025	276,185	21,400	297,585
Build-out	361,735	21,400	383,135

Historical Wastewater Flow and Loads

Wastewater received at the E-S WPCF consists of residential, I/I, commercial and industrial sources. Quantifying the individual contributions from these sources is difficult. Typically, the residential and commercial portion of the total wastewater flow is combined and cannot be separated. Industrial sources are relatively easy to quantify and separate, provided adequate flow data are available from the industry. For this study, the residential and commercial flow contributions are separated from the industrial flow contributions.

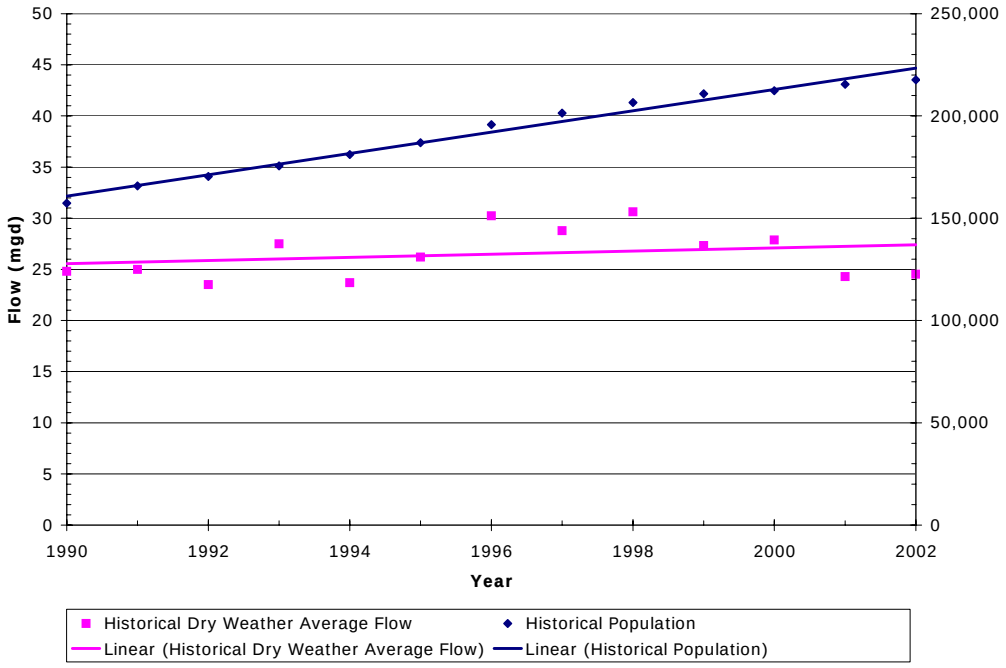
This analysis assumes that the residential and commercial flow contributions to the E-S WPCF are related to the population density within the service area. It is reasonable to assume that the base flow portion, consisting of residential and commercial contributions, will increase proportionally with increasing population. The I/I component is highly variable and is related not to population density but to other factors such as annual rainfall quantity, rainfall event duration, the condition of the existing collection system, and any I/I reduction programs that may have occurred over the study period.

Because I/I is not directly related to population density, it can adversely affect any flow per capita calculation. Typically, dry season flow averages are a good indication of base wastewater flows and can be used to quantify I/I during other non-dry seasons. For the E-S WPCF, the impacts of I/I can be seen in both the dry and wet season. This is, in part, a result of the months of May and October being included in the dry season. These months have historically shown much variability in rainfall quantities from year to year, significantly impacting the dry season per capita flow calculation.

Figure 2 illustrates the impact of I/I flow on the dry season flow per capita calculation. It depicts the historical dry season average flow and population trends from 1990 to 2002. Although the population has increased during this period, the actual dry season average flow trend over this same period has declined. This is a direct result of the variability of I/I on the E-S WPCF flows. The decrease in flow depicted in Figure 2 is likely a result of successive dryer years during the dry season and/or the result of I/I reduction programs. The impact of I/I on per capita flows and on flow peaking factors is even more pronounced for shorter flow durations, such as peak week, peak day, and peak hour. This added variability in both dry and wet season flows related to the I/I component makes it appropriate to consider a range of wastewater flows for planning purposes, rather than just a single projected flow value.

Historical flow and load data from May 1990 through May 2002 were evaluated to determine the average daily flow, BOD, TSS, ammonia, and total phosphorus. Data analysis was separated into dry weather (May 1 through October 31) and wet weather (November 1 through April 30) seasons. The two seasons align with the two sets of effluent requirements specified in the E-S WPCF's National Pollutant Discharge Elimination System (NPDES) discharge permit. The historical total flows and loads received at the E-S WPCF from November 1995 through October 2002 are summarized in Table A-1 in Attachment A. Historical flows were measured at the E-S WPCF influent Parshall flume, and historical loads were measured using 24-hour composite samples collected and analyzed by plant personnel.

FIGURE 2
Historical Dry Season Average Flow and Population Trends
MWMC Facility Plan, Eugene-Springfield



There are 16 industrial contributors from Springfield and 22 from Eugene. Hynix Semiconductor in Eugene contributes over half of all significant industrial flow to the collection system. The average historical industrial flow is 1.7 million gallons per day. The average industrial loadings for BOD, TSS and ammonia are 2,400, 2,200, and 600 pounds per day, respectively. Historical data are not available for phosphorous. Table A-2 shows the combined flows and loadings of all industrial dischargers. It has been assumed that industrial flows and loads will not increase significantly through the design period. Actual data from the industrial sources were subtracted from the total influent flows and loadings to obtain the residential, commercial, and I/I subtotal. Table A-3 summarizes the residential, commercial, and I/I portion of the wastewater flow to the E-S WPCF. Table A-9 summarizes the flows and loads from the industrial contributors from Eugene and Springfield. There is no evidence that any of the industrial contributors are seasonal users.

Historical Per Capita Wastewater Flows and Loads

Per capita flows are commonly used to estimate future flow conditions and are frequently based on analyses of historical average data. To calculate the average per capita domestic wastewater flows and loads, it is necessary to correlate historical population information with the historical domestic wastewater flow and load data. These per capita values are then used in conjunction with projected populations to estimate future domestic wastewater flows and loads to the E-S WPCF.

The historical seasonal average flows and loads from Table A-3 and from the 1997 E-S Master Plan have been combined with the historical populations to determine the resulting seasonal average per capita flows and loads. Historical flow and load peaking factors for shorter flow durations such as maximum month, maximum week, maximum day and peak hour were also obtained. Wet season peak hour analysis will be conducted by collection system modeling and is not included in this data set.

This analysis includes calculation of seasonal flows and BOD, TSS, ammonia, and phosphorus loadings for annual average, maximum month, maximum week, maximum day, and peak hour conditions. The historical average per capita flows and loads were computed by dividing the seasonal average values shown in Table A-3 by the average service area population for each year and averaging those values over the 7-year analysis period.

Tables A-4 through A-8 present the derivation of dry and wet weather per capita values selected for domestic flow and wasteload projections. The selected per capita values, summarized in Table 9, have been nominally adjusted from historical values using best professional judgement.

TABLE 9
E-S WPCF—Recommended Average Per Capita Flows and Loads (Residential, Commercial, and I/I Only)
MWMC Facility Plan, Eugene-Springfield

Parameter	Dry Weather Value	Wet Weather Value
Flow (gpcd)	129	229
CBOD (ppcd)	0.185	0.185
TSS (ppcd)	0.205	0.26
NH_3-N (ppcd)	0.020	0.022
Phosphorus (ppcd)	0.008	0.011

BOD – Biochemical Oxygen Demand
TSS – Total Suspended Solids
gpcd – Gallons/Capita/Day
ppcd – Pounds/Capita/Day

The recommended flow per capita values of 129 gpcd (dry season) and 229 gpcd (wet season) represent the average values of the historical values for those respective dry and wet seasons. Maximum historical values were not used because that would have resulted in overly conservative projections relative to typical municipal wastewater values. The recommended CBOD per capita value (for both dry and wet seasons) reflects the maximum that occurred in the dry season over the period of record. The average historical CBOD values were not used because compared to industry standards the 0.15 ppcd value is much lower than generally accepted industry standards for municipal wastewater facilities. The same CBOD per capita value was selected for both dry and wet weather seasons because there was not a significant difference in the historical data between seasons. The recommended dry season and wet season TSS per capita values reflect the maximum that

occurred in those respective seasons over the period of record. Ammonia and phosphorus per capitas were selected based on season averages of the historical data; maximum values were not selected because the variability of these parameters tends to be less than the conventional pollutants (CBOD and TSS) and because the maximum values appeared to only occur once over the period of record representing more of an anomaly.

Wastewater Flow and Load Peaking Factor Selection

Peaking factors are commonly used to estimate future peak flow and load conditions and are frequently based on analyses of historical average and peak flow and load data. The methods used for estimating peaking factors involved analysis of historical peaking factors for the years 1990 through 2002 for both dry and wet weather conditions, flow generated from computer modeling of the collection system, and the DEQ methodology. Although these methods generated similar results, they did vary somewhat. Therefore, peaking factors were selected based on the appropriateness of the method (e.g., wet weather peak hour flows were based on computer modeling) and other factors discussed below. Peaking factors for flow and load events (maximum month, maximum week, maximum day, and peak hour) are ratios of the particular seasonal events to the corresponding seasonal averages.

Historical Peaking Factor Analysis

Tables A-4 through A-8 in Attachment A present a summary of the analysis of the 1990 through 2002 data as well as the derivation of dry and wet weather per capita values and peaking factors for domestic (residential and commercial) flow and wasteload projections. Historical seasonal peaking factors were calculated for the maximum month, maximum week, maximum day, and peak hour conditions (dry season only). A range of flow peaking factors were established for each condition and season to reflect the high variability of the I/I. Because the historical load data are more directly related to population than on I/I, only a single peaking factor is determined for each load regime (i.e., maximum month, maximum week, etc.).

For flow, the dry season was evaluated with and without the month of May to illustrate the impact of possibly excluding May from the dry season. Also, two separate analyses were conducted for calculating peaking factors for flow. The first analysis considered all of the data, or a 100 percent confidence interval. One or two extreme "outlier"events were discarded from the determination of peaking factors based on the entire data set (100 percent confidence interval) as follows:

- Dry Weather Maximum Day
  - With May – Only two events, in the 12-year period of record, exceeded a peaking factor of 3.2 (June 1993, 3.67 and May 1991, 3.93).
  - Without May – Only two events exceeded a peaking factor of 2.8 (June 1993, 3.67 and October 1990, 3.16).

- Dry Weather Maximum Week
  - With May – Only two events, in the 12-year period of record, exceeded a peaking factor of 2.2 (June 1993, 2.83 and May 1991, 2.61).
  - Without May – Only one event exceeded a peaking factor of 1.9 (June 1993, 2.83).
- Wet Weather Maximum Day
  - One event resulted in a peaking factor over 3.3 (January 95, 3.43). Two separate events resulted in peaking factors of 3.3 (February 98, 3.28 and January 00, 3.29). All three of these years had typical average flows.
- Wet Weather Maximum Week
  - Only two events, in 12-year period of record, exceeded a peaking factor of 2.4 (January 95, 2.46 and January 2000, 2.52). In 2000 the peaking factor was high due to an extremely low average flow for the wet season (29.9 mgd).

With the above events excluded, upper limit peaking factors were determined for the 100 percent confidence interval data set.

The second analysis considered a 99.9 percent confidence interval, which excluded the highest 0.1 percent of all flows. These data were used to calculate the per capita average dry and wet weather flows, as well as the maximum month flow (both dry and wet) and peak hour (dry only) peaking factors. The 100 percent confidence interval data set were used to calculated the maximum week and maximum day peaking factors because the 99.9 percent data were found to exclude too many meaningful events for these flow regimes.

DEQ Methodology Peaking Factor Analysis

Peaking factors using the *Guidelines for Making Wet-Weather and Peak Flow Projections for Sewage Treatment in Western Oregon: MMDWF, MMWWF, PDAF, and PIF*, from the Oregon DEQ were developed and are presented in Attachment B. Attachment B also shows a comparison of the 2025 projections using the peaking factors derived from the DEQ method to the 2025 projections using the peaking factors derived from the historical method (upper limit of the range based on 99.9 percent confidence interval method).

Peaking Factor Selection

Table 10 summarizes the various upper limit peaking factors that could potentially be selected to project future flows. The dry season without May values are shown to illustrate that significant relief could be achieved by pursuing a NPDES permit that excludes May from the dry season.

The maximum month and peak hour (dry season only) peaking factors derived from the 100 percent confidence interval resulted in peaking factors that were too conservative for planning purposes. In all cases, except for the dry weather maximum month and wet weather peak hour (peak instantaneous), the peaking factors derived from the DEQ method were lower or less conservative than the peaking factor derived from the historical data method and it is recommended that the peaking factors derived from the historical data be used to project future flows. In the case of dry season maximum month, the peaking factor of 2.0 derived from the DEQ method significantly exceeded the 1.5 value from the

99.9 percent confidence interval using the historical data. This is likely because the DEQ method requires estimating the dry season maximum month flow at the 10-year storm condition. Because this condition will only occur once every 10 years on average, it is recommended that MWMC take temporary operational measures at the WPCF, if a flow corresponding to this 10-year event does occur at some point in the future. During this maximum month event, the WPCF plant staff could feed 33 percent of the primary effluent to each of the last three aeration basin cells during the diurnal peak and then revert back to feeding 25 percent to each of the four cells for the remainder of the day. This operating approach of utilizing a contact stabilization type of operation, which would not allow for nitrification, during peak diurnal with step feed during the rest of the day would take a considerable effort by the plant staff. The staff could not rely on this approach on a continuous basis but it is an approach that could be implemented for one month approximately every 10 years so that the risk of permit non-compliance could be mitigated during such an event. For these reasons, a peaking factor of 1.5 is the appropriate value to not overbuild, while not taking on too much risk associated with potentially impacting receiving water quality.

TABLE 10
Upper Limit Peaking Factor Selection Comparison Chart
MWMC Facility Plan, Eugene-Springfield

	Maximum Month	Maximum Week	Maximum Day
Dry Weather			
With May			
100 Percent Confidence Interval	1.7	2.8	3.9
99.9 Percent Confidence Interval	1.5	1.8	1.9
DEQ Methodology	1.9		
Selected	1.5	2.2	3.2
Without May			
100 Percent Confidence Interval	1.7	3.0	3.9
99.9 Percent Confidence Interval	1.3	1.6	1.9
Selected	1.3	1.9	2.8
Wet Weather			
100 Percent Confidence Interval	1.7	2.5	3.4
99.9 Percent Confidence Interval	1.6	2.3	3.0
DEQ Methodology	1.5	2.0	2.7
Selected	1.6	2.4	3.3

The process for selecting load peaking factors was less complicated than was required for flow values; all of the evaluated data is presented in Tables A-5 through A-8. For dry season CBOD peaking factors, the maximum of the period of record (1.3) was selected for maximum month. The historical data for this regime indicated a fairly tight range without much variability. The maximum week value of 1.5 was selected because the 1.7 maximum only occurred in one year and the 1.5 occurred in two years and was in a tight range with the other values. A maximum day value of 2.0 was selected because the 2.4 maximum only occurred in one year while the 2.0 value occurred in two years.

Table A-5 contains the CBOD data analysis. For wet season CBOD, a 1.3 value was selected for the maximum month because the maximum of 1.6 only occurred in one year and was significantly higher than all other values. The maximum week value of 1.6 was selected because the maximum 1.9 value only occurred in one year and was significantly higher than all other values. The maximum day value of 2.3 was selected for similar reasons to that stated for maximum month and maximum week.

Table A-6 contains the TSS data analysis. For dry season TSS peaking factors, the maximum of the period of record was selected for maximum month and maximum week. A less conservative value of 2.5 was selected for maximum day because the 4.0 value experienced in 1996 was an anomaly.

For wet season TSS, a 1.3 value was selected for the maximum month because the maximum of 1.6 only occurred in one year and was significantly higher than all other values. The maximum week value of 2.0 was selected because, although there were no other values in the period of record that reached this level exactly, there were two other years that were close to this level. The maximum day value of 3.0 was selected because there was a grouping of values around that value and the three years higher than 3 – 3.6 in 1991/2, 4.3 in 1994/5, and 4.0 in 1996/97 appear to be anomalies.

The ammonia data analysis is presented in Table A-7. For dry season ammonia peaking factors, the maximum of the period of record was selected for maximum month, maximum week, and maximum day regimes. Because there was minimal variability in the data between dry and wet seasons the same peaking factors were selected for the wet season.

Phosphorous is monitored only once a month so there is not difference between maximum month and maximum week peaking factors presented in Table A-8. There was also negligible difference between dry and wet season data after outlier values are removed. For phosphorous, a peaking factor of 1.4 was selected for all flow regimes for both seasons.

The resulting recommended peaking factors for both flow and loads are summarized in Table 11.

TABLE 11
Recommended Domestic Peaking Factors (Residential and Commercial Only)
MWMC Facility Plan, Eugene-Springfield

Flow Condition	Flow		BOD	TSS	NH_3-N	Phosphorus
Dry Weather Flow Peaking Factor Range and Load Peaking Factors						
	With May	***Without May***				
Average	1.0	1.0	1.0	1.0	1.0	1.0
Maximum Month	1.3 - 1.5	1.2 - 1.3	1.3	1.4	1.3	1.4
Maximum Week	1.7 - 2.2	1.6 - 1.9	1.5	1.8	1.5	1.4
Maximum Day	2.3 - 3.2	2.0 - 2.8	2.0	2.5	1.5	1.4
*Peak Hour	2.8-4.0					
Wet Weather Flow Peaking Factor Range and Load Peaking Factors						
Average	1.0		1.0	1.0	1.0	1.0
Maximum Month	1.4 - 1.6		1.3	1.3	1.3	1.4
Maximum Week	1.9 - 2.4		1.6	2.0	1.5	1.4
Maximum Day	2.8 - 3.3		2.3	3.0	1.5	1.4
*Peak Hour						
Annual Peaking Factor						
Annual Average	1.5		1.0	1.1	1.1	1.2

Dry Weather (May 1 through October 3) peaking factors are relative to Average Dry Weather.
Wet Weather (November 1 through April 30) peaking factors are relative to Average Wet Weather.
Annual Average peaking factors are relative to Average Dry Weather.
*Wet weather peak hour projections are developed based on collection system modeling (see the *Wet Weather Peak Flow* technical memorandum).

Projected Wastewater Flows and Loads

Wastewater flows and loads were projected to the year 2025, at 5-year intervals, and for the build-out condition in approximately 2050, for domestic and industrial sources. Similar to the historical analysis, average, maximum month, maximum week, and maximum day flow ranges and loads were determined for both dry and wet seasons.

Domestic (residential and commercial, and I/I) projections were estimated based on the population projections and the selected per capita and peaking factors identified in previous sections. The methods for determining average, maximum month, maximum week, maximum day, and peak hour values are listed below and refer to both flows and loadings:

- *Average Dry Weather*—Determined by multiplying the selected per capita value by the projected population for 2005, 2010, 2015, 2020, 2025, and build-out.
- *Average Wet Weather*—Determined by multiplying the selected per capita value by the projected population for 2005, 2010, 2015, 2020, 2025, and build-out.

- *Maximum Month*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum month peaking factor.
- *Maximum Week*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum week peaking factor.
- *Maximum Day*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum day peaking factor.
- *Dry Weather Peak Hour Flow*—Determined by multiplying the dry weather average for a given year by the selected peak hour peaking factor.
- *Wet Weather Peak Hour Flow*—Determined by modeling the collection system at a 5-year, 24-hour storm recurrence. The results of these modeling efforts are presented in the *Wet Weather Peak Flow* technical memorandum.

Industrial Wastewater Flow and Loading Projections

Industrial flow and loading projections are based on Significant Industrial User (SIU) data provided by the City of Eugene and the City of Springfield. Flows and loads from industrial users are assumed to remain constant over the planning period. The average industrial flow assumed for the planning period is 1.7 million gallons per day. The average industrial loading projections for BOD, TSS, and ammonia are 2,400, 2,200, and 600, respectively. Historical data are not available for phosphorous; therefore, it was assumed that the amount of phosphorous loading would not be significant.

Total Wastewater Flow and Loading Projection Results

Table 12 summarizes the average and peak month future projected flows and loads for both dry and wet seasons. These are the total flow and total load projections consisting of the residential, commercial, industrial, and I/I components. Table C-1 in Attachment C shows the overall projected total flows and loads for all key time intervals. Table B-1 also shows the industrial component of the flow and load separated out from the residential, commercial, and I/I components. Industrial flows and loads are not peaked.

Figures 3 through 6 illustrate the projected dry and wet season flow ranges for average, maximum month, maximum week, and maximum day from 2005 through build-out. Figure 7 illustrates the projected dry season peak hour flow range. The wet weather peak hour flow will be determined by further evaluation of the collection system. Figure 8 depicts the dry and wet weather maximum month loading projections for BOD and TSS.

TABLE 12
Summary of Total Flow and Load Projections (Residential, Commercial, and Industrial)
MWMC Facility Plan, Eugene-Springfield

Year	2005	2010	2015	2020	2025	Build-out (2050)
Estimated Population	229,145	246,255	263,365	280,475	297,585	383,135
Wastewater Flow Projections (mgd)						
Average Dry Weather	29.6	31.8	34.0	36.2	38.4	49.4
Max. Month Dry Weather (Average)	40.1	43.0	45.9	48.7	51.6	66.0
Max. Month Dry Weather (Upper Limit)	46.0	49.4	52.7	56.0	59.3	75.8
Average Wet Weather	52.5	56.4	60.3	64.3	68.2	87.8
Max. Month Wet Weather (Average)	75.2	80.7	86.2	91.7	97.1	124.6
Max. Month Wet Weather (Upper Limit)	85.7	92.0	98.2	104.5	110.8	142.1
Peak Hour Wet Weather	266	268.5	271	274	277	294
BOD Loading Projections (lb/day)						
Average Dry Weather	42,400	45,600	48,700	51,900	55,000	70,900
Max. Month Dry Weather	57,500	61,600	65,700	69,900	74,000	94,500
Average Wet Weather	42,400	45,600	48,700	51,900	55,000	70,900
Max. Month Wet Weather	57,500	61,600	65,700	69,900	74,000	94,500
TSS Loading Projections (lb/day)						
Average Dry Weather	47,000	50,500	54,000	57,500	61,000	78,500
Max. Month Dry Weather	68,000	73,000	77,800	82,800	87,600	112,200
Average Wet Weather	59,600	64,000	68,500	72,900	77,400	99,600
Max. Month Wet Weather	79,700	85,500	91,200	97,000	102,800	131,700
Ammonia Loading Projections (lb/day)						
Average Dry Weather	4,500	4,800	5,100	5,500	5,800	7,500
Max. Month Dry Weather	6,400	6,900	7,300	7,700	8,200	10,300
Average Wet Weather	4,900	5,300	5,700	6,000	6,400	8,200
Max. Month Wet Weather	7,000	7,500	8,000	8,400	8,900	11,300
Phosphorous Loading Projections (lb/day)						
Average Dry Weather	1,800	2,000	2,100	2,200	2,400	3,000
Max. Month Dry Weather	2,600	2,800	3,000	3,100	3,300	4,300
Average Wet Weather	2,500	2,700	2,900	3,100	3,300	4,200
Max. Month Wet Weather	3,500	3,800	4,100	4,300	4,600	5,900

Figure 3
Projected Average Flow

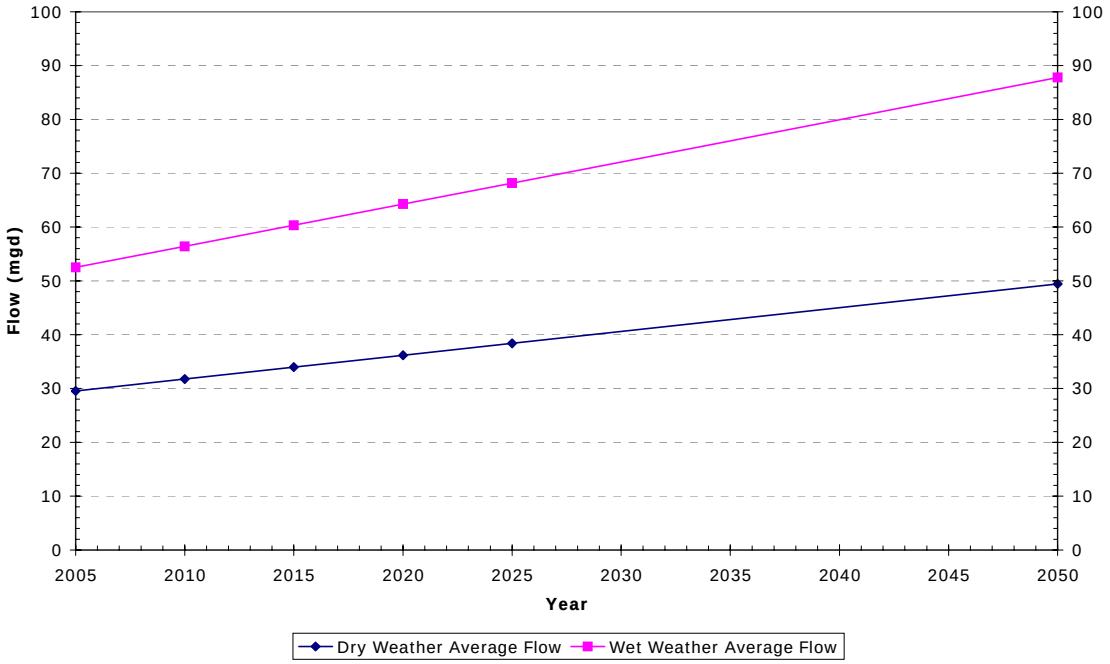


Figure 4
Projected Maximum Month Flow Ranges

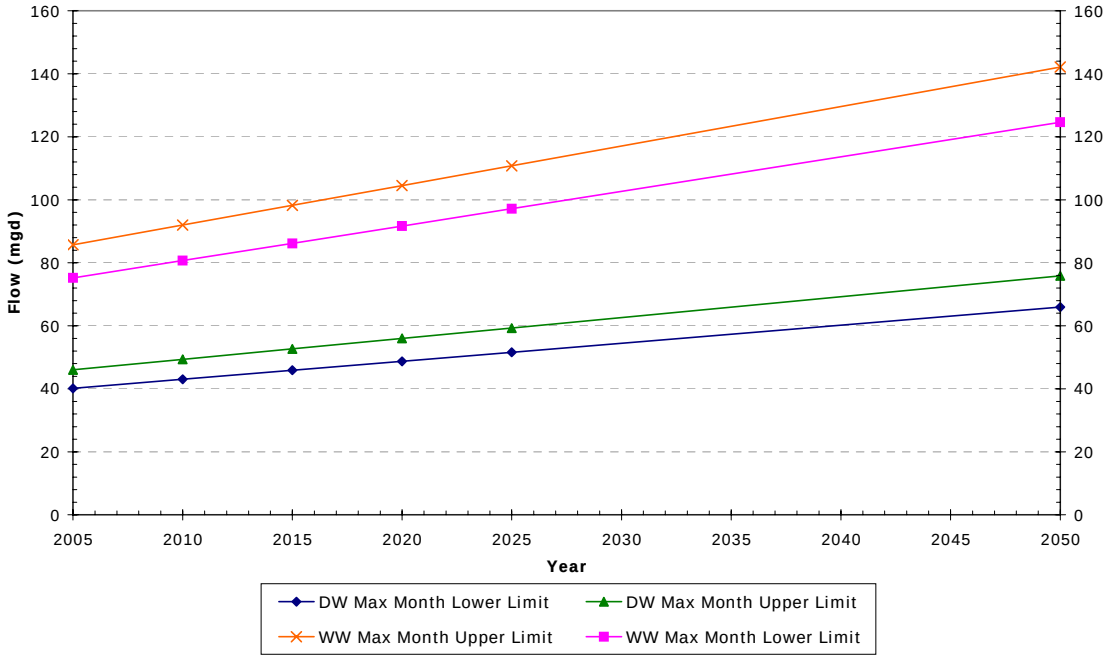


Figure 5
Projected Maximum Week Flow Ranges

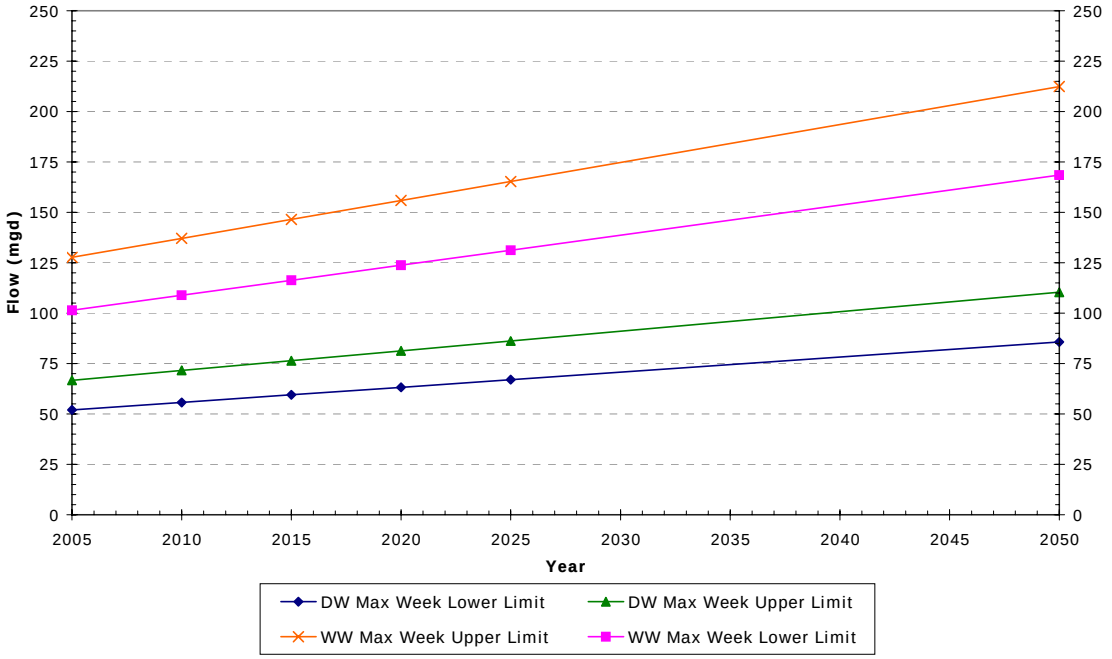


Figure 6
Projected Maximum Day Flow Ranges

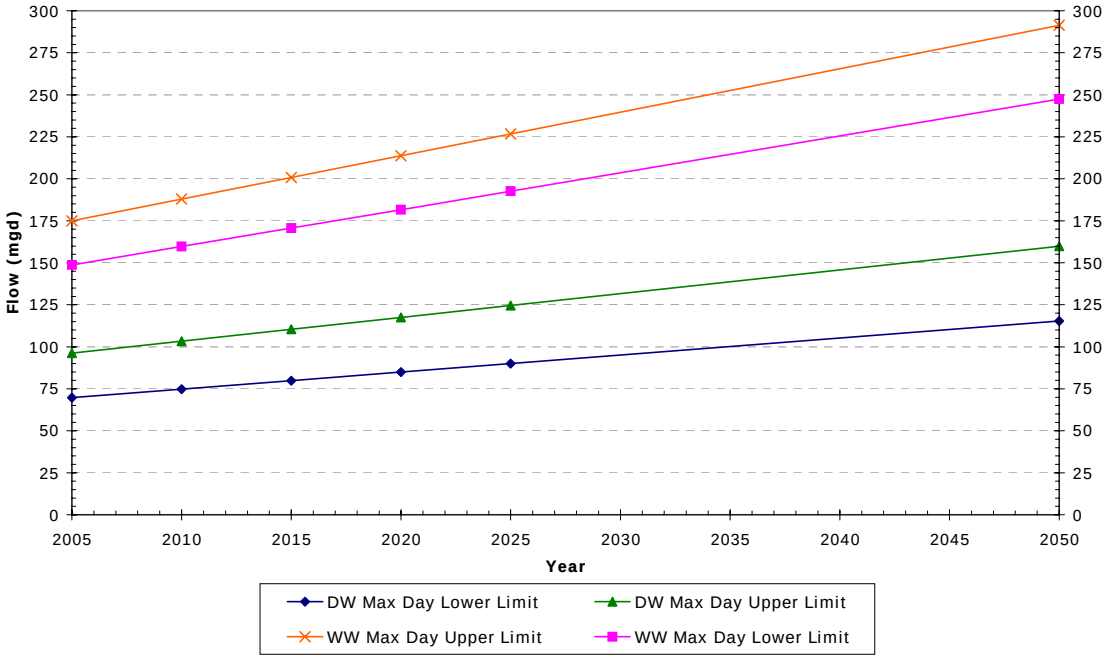


Figure 7
Projected Peak Hour Dry Weather Flow Range

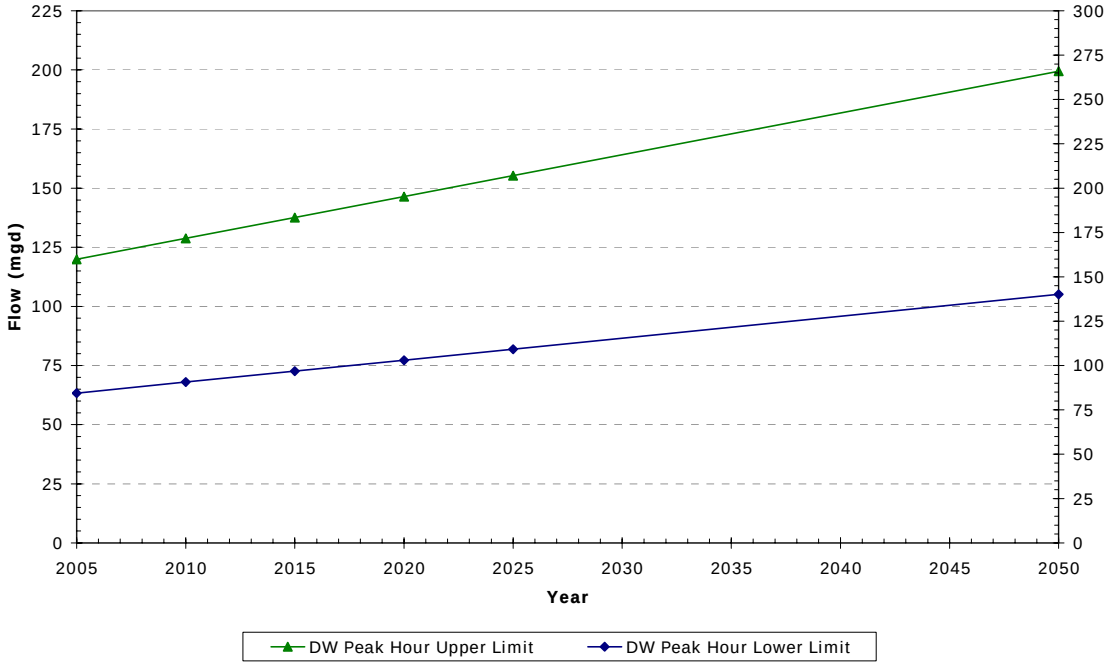
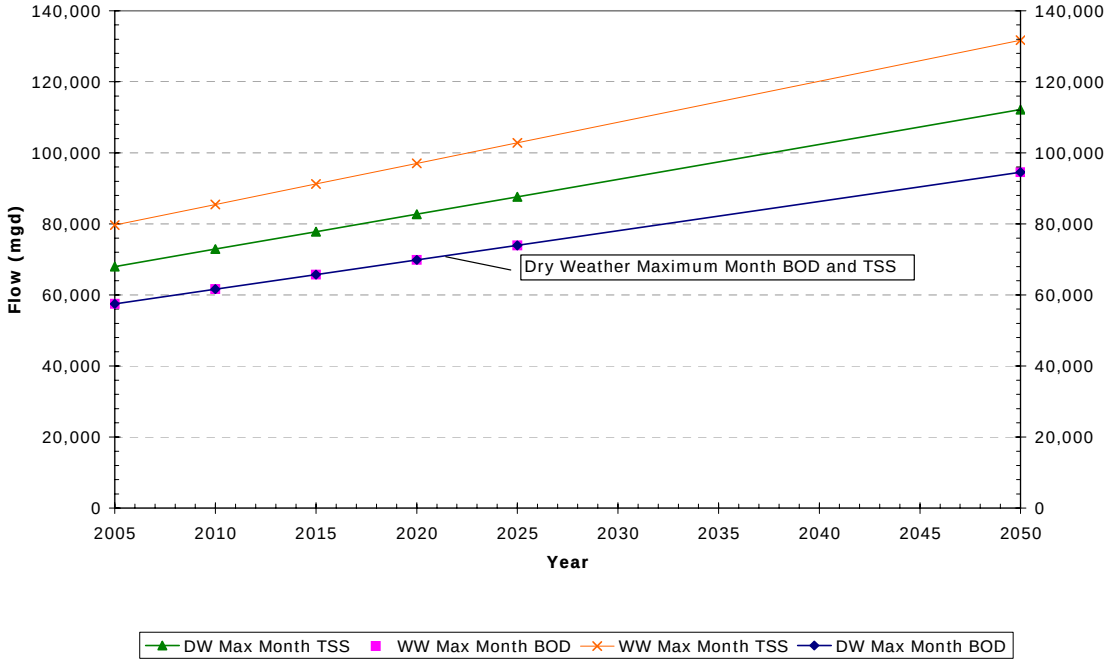


Figure 8
Maximum Month BOD and TSS Loading Projections



Attachments

Attachments A, B, and C contain the following tables and figures:

- Table A-1: Historical Total Wastewater Flows and Loads
- Table A-2: Historical Industrial Influent Wastewater Flows and Loads
- Table A-3: Historical Domestic/Commercial Wastewater Flows and Loads
- Table A-4a: Derivation of Peaking Factors and Per Capita Values for Flow (with May)
- Table A-4b: Derivation of Peaking Factors and Per Capita Values for Flow (without May)
- Table A-5: Derivation of Peaking Factors and Per Capita Values for CBOD
- Table A-6: Derivation of Peaking Factors and Per Capita Values for TSS
- Table A-7: Derivation of Peaking Factors and Per Capita Values for Ammonia
- Table A-8: Derivation of Peaking Factors and Per Capita Values for Phosphorous
- Table A-9: Industrial Contributors to the E-S WPCF
- Table B-1: Comparison of Peaking Factors and Projections – Historical vs. DEQ Method
- Figure B-1: MWMC Monthly Residential Flow (mgd) vs. Cumulative Monthly Precipitation (in) Representative Months (2000 through 2002)
- Figure B-2: MWMC Daily Residential Flow (mgd) vs. Precipitation (in) Selected Storms (2000 through 2002)
- Figure B-3: MWMC Residential Flow and Projection Probability Distribution (Selected Data 2000-2002)
- Table C-1: Flow and Load Projections

Attachment A

TABLE A-1
Historical Total Wastewater Flows and Loads
MWMC Facility Plan, Eugene-Springfield

Year	Population	Condition	Flow (mgd)	BOD (lb/d)	TSS (lb/d)	Ammonia-N (lb/d)	Phosphorous (lb/d)
1996		AA	49.6	28,744	48,379		
		ADW	30.2	27,343	42,224		
		MMDW	47.0	35,043	55,499		
		MWDW	64.1	38,185	72,952		
		MDDW	72.2	51,950	160,574		
		PHDW	96.3				
1995/96		AWW	59.1	30,599	51,823		
		MMWW	90.0	38,119	64,511		
		MWWW	115.7	48,266	93,316		
		MDWW	167.9	65,635	147,368		
		PHWW	195.7				
1997		AA	38.7	34,065	46,461	4,533	1,632
		ADW	28.8	37,606	43,444	4,383	1,578
		MMDW	39.0	42,521	47,425	5,300	2,388
		MWDW	40.9	48,519	57,762	6,129	2,388
		MDDW	41.8	53,605	79,125	6,129	1,736
		PHDW	69.4				
1996/97		AWW	64.9	30,226	54,417	4,526	1,451
		MMWW	107.2	36,806	71,795	5,114	1,736
		MWWW	136.1	46,611	105,597	5,852	1,580
		MDWW	175.9	56,387	209,636	5,852	1,580
		PHWW	198.8				
1998		AA	43.2	30,580	46,260	4,231	2,273
		ADW	30.6	30,777	40,794	3,990	1,587
		MMDW	46.6	37,309	54,356	5,139	4,811
		MWDW	56.6	44,812	72,663	5,486	4,811
		MDDW	71.7	48,223	100,151	5,583	1,713
		PHDW	94.4				
1997/98		AWW	46.6	31,330	49,849	4,605	2,090
		MMWW	62.1	36,003	61,569	5,832	2,388
		MWWW	81.4	40,056	68,769	7,105	2,388
		MDWW	149.0	44,564	139,380	7,105	2,388
		PHWW	175.0				
1999		AA	41.0	29,128	48,069	4,764	2,107
		ADW	27.3	28,194	42,372	4,278	1,573
		MMDW	33.5	32,467	50,088	5,235	2,622
		MWDW	37.7	33,784	56,559	5,478	2,622
		MDDW	45.2	39,705	66,491	5,478	1,941
		PHDW	73.0				
1998/99		AWW	60.8	30,273	51,193	5,018	3,025
		MMWW	83.4	33,951	58,473	6,655	4,811
		MWWW	129.0	42,691	72,744	7,729	4,811
		MDWW	181.8	55,352	101,140	7,729	4,811
		PHWW	198.3				
2000		AA	37.2	28,551	47,450	4,752	2,119
		ADW	27.9	28,167	42,829	4,377	1,873
		MMDW	37.1	31,842	54,361	5,210	3,200
		MWDW	44.2	34,867	61,134	6,418	3,200
		MDDW	55.9	42,494	74,569	6,418	3,200
		PHDW	70.6				
1999/00		AWW	51.1	28,183	56,398	5,600	2,593
		MMWW	75.0	31,562	66,870	7,039	3,688
		MWWW	126.1	37,626	82,114	8,131	3,688
		MDWW	164.2	56,675	159,363	8,131	3,688
		PHWW	198.5				
2001		AA	31.4	27,474	46,204	4,928	2,027
		ADW	24.3	28,109	41,293	4,810	1,735
		MMDW	29.5	31,401	53,790	5,537	2,294
		MWDW	31.7	34,289	66,358	6,079	2,294
		MDDW	40.8	43,987	96,901	6,079	2,294
		PHDW	52.8				
2000/01		AWW	31.6	28,793	49,357	5,039	2,402
		MMWW	37.1	34,500	56,826	5,616	2,730
		MWWW	45.2	40,387	61,704	6,961	2,730
		MDWW	69.2	49,303	98,605	6,961	2,730
		PHWW	105.2				
2002		AA	33.9	28,155	42,701	5,274	1,709
		ADW	24.5	29,353	38,328	5,327	1,516
		MMDW	30.7	34,069	41,993	6,594	1,909
		MWDW	31.3	39,251	48,553	7,099	1,909
		MDDW	38.1	44,324	66,486	7,099	1,909
		PHDW	55.0				
2001/02		AWW	49.7	26,300	50,352	5,154	2,113
		MMWW	70.1	31,491	62,450	5,899	2,910
		MWWW	97.2	42,136	72,542	6,223	2,910
		MDWW	134.8	58,834	129,062	6,223	2,910
		PHWW	193.0				

TABLE A-2
Historical Industrial Influent Wastewater Flows and Loads
MWMC Facility Plan, Eugene-Springfield

Year	Population	Condition	Flow (mgd)	BOD (lb/d)	TSS (lb/d)	Ammonia-N (lb/d)	Phosphorous (lb/d)
Average		AA	1.7	2,402	2,224	606	
		ADW	1.7	2,402	2,224	606	
		MMDW	1.7	2,402	2,224	606	
		MWDW	1.7	2,402	2,224	606	
		MDDW	1.7	2,402	2,224	606	
		PHDW	1.7	2,402	2,224	606	
		AWW	1.7	2,402	2,224	606	
		MMWW	1.7	2,402	2,224	606	
		MWWW	1.7	2,402	2,224	606	
		MDWW	1.7	2,402	2,224	606	
		PHWW	1.7	2,402	2,224	606	

TABLE A-3
Historical Domestic/Commercial Flows and Loads
MWMC Facility Plan, Eugene-Springfield

Year	Population	Condition	Flow (mgd)	BOD (lb/d)	TSS (lb/d)	Ammonia-N (lb/d)	Phosphorous (lb/d)
1996		AA	47.9	26,342	46,155		
		ADW	28.5	24,941	40,000		
		MMDW	45.3	32,641	53,275		
		MWDW	62.4	35,783	70,728		
		MDDW	70.5	49,548	158,350		
		PHDW	94.6				
1995/96		AWW	57.4	28,197	49,599		
		MMWW	88.3	35,717	62,287		
		MWWW	114.0	45,864	91,092		
		MDWW	166.2	63,233	145,144		
		PHWW	194.0				
1997		AA	37.0	31,663	44,237	3,927	1,632
		ADW	27.1	35,204	41,220	3,777	1,578
		MMDW	37.3	40,119	45,201	4,694	2,388
		MWDW	39.2	46,117	55,538	5,523	2,388
		MDDW	40.1	51,203	76,901	5,523	1,736
		PHDW	67.7				
1996/97		AWW	63.2	27,824	52,193	3,920	1,451
		MMWW	105.5	34,404	69,571	4,508	1,736
		MWWW	136.1	44,209	103,373	5,246	1,580
		MDWW	174.2	53,985	207,412	5,246	1,580
		PHWW	197.1				
1998		AA	41.5	28,178	44,036	3,625	2,273
		ADW	28.9	28,375	38,570	3,384	1,587
		MMDW	44.9	34,907	52,132	4,533	4,811
		MWDW	54.9	42,410	70,439	4,880	4,811
		MDDW	70.0	45,821	97,927	4,977	1,713
		PHDW	92.7				
1997/98		AWW	44.9	28,928	47,625	3,999	2,090
		MMWW	60.4	33,601	59,345	5,226	2,388
		MWWW	81.4	37,654	66,545	6,499	2,388
		MDWW	147.3	42,162	137,156	6,499	2,388
		PHWW	173.3				
1999		AA	39.3	26,726	45,845	4,158	2,107
		ADW	25.6	25,792	40,148	3,672	1,573
		MMDW	31.8	30,065	47,864	4,629	2,622
		MWDW	36.0	31,382	54,335	4,872	2,622
		MDDW	43.5	37,303	64,267	4,872	1,941
		PHDW	71.3				
1998/99		AWW	59.1	27,871	48,969	4,412	3,025
		MMWW	81.7	31,549	56,249	6,049	4,811
		MWWW	129.0	40,289	70,520	7,123	4,811
		MDWW	180.1	52,950	98,916	7,123	4,811
		PHWW	196.6				
2000		AA	35.5	26,149	45,226	4,146	2,119
		ADW	26.2	25,765	40,605	3,771	1,873
		MMDW	35.4	29,440	52,137	4,604	3,200
		MWDW	42.5	32,465	58,910	5,812	3,200
		MDDW	54.2	40,092	72,345	5,812	3,200
		PHDW	68.9				
1999/00		AWW	49.4	25,781	54,174	4,994	2,593
		MMWW	73.3	29,160	64,646	6,433	3,688
		MWWW	126.1	35,224	79,890	7,525	3,688
		MDWW	162.5	54,273	157,139	7,525	3,688
		PHWW	196.8				
2001		AA	29.7	25,072	43,980	4,322	2,027
		ADW	22.6	25,707	39,069	4,204	1,735
		MMDW	27.8	28,999	51,566	4,931	2,294
		MWDW	30.0	31,887	64,134	5,473	2,294
		MDDW	39.1	41,585	94,677	5,473	2,294
		PHDW	51.1				
2000/01		AWW	29.9	26,391	47,133	4,433	2,402
		MMWW	35.4	32,098	54,602	5,010	2,730
		MWWW	45.2	37,985	59,480	6,355	2,730
		MDWW	67.5	46,901	96,381	6,355	2,730
		PHWW	103.5				
2002		AA	32.2	25,753	40,477	4,668	1,709
		ADW	22.8	26,951	36,104	4,721	1,516
		MMDW	29.0	31,667	39,769	5,988	1,909
		MWDW	29.6	36,849	46,329	6,493	1,909
		MDDW	36.4	41,922	64,262	6,493	1,909
		PHDW	53.3				
2001/02		AWW	48.0	23,898	48,128	4,548	2,113
		MMWW	68.4	29,089	60,226	5,293	2,910
		MWWW	97.2	39,734	70,318	5,617	2,910
		MDWW	133.1	56,432	126,838	5,617	2,910
		PHWW	191.3				

TABLE A-4A

Derivation of Peaking Factors and Per Capita Values for Flow

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis (May 1 through October 31)		
Year	Population	Flow (gpcd)
1990	157,352	147
1991	165,745	141
1992	170,455	128
1993	175,580	147
1994	181,140	121
1995	186,960	131
1996	195,725	135
1997	201,370	135
1998	206,560	133
1999	210,835	121
2000	212,319	122
2001	215,454	105
2002	217,737	105
Minimum ->		105
Maximum ->		147
Average ->		128
Selected Values->		129
1997 Facility Plan ->		143

Historical Dry Season Flows (mgd)						
Year	99.9% Average	Maximum Month[3]	100% Average	Maximum Week[4]	Maximum Day[4]	Peak Hour
1990	23.1	28.2	23.6	37.3	74.5	[5]
1991	23.3	32.8	24.7	64.4	97.1	[5]
1992	21.8	25.7	21.8	30.4	34.6	[5]
1993	25.8	36.9	28.8	81.5	105.7	[5]
1994	22.0	25.7	22.0	27.1	39.8	[5]
1995	24.5	31.6	24.8	43.0	56.2	[5]
1996	26.4	33.5	28.5	62.4	70.5	96.3
1997	27.1	31.9	27.1	35.8	40.1	69.4
1998	27.4	39.8	28.9	54.9	70.0	94.4
1999	25.6	31.7	25.6	36.0	43.5	73.0
2000	26.0	33.1	26.2	42.5	54.2	70.6
2001	22.6	25.9	22.6	29.1	39.1	52.8
2002	22.8	26.6	22.8	29.6	36.4	55.0
Minimum ->	21.8	25.7	21.8	27.1	34.6	52.8
Maximum ->	27.4	39.8	28.9	81.5	105.7	96.3
Average ->	24.5	31.0	25.2	44.2	58.6	73.1

Historical Peaking Factors				
Year	Maximum Month[3]	Maximum Week[4]	Maximum Day[4]	Peak Hour
1990	1.2	1.6	3.2	
1991	1.4	2.6	3.9	
1992	1.2	1.4	1.6	
1993	1.4	2.8	3.7	
1994	1.2	1.2	1.8	
1995	1.3	1.7	2.3	
1996	1.3	2.2	2.5	3.4
1997	1.2	1.3	1.5	2.6
1998	1.5	1.9	2.4	3.3
1999	1.2	1.4	1.7	2.9
2000	1.3	1.6	2.1	2.7
2001	1.1	1.3	1.7	2.3
2002	1.2	1.3	1.6	2.4
Minimum ->	1.1	1.2	1.5	2.3
Maximum ->	1.5	2.8	3.9	3.4
Average ->	1.3	1.7	2.3	2.8
Selected Range->	**1.3 - 1.5**	**1.7 - 2.2**	**2.3 - 3.2**	**2.8 - 4.0[7]**
1997 Facility Plan ->	1.3			

Wet Season Analysis (November 1 through April 30)		
Year	Population	Flow (gpcd)
1989/90	157,352	244
1990/91	165,745	242
1991/92	170,455	220
1992/93	175,580	260
1993/94	181,140	172
1994/95	186,960	235
1995/96	195,725	271
1996/97	201,370	275
1997/98	206,560	213
1998/99	210,835	254
1999/00	212,319	223
2000/01	215,454	139
2001/02	217,737	218
2002/03	217,737	222
Minimum ->		139
Maximum ->		275
Average ->		227
Selected Values->		229
1997 Facility Plan ->		197

Historical Wet Season Flows (mgd)						
Year	99.9% Average	Maximum Month[3]	100% Average	Maximum Week[4]	Maximum Day[4]	Peak Hour
1989/90	38.4	53.4	38.4	63.9	87.1	[6]
1990/91	40.0	50.3	40.5	74.3	119.1	[6]
1991/92	37.4	50.1	37.4	63.8	88.6	[6]
1992/93	45.6	59.9	45.6	74.8	110.9	[6]
1993/94	31.2	38.6	31.2	58.7	93.9	[6]
1994/95	44.0	63.8	45.6	112.2	156.5	[6]
1995/96	53.0	75.6	57.4	114.0	166.2	[6]
1996/97	55.5	89.9	63.2	134.4	174.3	[6]
1997/98	44.0	60.9	44.9	79.7	147.3	[6]
1998/99	53.7	76.6	59.1	127.3	180.1	[6]
1999/00	47.3	65.9	49.4	124.4	162.5	[6]
2000/01	29.9	35.7	29.9	43.5	67.5	[6]
2001/02	47.5	68.9	48.0	95.5	133.1	[6]
2002/03	48.3	67.4	49.4	99.1	144.0	[6]
Minimum ->	29.9	35.7	29.9	43.5	67.5	[6]
Maximum ->	55.5	89.9	63.2	134.4	180.1	[6]
Average ->	44.0	61.2	45.7	90.4	130.8	[6]

Historical Peaking Factors				
Year	Maximum Month[3]	Maximum Week[4]	Maximum Day[4]	Peak Hour
1989/90	1.4	1.7	2.3	[6]
1990/91	1.3	1.8	2.9	[6]
1991/92	1.3	1.7	2.4	[6]
1992/93	1.3	1.6	2.4	[6]
1993/94	1.2	1.9	3.0	[6]
1994/95	1.5	2.5	3.4	[6]
1995/96	1.4	2.0	2.9	[6]
1996/97	1.6	2.1	2.8	[6]
1997/98	1.4	1.8	3.3	[6]
1998/99	1.4	2.2	3.0	[6]
1999/00	1.4	2.5	3.3	[6]
2000/01	1.2	1.5	2.3	[6]
2001/02	1.4	2.0	2.8	[6]
2002/03	1.4	2.0	2.9	[6]
Minimum ->	1.2	1.5	2.3	[6]
Maximum ->	1.6	2.5	3.4	[6]
Average ->	1.4	1.9	2.8	[6]
Selected Range->	**1.4 - 1.6**	**1.9 - 2.4**	**2.8 - 3.3**	
1997 Facility Plan ->	1.8			

Note:

1. Peak hour is to be determined by modeling.
2. 1990-1995 data taken from 1997 Facility Plan.
3. Maximum Month flows were determined using a 99.9% confidence interval.
4. Maximum Week and Maximum Day flows were determined using a 100% confidence interval.
5. Data not available.
6. Wet weather peak hour is to be determined through collection system modeling.
7. The wet weather maximum peaking factor of 4.0 was chosen to more closely reflect the high maximum day peaking factors from 1990 through 1995.

TABLE A4-B

Derivation of Peaking Factors and Per Capita Values for Flow (Dry Season Excludes May)

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis[5] (June 1 through October 31)		
Year	Population	Flow (gpcd)
1990	157,352	142
1991	165,745	132
1992	170,455	124
1993	175,580	135
1994	181,140	117
1995	186,960	124
1996	195,725	128
1997	201,370	130
1998	206,560	125
1999	210,835	115
2000	212,319	116
2001	215,454	102
2002	217,737	101
Minimum ->		101
Maximum ->		142
Average ->		122
Selected Values->		129
1997 Facility Plan ->		177

Historical Dry Season Flows (mgd)					
Year	99.9% Average	Maximum Month[3]	100% Average	Maximum Week[4]	Maximum Day[4]
1990	22.4	26.6	23.5	45.0	76.2
1991	21.9	25.9	21.9	31.1	30.4
1992	21.1	24.4	21.1	26.0	34.6
1993	23.7	30.9	27.0	81.5	105.7
1994	21.3	24.1	21.3	40.3	39.8
1995	23.1	26.8	23.2	31.4	41.0
1996	25.1	28.0	25.7	41.6	51.0
1997	26.1	34.9	26.1	34.5	40.1
1998	25.9	31.5	26.1	51.6	47.4
1999	24.3	26.5	24.4	30.4	43.5
2000	24.7	27.3	24.7	28.8	36.6
2001	21.9	23.8	21.9	30.0	39.1
2002	22.1	24.0	22.1	25.5	27.6
Minimum ->	21.1	23.8	21.1	25.5	27.6
Maximum ->	26.1	34.9	27.0	81.5	105.7
Average ->	23.3	27.3	23.8	38.3	47.2

Historical Peaking Factors			
Year	Maximum Month[3]	Maximum Week[4]	Maximum Day[4]
1990	1.2	1.9	3.2
1991	1.2	1.4	1.4
1992	1.2	1.2	1.6
1993	1.3	3.0	3.9
1994	1.1	1.9	1.9
1995	1.2	1.4	1.8
1996	1.1	1.6	2.0
1997	1.3	1.3	1.5
1998	1.2	2.0	1.8
1999	1.1	1.2	1.8
2000	1.1	1.2	1.5
2001	1.1	1.4	1.8
2002	1.1	1.2	1.2
Minimum ->	1.1	1.2	1.2
Maximum ->	1.3	3.0	3.9
Average ->	1.2	1.6	2.0
Selected Range->	**1.2 - 1.3**	**1.6 - 1.9**	**2.0 - 2.8**
1997 Facility Plan ->	1.3		

Wet Season Analysis (November 1 through April 30)		
Year	Population	Flow (gpcd)
1989/90	157,352	244
1990/91	165,745	242
1991/92	170,455	220
1992/93	175,580	260
1993/94	181,140	172
1994/95	186,960	235
1995/96	195,725	271
1996/97	201,370	275
1997/98	206,560	213
1998/99	210,835	254
1999/00	212,319	223
2000/01	215,454	139
2001/02	217,737	218
2002/03	217,737	222
Minimum ->		139
Maximum ->		275
Average ->		227
Selected Values->		229
1997 Facility Plan ->		253

Historical Wet Season Flows (mgd)					
Year	99.9% Average	Maximum Month[3]	100% Average	Maximum Week[4]	Maximum Day[4]
1989/90	38.4	53.4	38.4	63.9	87.1
1990/91	40.0	50.3	40.5	74.3	119.1
1991/92	37.4	50.1	37.4	63.8	88.6
1992/93	45.6	59.9	45.6	74.8	110.9
1993/94	31.2	38.6	31.2	58.7	93.9
1994/95	44.0	63.8	45.6	112.2	156.5
1995/96	53.0	75.6	57.4	114.0	166.2
1996/97	55.5	89.9	63.2	134.4	174.3
1997/98	44.0	60.9	44.9	79.7	147.3
1998/99	53.7	76.6	59.1	127.3	180.1
1999/00	47.3	65.9	49.4	124.4	162.5
2000/01	29.9	35.7	29.9	43.5	67.5
2001/02	47.5	68.9	48.0	95.5	133.1
2002/03	48.3	67.4	49.4	99.1	144.0
Minimum ->	29.9	35.7	29.9	43.5	67.5
Maximum ->	55.5	89.9	63.2	134.4	180.1
Average ->	44.0	61.2	45.7	90.4	130.8

Historical Peaking Factors			
Year	Maximum Month[3]	Maximum Week[4]	Maximum Day[4]
1989/90	1.4	1.7	2.3
1990/91	1.3	1.8	2.9
1991/92	1.3	1.7	2.4
1992/93	1.3	1.6	2.4
1993/94	1.2	1.9	3.0
1994/95	1.5	2.5	3.4
1995/96	1.4	2.0	2.9
1996/97	1.6	2.1	2.8
1997/98	1.4	1.8	3.3
1998/99	1.4	2.2	3.0
1999/00	1.4	2.5	3.3
2000/01	1.2	1.5	2.3
2001/02	1.4	2.0	2.8
2002/03	1.4	2.0	2.9
Minimum ->	1.2	1.5	2.3
Maximum ->	1.6	2.5	3.4
Average ->	1.4	1.9	2.8
Selected Range->	**1.4 - 1.6**	**1.9 - 2.4**	**2.8 - 3.3**
1997 Facility Plan ->	1.8		

Note:

1. Peak hour is to be determined by modeling.
2. 1990-1995 data taken from 1997 Facility Plan.
3. Maximum Month flows were determined using a 99.9% confidence interval.
4. Maximum Week and Maximum Day flows were determined using a 100% confidence interval.
5. Dry season analysis was conducted without May.

TABLE A-5

Derivation of Peaking Factors and Per Capita Values for CBOD

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis (May 1 through October 31)		
Year	Population	Load (ppcd)
1990	157,352	0.19
1991	165,745	0.18
1992	170,455	0.16
1993	175,580	0.15
1994	181,140	0.15
1995	186,960	0.17
1996	195,725	0.13
1997	201,370	0.17
1998	206,560	0.14
1999	210,835	0.12
2000	212,319	0.12
2001	215,454	0.12
2002	217,737	0.12
Minimum ->		0.12
Maximum ->		0.19
Average ->		0.15
Selected Values->		**0.185**
1997 Facility Plan ->		0.24

Historical Dry Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1990	29,374	32,923	38,924	47,973
1991	29,512	31,854	43,229	58,503
1992	27,907	31,739	34,821	42,594
1993	26,547	30,182	43,916	64,683
1994	27,234	33,603	36,934	40,424
1995	31,944	36,098	44,025	48,222
1996	24,940	32,640	35,782	49,547
1997	35,203	40,118	46,116	51,202
1998	28,374	34,906	42,409	45,819
1999	25,790	30,064	31,381	37,302
2000	25,764	29,439	32,464	40,091
2001	25,706	28,998	31,885	41,584
2002	26,949	31,666	36,848	41,921
Minimum ->	24,940	28,998	31,381	37,302
Maximum ->	35,203	40,118	46,116	64,683
Average ->	28,096	32,633	38,364	46,913

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1990	1.1	1.3	1.6
1991	1.1	1.5	2.0
1992	1.1	1.2	1.5
1993	1.1	1.7	2.4
1994	1.2	1.4	1.5
1995	1.1	1.4	1.5
1996	1.3	1.4	2.0
1997	1.1	1.3	1.5
1998	1.2	1.5	1.6
1999	1.2	1.2	1.4
2000	1.1	1.3	1.6
2001	1.1	1.2	1.6
2002	1.2	1.4	1.6
Minimum ->	1.1	1.2	1.4
Maximum ->	1.3	1.7	2.4
Average ->	1.2	1.4	1.7
Selected Values->	**1.3**	**1.5**	**2.0**

Wet Season Analysis (November 1 through April 30)		
Year	Population	Load (ppcd)
1990/91	165,745	0.23
1991/92	170,455	0.19
1992/93	175,580	0.15
1993/94	181,140	0.16
1994/95	186,960	0.15
1995/96	195,725	0.14
1996/97	201,370	0.14
1997/98	206,560	0.14
1998/99	210,835	0.13
1999/00	212,319	0.12
2000/01	215,454	0.12
2001/02	217,737	0.11
Minimum ->		0.11
Maximum ->		0.23
Average ->		0.15
Selected Values->		**0.185**
1997 Facility Plan ->		0.24

Historical Wet Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1990/91	38,036	59,593	72,095	86,249
1991/92	32,593	37,203	44,748	62,080
1992/93	26,533	31,084	37,842	39,331
1993/94	28,554	31,559	38,374	46,854
1994/95	27,652	35,327	38,984	46,677
1995/96	28,196	35,716	45,863	63,231
1996/97	27,823	34,403	44,208	53,984
1997/98	28,927	33,600	37,653	42,161
1998/99	27,870	31,548	40,287	52,949
1999/00	25,780	29,159	35,223	54,272
2000/01	26,390	32,097	37,984	46,899
2001/02	23,897	29,088	39,732	56,431
Minimum ->	23,897	29,088	35,223	39,331
Maximum ->	38,036	59,593	72,095	86,249
Average ->	28,521	35,031	42,749	54,260

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1990/91	1.6	1.9	2.3
1991/92	1.1	1.4	1.9
1992/93	1.2	1.4	1.5
1993/94	1.1	1.3	1.6
1994/95	1.3	1.4	1.7
1995/96	1.3	1.6	2.2
1996/97	1.2	1.6	1.9
1997/98	1.2	1.3	1.5
1998/99	1.1	1.4	1.9
1999/00	1.1	1.4	2.1
2000/01	1.2	1.4	1.8
2001/02	1.2	1.7	2.4
Minimum ->	1.1	1.3	1.5
Maximum ->	1.6	1.9	2.4
Average ->	1.2	1.5	1.9
Selected Values->	**1.3**	**1.6**	**2.3**

Note:

1. Measurements from 1990-1992 are BOD. All measurements after October 1992 are CBOD.
2. 1990-1995 data taken from 1997 Facility Plan analysis.

TABLE A-6

Derivation of Peaking Factors and Per Capita Values for TSS

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis (May 1 through October 31)		
Year	Population	Load (ppcd)
1990	157,352	0.18
1991	165,745	0.19
1992	170,455	0.18
1993	175,580	0.18
1994	181,140	0.18
1995	186,960	0.19
1996	195,725	0.20
1997	201,370	0.20
1998	206,560	0.19
1999	210,835	0.19
2000	212,319	0.19
2001	215,454	0.18
2002	217,737	0.17
Minimum ->		0.17
Maximum ->		0.20
Average ->		0.19
Selected Values->		**0.205**
1997 Facility Plan ->		0.24

Historical Dry Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1990	27,799	31,302	37,972	73,125
1991	30,892	33,302	44,336	82,399
1992	30,406	33,531	36,650	53,775
1993	30,915	36,301	43,410	63,296
1994	31,886	35,852	39,282	69,222
1995	35,763	39,706	47,725	74,785
1996	39,998	53,273	70,727	158,349
1997	41,218	45,200	55,536	76,900
1998	38,569	52,131	70,438	97,926
1999	40,146	47,863	54,334	64,265
2000	40,604	52,136	58,909	72,344
2001	39,067	51,565	64,133	94,675
2002	36,103	39,768	46,328	64,261
Minimum ->	27,799	31,302	36,650	53,775
Maximum ->	41,218	53,273	70,727	158,349
Average ->	35,644	42,456	51,522	80,409

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1990	1.1	1.4	2.6
1991	1.1	1.4	2.7
1992	1.1	1.2	1.8
1993	1.2	1.4	2.0
1994	1.1	1.2	2.2
1995	1.1	1.3	2.1
1996	1.3	1.8	4.0
1997	1.1	1.3	1.9
1998	1.4	1.8	2.5
1999	1.2	1.4	1.6
2000	1.3	1.5	1.8
2001	1.3	1.6	2.4
2002	1.1	1.3	1.8
Minimum ->	1.1	1.2	1.6
Maximum ->	1.4	1.8	4.0
Average ->	1.2	1.4	2.3
Selected Values->	**1.4**	**1.8**	**2.5**

Wet Season Analysis (November 1 through April 30)		
Year	Population	Load (ppcd)
1990/91	165,745	0.23
1991/92	170,455	0.21
1992/93	175,580	0.19
1993/94	181,140	0.18
1994/95	186,960	0.24
1995/96	195,725	0.25
1996/97	201,370	0.26
1997/98	206,560	0.23
1998/99	210,835	0.23
1999/00	212,319	0.26
2000/01	215,454	0.22
2001/02	217,737	0.22
Minimum ->		0.18
Maximum ->		0.26
Average ->		0.23
Selected Values->		**0.26**
1997 Facility Plan ->		0.26

Historical Wet Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1990/91	37,857	60,448	66,773	116,853
1991/92	35,979	40,707	49,143	127,849
1992/93	32,992	38,093	45,093	73,966
1993/94	33,505	37,687	46,738	67,608
1994/95	44,012	51,708	64,627	190,272
1995/96	49,598	62,286	91,091	145,143
1996/97	52,191	69,569	103,372	207,410
1997/98	47,624	59,344	66,544	137,155
1998/99	48,968	56,248	70,519	98,915
1999/00	54,173	64,645	79,889	157,138
2000/01	47,132	54,601	59,479	96,380
2001/02	48,127	60,225	70,317	126,837
Minimum ->	32,992	37,687	45,093	67,608
Maximum ->	54,173	69,569	103,372	207,410
Average ->	44,347	54,630	67,799	128,794

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1990/91	1.6	1.8	3.1
1991/92	1.1	1.4	3.6
1992/93	1.2	1.4	2.2
1993/94	1.1	1.4	2.0
1994/95	1.2	1.5	4.3
1995/96	1.3	1.8	2.9
1996/97	1.3	2.0	4.0
1997/98	1.2	1.4	2.9
1998/99	1.1	1.4	2.0
1999/00	1.2	1.5	2.9
2000/01	1.2	1.3	2.0
2001/02	1.3	1.5	2.6
Minimum ->	1.1	1.3	2.0
Maximum ->	1.6	2.0	4.3
Average ->	1.2	1.5	2.9
Selected Values->	**1.3**	**2.0**	**3.0**

Note:

1. 1990-1995 data taken from 1997 Facility Plan analysis.

TABLE A-7

Derivation of Peaking Factors and Per Capita Values for Ammonia

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis (May 1 through October 31)		
Year	Population	Load (ppcd)
1996	195,725	
1997	201,370	0.019
1998	206,560	0.016
1999	210,835	0.017
2000	212,319	0.018
2001	215,454	0.020
2002	217,737	0.022
Minimum ->		0.016
Maximum ->		0.022
Average ->		0.019
Selected Values->		**0.020**

Historical Dry Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1996				
1997	3,777	4,694	5,523	5,523
1998	3,384	4,534	4,880	4,978
1999	3,672	4,629	4,872	4,872
2000	3,771	4,604	5,812	5,812
2001	4,205	4,931	5,473	5,473
2002	4,722	5,988	6,493	6,493
Minimum ->	3,384	4,534	4,872	4,872
Maximum ->	4,722	5,988	6,493	6,493
Average ->	3,922	4,897	5,509	5,525

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1996			
1997	1.2	1.5	1.5
1998	1.3	1.4	1.5
1999	1.3	1.3	1.3
2000	1.2	1.5	1.5
2001	1.2	1.3	1.3
2002	1.3	1.4	1.4
Minimum ->	1.2	1.3	1.3
Maximum ->	1.3	1.5	1.5
Average ->	1.3	1.4	1.4
Selected Values->	**1.3**	**1.5**	**1.5**

Wet Season Analysis (November 1 through April 30)		
Year	Population	Load (ppcd)
1995/96	195,725	
1996/97	201,370	0.019
1997/98	206,560	0.019
1998/99	210,835	0.021
1999/00	212,319	0.024
2000/01	215,454	0.021
2001/02	217,737	0.021
Minimum ->		0.019
Maximum ->		0.024
Average ->		0.021
Selected Values->		**0.022**

Historical Wet Season Loads (ppd)				
Year	Average	Maximum Month	Maximum Week	Maximum Day
1995/96				
1996/97	3,920	4,508	5,246	5,246
1997/98	3,999	5,226	6,499	6,499
1998/99	4,412	6,050	7,123	7,123
1999/00	4,994	6,433	7,525	7,525
2000/01	4,433	5,010	6,355	6,355
2001/02	4,548	5,293	5,617	5,617
Minimum ->	3,920	4,508	5,246	5,246
Maximum ->	4,994	6,433	7,525	7,525
Average ->	4,384	5,420	6,394	6,394

Historical Peaking Factors			
Year	Maximum Month	Maximum Week	Maximum Day
1995/96			
1996/97	1.2	1.3	1.3
1997/98	1.3	1.6	1.6
1998/99	1.4	1.6	1.6
1999/00	1.3	1.5	1.5
2000/01	1.1	1.4	1.4
2001/02	1.2	1.2	1.2
Minimum ->	1.1	1.2	1.2
Maximum ->	1.4	1.6	1.6
Average ->	1.2	1.5	1.5
Selected Values->	**1.3**	**1.5**	**1.5**

Note:

1. 1990-1995 data taken from 1995 Phase 1 - Short Term Improvements Report
2. 1995 data includes January through April only.

TABLE A-8

Derivation of Peaking Factors and Per Capita Values for Phosphorous

MWMC Facility Plan, Eugene-Springfield

Dry Season Analysis (May 1 through October 31)		
Year	Population	Load (ppcd)
1996	195,725	
1997	201,370	0.008
1998	206,560	0.008
1999	210,835	0.007
2000	212,319	0.009
2001	215,454	0.008
2002	217,737	0.007
Average ->		0.008
Maximum ->		0.009
Selected Values->		**0.008**

Historical Dry Season Loads (ppd)			
Average	Maximum Month	Maximum Week	Maximum Day
1,578	2,388	2,388	2,388
1,587	4,811	4,811	4,811
1,573	2,622	2,622	2,622
1,873	3,200	3,200	3,200
1,735	2,294	2,294	2,294
1,516	1,909	1,909	1,909
1,644	2,871	2,871	2,871

Historical Peaking Factors		
Maximum Month	Maximum Week	Maximum Day
1.51	1.51	1.51
3.03	3.03	3.03
1.67	1.67	1.67
1.71	1.71	1.71
1.32	1.32	1.32
1.26	1.26	1.26
1.75	1.75	1.75
3.03	3.03	3.03
1.40	**1.40**	**1.40**

Wet Season Analysis (November 1 through April 30)		
Year	Population	Load (ppcd)
1995/96	195,725	
1996/97	201,370	0.007
1997/98	206,560	0.010
1998/99	210,835	0.014
1999/00	212,319	0.012
2000/01	215,454	0.011
2001/02	217,737	0.010
Average ->		0.011
Maximum ->		0.014
Selected Values->		**0.011**

Historical Wet Season Loads (ppd)			
Average	Maximum Month	Maximum Week	Maximum Day
1,451	1,580	1,580	1,580
2,090	2,388	2,388	2,388
3,025	4,811	4,811	4,811
2,593	3,688	3,688	3,688
2,402	2,730	2,730	2,730
2,113	2,910	2,910	2,910
2,279	3,018	3,018	3,018

Historical Peaking Factors		
Maximum Month	Maximum Week	Maximum Day
1.09	1.09	1.09
1.14	1.14	1.14
1.59	1.59	1.59
1.42	1.42	1.42
1.14	1.14	1.14
1.38	1.38	1.38
1.29	1.29	1.29
1.59	1.59	1.59
1.40	**1.40**	**1.40**

TABLE A-9
Industrial Contributors to the E-S WPCF
MWMC Facility Plan, Eugene-Springfield

	SIU	Average Process Discharge (MGD)	Average Process Discharge (gpd)	Average NH_3-N (mg/L)	Average NH_3-N (ppd)	Average BOD (mg/L)	Average BOD (ppd)	Average TSS (mg/L)	Average TSS (ppd)
Eugene(2)	Altech Finishes	0.078000	78000	No data	608.5	733	17840.5	325	7910.2
	Aramark Uniform Services	0.070373	70373	No Data	549.0	393	8629.9	129	2832.7
	Brads BP	0.001261	1261	No Data	9.8	No Data	78.7	No Data	78.7
	Forrest Paint Company	0.005350	5350	No Data	41.7	No Data	333.9	No Data	333.9
	Georgia Pacific	0.001800	1800	No Data	14.0	>1000	561.7	5800	3257.7
	Gheen Irrigation Works, Inc.	0.046025	46025	No Data	359.0	No Data	2872.3	No Data	2872.3
	Hynix Semiconductor Manufacturing America	1.080000	1080000	34.8	11727.6	9	3033.0	11	3707.0
	Molecular Probes	0.008000	8000	No Data	62.4	No Data	499.3	No Data	499.3
	Oregon Medical Laboratories	0.003527	3527	3.25	3.6	No Data	220.1	No Data	220.1
	Pierce Corporation	0.010510	10510	17.5	57.4	No Data	655.9	No Data	655.9
	Trus Joist, A Weyerhaeuser Business	0.003231	3231	No Data	25.2	255	257.1	113	113.9
	Weyerhaeuser Company	0.114100	114100	No Data	890.1	640	22786.3	1219	43400.7
	Williams Bakery	0.011070	11070	No Data	86.4	857	2960.3	361	1247.0
Springfield(3)	Borden Chemical	0.021505	21505	No data	167.8	1860	12481.3	538	3610.2
	Dynea Corporation	0.001676	1676	No data	13.1	1198	626.5	78	40.8
	Lane County – leachate	0.086940	86940	251	6809.3	240	6510.9	27	732.5
	Lane County – vactor	0.001061	1061	No data	8.3	130	43.0	80	26.5
	McKenzie Chrome	0.001100	1100	No data	8.6	224	76.9	360	123.6
	McKenzie Forest Products	0.002553	2553	No data	19.9	126	100.4	194	154.5
	Pepsi Cola Bottling Co.	0.009010	9010	No data	70.3	-		-	
	Quadra Chemical	0.000040	40	No data	0.3	-		-	
	Rosboro Lumber Co.	0.005788	5788	No data	45.2	510	921.1	1100	1986.7
	Sierra Pine	0.008175	8175	No data	63.8	300	765.3	360	918.3
	Voith Paper	0.000600	600	No data	4.7	-		-	
	Weyerhaeuser - Springfield Plywood	0.017723	17723	No data	138.3	976	5397.5	705	3898.8
	Weyerhaeuser Co. Main Plant	0.064160	64160	No data	500.5	60	1201.2	122	2442.5
	Weyerhaeuser Tk. Rd. Land Fill	0.047279	47279	No data	368.8	27	398.3	104	1534.3
	Total	1.70			22,653		89,251		82,598

Note:
(1) Where no data is available the following concentrations are used:

BOD (mg/L)	200
TSS (mg/L)	200
NH_3-N (mg/L)	25

(2) 9 contributors from Eugene submitted no information on flow.
(3) 2 contributors from Springfield are not discharging and are in the process of permanent shut down.

Attachment B

DEQ Methodology

The *Guidelines for Making Wet-Weather and Peak Flow Projections for Sewage Treatment in Western Oregon: MMDWF, MMWWF, PDAF, and PIF*, from the Oregon DEQ, present instructions for calculating current flow rates. A statistical analysis of representative historical data from 2000 through 2002 was used to predict current peak flow rates. The monthly average flows for dry weather and wet weather are predicted using rainfall recurrence data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center, *Climatography of the United States No. 20, 1971-2000*, Eugene Mahlon Sweet Airport Station (see Figure B-1). The peak day average flow (PDAF) is predicted using daily precipitation and flow data for January through May, the months that groundwater impacts I/I rates in the system (see Figure B-2). Using a probability distribution, the current peak week and peak instantaneous flow rates are predicted (see Figure B-3). The 2025 average dry weather and average wet weather projections are calculated by applying the 2000 through 2002 representative average per capitas to the projected 2025 population. Maximum month, peak week, peak day, and peak instantaneous for the year 2025 are projected by adjusting the current values by the increase in the base flows (ADWF and AWWF) between current and 2025 levels. These projections are presented in Table B-1. Also shown in Table B-1 are the projections based on the historical data method, which is explained in the body of the technical memorandum.

For projecting future flows, it is recommended that the peaking factors based on historical data be used. This approach results in more conservative flow projections except for the dry weather maximum month and wet weather peak instantaneous values. The approach for projecting dry season maximum month values is discussed in the body of the technical memorandum. Regarding wet weather peak instantaneous flows, a significant collection system modeling effort forms the basis of the 277 mgd (see *Wet Weather Peak Flow* technical memorandum), which is only slightly less than the 282.4 mgd predicted using the DEQ method, and therefore it is recommended that the 277 mgd be used for planning purposes.

Abbreviations/Terminology:

ADWF – Average Dry Weather Flow
AWWF – Average Wet Weather Flow
AAF – Average Annual Flow
MMDWF - Maximum Month Dry Weather Flow
MMWWF - Maximum Month Wet Weather Flow
PWWWF - Peak Week Wet Weather Flow
PDAF - Peak Day Average Wet Weather Flow
PIF - Peak Instantaneous Wet Weather Flow (considered equivalent to peak hour wet weather flow)

TABLE B-1
Comparison of Peaking Factors and Projections
Historical vs. DEQ Method
MWMC Facility Plan, Eugene-Springfield

	DEQ Method						Historical Data Method	
	Actual values based on 2000-2002 data	Estimated values based on 00-02 data	Notes	2025 Projections	Notes	Peaking Factors[g]	2025 Projections[h]	Peaking Factors[i]
ADW FLOW/CAP	122			122			129	
AWW FLOW/CAP	235			235			229	
AAF/CAP	168			168				
POP	214,923			297,585			297,585	
ADWF	26.2			36.3	e		38.4	1.0
AWWF	50.4			69.8	e		68.1	1.0
AAF	36.2	36.2		50.1	e			
MMDWF		58.8	a	68.9	f	1.9	59.3	1.5
MMWWF		86.0	a	105.4	f	1.5	110.8	1.6
PWWWF		118.0	b	137.4	f	2.0	165.3	2.4
PDAF		167.4	c	186.8	f	2.7	226.7	3.3
PIF		263.0	d	282.4	f	4.0	277.0	4.1

Notes:
a) Read off from Figure B-1.
b) Interpolated from Figure B-3
c) Determined from Figure B-2
d) Extrapolated from Figure B-3
e) Calculated ADWF, AWWF, and AAF for 2025 by multiplying the per capita values from the 2000-2002 actual data by the 2025 population.
f) Projected values are determined by increasing the base flows to 2025 levels assuming that the I/I, design storm, etc. remains the same in 2025. For example the 2025 MMDWF = (36.3 - 26.2) + 58.8 = 68.9 mgd. The 2025 MMWWF = (69.8 - 50.4) + 86 = 105.4 mgd
g) Peaking factors from DEQ method are back-calculated from the projected 2025 values.
h) From Table C-1.
i) From Table 11, high end of the range.

Figure B-1: MWMC Monthly Residential Flow (mgd) vs Cumulative Monthly Precipitation (in)
Representative Months (2000 through 2002)

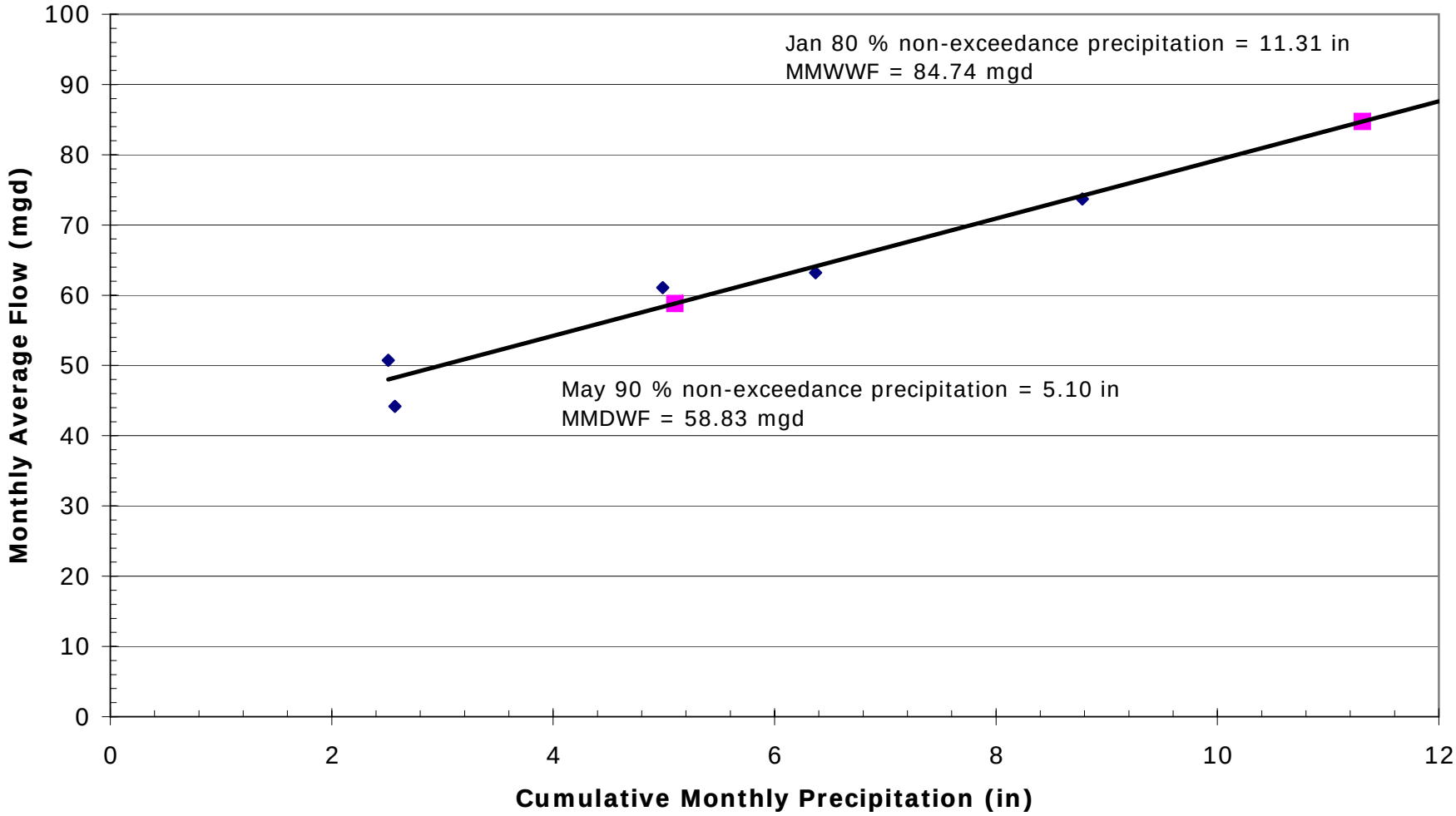


Figure B-2: MWMC Daily Residential Flow (mgd) vs. Precipitation (in)
Selected Storms (2000 through 2002)

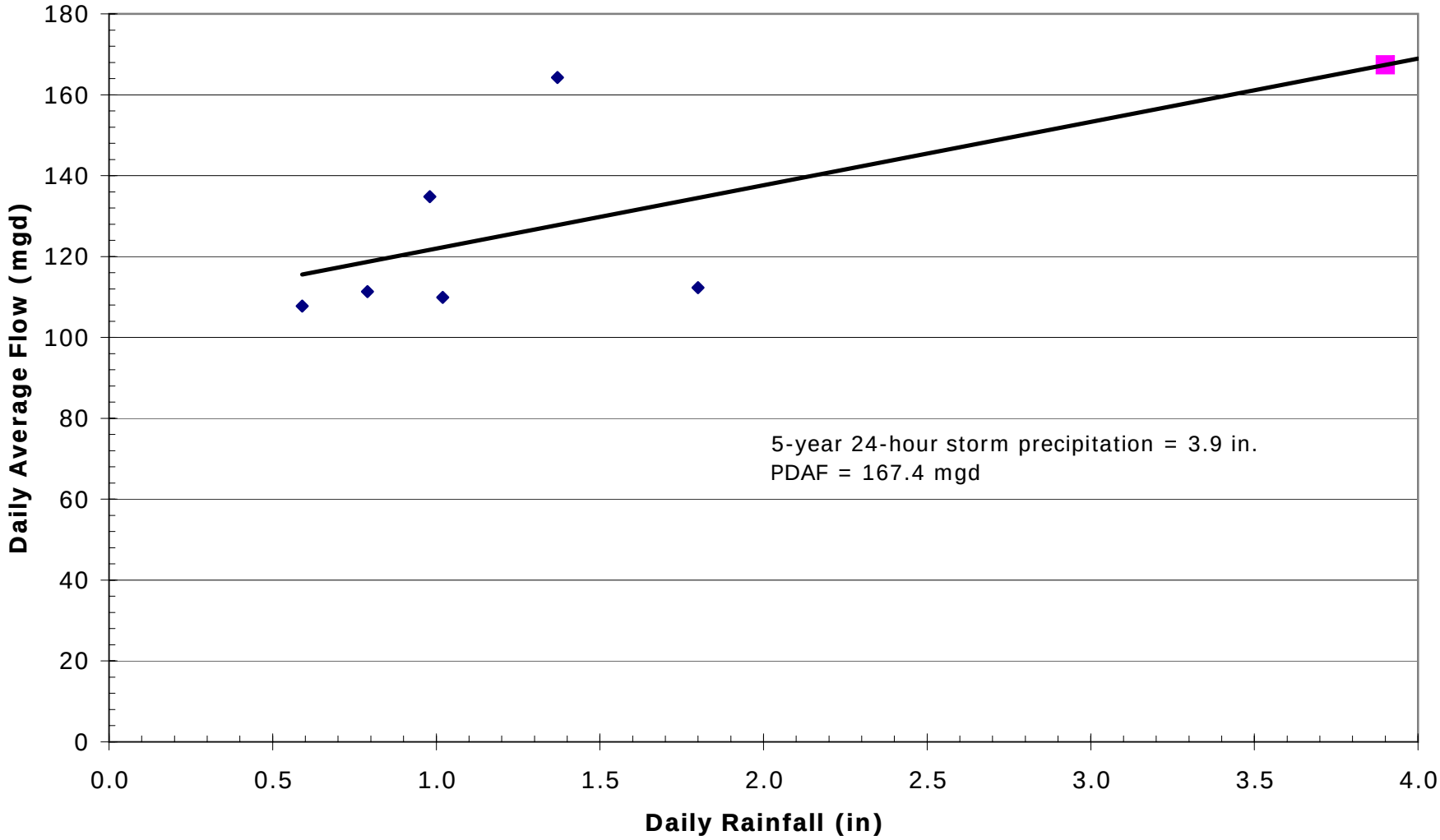
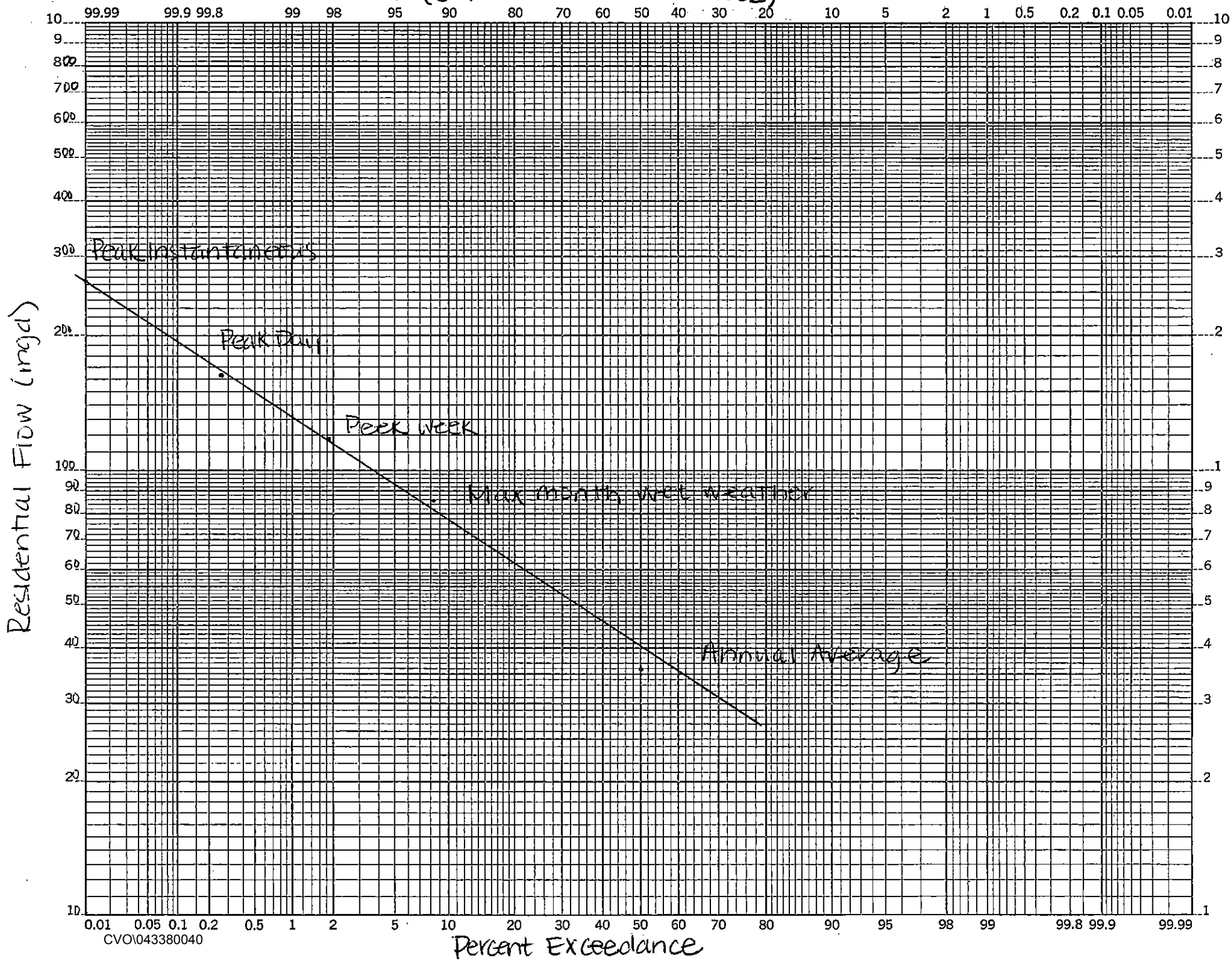


Figure B-3 MWMC Residential Flow and Projection Probability Distribution (selected data 2000-2002)



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MWMC Monthly Average Plant Flows vs Cumulative Precipitation

Yr-Mo	Cumulative Precipitation (inches)	Average Plant Flow (mgd)
Jan-96	7.29	77.41
Feb-96	15.52	83.53
Mar-96	2.17	46.29
Apr-96	2.72	42.88
May-96	3.28	43.90
Jan-97	5.68	71.67
Feb-97	1.23	51.94
Mar-97	5.19	58.97
Apr-97	3.1	39.38
May-97	2.66	33.77
Jan-98	8.09	60.28
Feb-98	6.21	58.84
Mar-98	5.13	52.29
Apr-98	2.61	39.14
May-98	4.93	44.34
Jan-99	7.65	71.47
Feb-99	10.03	76.59
Mar-99	3.45	55.52
Apr-99	0.65	37.23
May-99	2.9	33.27
Jan-00	8.78	73.70
Feb-00	4.99	61.10
Mar-00	2.17	47.03
Apr-00	1.76	35.18
May-00	2.38	35.33
Jan-01	1.1	30.92
Feb-01	1.14	31.10
Mar-01	1.94	31.23
Apr-01	1.76	32.99
May-01	0.7	27.55
Jan-02	6.37	63.22
Feb-02	2.51	50.75
Mar-02	2.57	44.19
Apr-02	1.65	34.89
May-02	1.61	28.23
From Linear Interpolation		
2000 - 2002		
MMDW: May 90% non-	5.10	55.96
MMWW: Jan 80% non-	11.31	93.50

Jan-00	8.78	73.70
Feb-00	4.99	61.10
Mar-00		
Apr-00		
May-00		
Jan-01		
Feb-01		
Mar-01		
Apr-01		
May-01		
Jan-02	6.37	63.22
Feb-02	2.51	50.75
Mar-02	2.57	44.19
Apr-02		
May-02		
From Linear Interpolation		
2000 - 2002		
MMDW: May 90% non-exceedance	5.10	58.83
MMWW: Jan 80% non-exceedance	11.31	84.74

DEQ PD

Date	Inf Flow Total (mgd)	Precip (in)
1-Jan-96	57.50	0.00
2-Jan-96	52.70	0.00
3-Jan-96	52.77	0.26
4-Jan-96	51.85	0.01
5-Jan-96	49.45	0.16
6-Jan-96	50.31	0.00
7-Jan-96	58.38	0.00
8-Jan-96	64.91	0.00
9-Jan-96	82.26	0.63
10-Jan-96	70.48	0.00
11-Jan-96	58.33	0.00
12-Jan-96	52.60	0.00
13-Jan-96	48.47	0.00
14-Jan-96	49.21	0.38
15-Jan-96	70.68	0.24
16-Jan-96	79.10	0.37
17-Jan-96	66.06	0.00
18-Jan-96	71.63	0.59
19-Jan-96	96.20	0.37
20-Jan-96	118.93	0.98
21-Jan-96	144.66	0.32
22-Jan-96	96.36	0.10
23-Jan-96	79.11	0.48
24-Jan-96	118.67	0.86
25-Jan-96	108.77	0.12
26-Jan-96	83.62	0.18
27-Jan-96	121.02	0.94
28-Jan-96	110.30	0.20
29-Jan-96	95.81	0.10
30-Jan-96	76.50	0.00
31-Jan-96	63.10	0.00
1-Feb-96	58.50	0.00
2-Feb-96	52.70	0.00
3-Feb-96	48.72	0.03
4-Feb-96	49.75	0.17
5-Feb-96	54.90	0.67
6-Feb-96	108.09	2.89
7-Feb-96	167.87	5.31
8-Feb-96	136.17	1.58
9-Feb-96	150.50	0.23
10-Feb-96	95.10	0.00
11-Feb-96	81.78	0.00
12-Feb-96	70.47	0.00
13-Feb-96	59.89	0.00
14-Feb-96	54.17	0.00
15-Feb-96	52.50	0.00
16-Feb-96	50.00	0.35
17-Feb-96	66.90	0.71
18-Feb-96	101.70	0.75

Inf Flow Total (mgd)	Precip (in)
From Linear Interpolation	
2000 through 2002	
247.09	3.90
From Linear Interpolation	
Selected Storms (2000 through 2002)	
167.38	3.90

1.80
0.79
1.37
0.59
0.98
1.02

19-Feb-96	104.80	0.09
20-Feb-96	91.30	0.56
21-Feb-96	103.70	0.19
22-Feb-96	77.40	0.00
23-Feb-96	120.91	0.94
24-Feb-96	102.80	0.17
25-Feb-96	78.47	0.00
26-Feb-96	66.18	0.00
27-Feb-96	61.59	0.11
28-Feb-96	72.07	0.77
29-Feb-96	83.57	0.00
1-Mar-96	64.40	0.00
2-Mar-96	64.50	0.00
3-Mar-96	59.60	0.14
4-Mar-96	75.50	0.53
5-Mar-96	74.38	0.14
6-Mar-96	61.44	0.00
7-Mar-96	53.96	0.00
8-Mar-96	49.91	0.00
9-Mar-96	47.60	0.01
10-Mar-96	47.73	0.25
11-Mar-96	56.82	0.31
12-Mar-96	61.63	0.02
13-Mar-96	52.30	0.00
14-Mar-96	46.78	0.00
15-Mar-96	42.80	0.00
16-Mar-96	39.40	0.00
17-Mar-96	38.42	0.00
18-Mar-96	37.49	0.00
19-Mar-96	35.58	0.00
20-Mar-96	38.45	0.00
21-Mar-96	38.00	0.00
22-Mar-96	38.20	0.00
23-Mar-96	35.59	0.00
24-Mar-96	33.68	0.00
25-Mar-96	33.26	0.00
26-Mar-96	32.27	0.00
27-Mar-96	32.63	0.17
28-Mar-96	32.65	0.00
29-Mar-96	31.45	0.00
30-Mar-96	34.50	0.00
31-Mar-96	44.20	0.60
1-Apr-96	61.73	0.27
2-Apr-96	48.79	0.00
3-Apr-96	41.16	0.00
4-Apr-96	37.41	0.00
5-Apr-96	35.77	0.00
6-Apr-96	34.84	0.00
7-Apr-96	33.81	0.00
8-Apr-96	33.90	0.00
9-Apr-96	33.57	0.00
10-Apr-96	34.30	0.11
11-Apr-96	41.80	0.37
12-Apr-96	41.31	0.12
13-Apr-96	35.60	0.00
14-Apr-96	33.08	0.00

15-Apr-96	35.70	0.26
16-Apr-96	42.32	0.16
17-Apr-96	37.89	0.03
18-Apr-96	36.93	0.05
19-Apr-96	36.65	0.02
20-Apr-96	37.41	0.04
21-Apr-96	38.90	0.12
22-Apr-96	53.95	0.46
23-Apr-96	61.04	0.60
24-Apr-96	87.10	0.11
25-Apr-96	60.17	0.00
26-Apr-96	49.72	0.00
27-Apr-96	43.19	0.00
28-Apr-96	40.65	0.00
29-Apr-96	39.33	0.00
30-Apr-96	38.44	0.00
1-May-96	35.22	0.00
2-May-96	34.78	0.00
3-May-96	34.91	0.01
4-May-96	32.57	0.01
5-May-96	32.42	0.00
6-May-96	32.77	0.00
7-May-96	33.30	0.00
8-May-96	31.04	0.00
9-May-96	30.10	0.00
10-May-96	29.41	0.00
11-May-96	30.64	0.00
12-May-96	28.93	0.03
13-May-96	33.78	0.63
14-May-96	57.50	0.50
15-May-96	64.04	0.51
16-May-96	48.41	0.01
17-May-96	61.62	0.60
18-May-96	72.20	0.25
19-May-96	66.18	0.20
20-May-96	55.03	0.04
21-May-96	70.74	0.47
22-May-96	67.38	0.02
23-May-96	55.63	0.00
24-May-96	52.37	0.00
25-May-96	45.32	0.00
26-May-96	40.84	0.00
27-May-96	39.23	0.00
28-May-96	38.29	0.00
29-May-96	36.58	0.00
30-May-96	34.93	0.00
31-May-96	34.80	0.00
1-Jan-97	152.89	0.39
2-Jan-97	130.03	0.26
3-Jan-97	121.39	0.10
4-Jan-97	93.73	0.00
5-Jan-97	81.68	0.03
6-Jan-97	72.42	0.00
7-Jan-97	69.46	0.06
8-Jan-97	65.89	0.02
9-Jan-97	60.16	0.00

10-Jan-97	56.67	0.00
11-Jan-97	53.51	0.00
12-Jan-97	50.14	0.00
13-Jan-97	47.27	0.00
14-Jan-97	45.26	0.00
15-Jan-97	43.17	0.00
16-Jan-97	42.43	0.12
17-Jan-97	49.79	0.36
18-Jan-97	47.69	0.02
19-Jan-97	44.53	0.01
20-Jan-97	54.67	0.00
21-Jan-97	55.15	0.35
22-Jan-97	49.85	0.00
23-Jan-97	46.13	0.01
24-Jan-97	43.66	0.00
25-Jan-97	67.47	1.08
26-Jan-97	108.82	0.31
27-Jan-97	73.04	0.29
28-Jan-97	82.53	0.10
29-Jan-97	65.68	0.00
30-Jan-97	70.65	1.06
31-Jan-97	175.95	1.11
1-Feb-97	129.20	0.13
2-Feb-97	92.81	0.00
3-Feb-97	77.00	0.00
4-Feb-97	67.60	0.01
5-Feb-97	59.40	0.00
6-Feb-97	58.55	0.00
7-Feb-97	61.39	0.36
8-Feb-97	59.04	0.00
9-Feb-97	52.62	0.00
10-Feb-97	48.56	0.00
11-Feb-97	46.93	0.09
12-Feb-97	45.92	0.01
13-Feb-97	42.93	0.02
14-Feb-97	42.65	0.01
15-Feb-97	40.28	0.01
16-Feb-97	40.03	0.00
17-Feb-97	39.43	0.00
18-Feb-97	37.84	0.17
19-Feb-97	47.09	0.22
20-Feb-97	44.88	0.01
21-Feb-97	42.20	0.00
22-Feb-97	39.58	0.00
23-Feb-97	40.29	0.00
24-Feb-97	37.35	0.00
25-Feb-97	37.45	0.00
26-Feb-97	39.78	0.08
27-Feb-97	42.38	0.11
28-Feb-97	41.08	0.00
1-Mar-97	63.63	1.14
2-Mar-97	107.60	0.40
3-Mar-97	80.95	0.07
4-Mar-97	65.58	0.00
5-Mar-97	57.55	0.13
6-Mar-97	52.16	0.06

7-Mar-97	54.42	0.10
8-Mar-97	49.14	0.02
9-Mar-97	45.85	0.00
10-Mar-97	84.87	1.13
11-Mar-97	88.16	0.09
12-Mar-97	74.18	0.18
13-Mar-97	65.08	0.00
14-Mar-97	59.01	0.00
15-Mar-97	60.10	0.22
16-Mar-97	77.45	0.75
17-Mar-97	77.02	0.01
18-Mar-97	61.66	0.00
19-Mar-97	56.52	0.13
20-Mar-97	62.47	0.14
21-Mar-97	54.48	0.00
22-Mar-97	49.40	0.00
23-Mar-97	45.19	0.00
24-Mar-97	43.56	0.00
25-Mar-97	41.25	0.00
26-Mar-97	43.52	0.17
27-Mar-97	43.12	0.17
28-Mar-97	42.60	0.01
29-Mar-97	39.85	0.00
30-Mar-97	39.47	0.07
31-Mar-97	42.27	0.20
1-Apr-97	39.70	0.00
2-Apr-97	37.30	0.00
3-Apr-97	36.98	0.00
4-Apr-97	35.17	0.00
5-Apr-97	37.07	0.00
6-Apr-97	35.21	0.01
7-Apr-97	35.06	0.10
8-Apr-97	36.07	0.02
9-Apr-97	35.40	0.00
10-Apr-97	34.71	0.00
11-Apr-97	35.14	0.00
12-Apr-97	33.03	0.00
13-Apr-97	33.09	0.02
14-Apr-97	32.61	0.00
15-Apr-97	31.44	0.00
16-Apr-97	33.45	0.01
17-Apr-97	32.08	0.00
18-Apr-97	34.28	0.05
19-Apr-97	38.65	0.69
20-Apr-97	50.07	0.78
21-Apr-97	40.07	0.02
22-Apr-97	47.61	0.47
23-Apr-97	64.04	0.29
24-Apr-97	51.17	0.00
25-Apr-97	44.72	0.00
26-Apr-97	41.40	0.19
27-Apr-97	43.53	0.00
28-Apr-97	41.98	0.32
29-Apr-97	46.79	0.01
30-Apr-97	43.61	0.12
1-May-97	40.75	0.01

2-May-97	38.19	0.12
3-May-97	38.43	0.02
4-May-97	36.52	0.00
5-May-97	35.88	0.00
6-May-97	36.94	0.05
7-May-97	35.93	0.00
8-May-97	34.60	0.00
9-May-97	33.88	0.00
10-May-97	32.63	0.00
11-May-97	32.15	0.00
12-May-97	34.04	0.00
13-May-97	31.90	0.00
14-May-97	32.28	0.01
15-May-97	31.89	0.00
16-May-97	30.48	0.00
17-May-97	31.13	0.00
18-May-97	30.96	0.00
19-May-97	32.60	0.00
20-May-97	30.84	0.00
21-May-97	28.72	0.00
22-May-97	29.15	0.13
23-May-97	33.33	0.13
24-May-97	32.80	0.40
25-May-97	30.97	0.00
26-May-97	30.37	0.03
27-May-97	33.27	0.18
28-May-97	35.73	0.35
29-May-97	38.86	0.01
30-May-97	32.90	0.02
31-May-97	38.86	1.20
1-Jan-98	35.65	0.40
2-Jan-98	41.84	0.00
3-Jan-98	42.38	0.43
4-Jan-98	47.93	0.04
5-Jan-98	40.72	0.09
6-Jan-98	39.24	0.15
7-Jan-98	41.43	0.07
8-Jan-98	39.34	0.00
9-Jan-98	36.73	0.01
10-Jan-98	41.21	0.41
11-Jan-98	75.60	0.91
12-Jan-98	71.56	0.59
13-Jan-98	96.57	0.74
14-Jan-98	80.33	0.63
15-Jan-98	78.86	0.01
16-Jan-98	65.93	0.57
17-Jan-98	75.58	0.25
18-Jan-98	67.11	0.21
19-Jan-98	66.36	0.07
20-Jan-98	56.85	0.00
21-Jan-98	53.48	0.19
22-Jan-98	58.25	0.53
23-Jan-98	67.88	0.39
24-Jan-98	75.22	0.67
25-Jan-98	78.33	0.34
26-Jan-98	82.31	0.13

27-Jan-98	80.16	0.02
28-Jan-98	65.94	0.01
29-Jan-98	61.40	0.23
30-Jan-98	54.43	0.00
31-Jan-98	50.00	0.00
1-Feb-98	48.16	0.27
2-Feb-98	45.93	0.15
3-Feb-98	48.22	0.27
4-Feb-98	48.41	0.04
5-Feb-98	46.03	0.36
6-Feb-98	49.52	0.09
7-Feb-98	45.05	0.02
8-Feb-98	43.51	0.33
9-Feb-98	41.37	0.00
10-Feb-98	45.49	0.39
11-Feb-98	50.26	0.04
12-Feb-98	61.98	0.48
13-Feb-98	70.60	0.01
14-Feb-98	65.10	0.28
15-Feb-98	60.55	0.22
16-Feb-98	54.96	0.00
17-Feb-98	49.57	0.06
18-Feb-98	46.63	0.15
19-Feb-98	53.16	0.26
20-Feb-98	49.16	0.75
21-Feb-98	148.95	1.40
22-Feb-98	119.30	0.13
23-Feb-98	78.10	0.00
24-Feb-98	64.21	0.00
25-Feb-98	57.13	0.14
26-Feb-98	51.23	0.00
27-Feb-98	48.38	0.20
28-Feb-98	56.52	0.17
1-Mar-98	54.19	0.12
2-Mar-98	56.52	0.10
3-Mar-98	68.32	0.46
4-Mar-98	66.30	0.09
5-Mar-98	56.31	0.00
6-Mar-98	50.15	0.00
7-Mar-98	46.99	0.28
8-Mar-98	50.28	0.02
9-Mar-98	45.42	0.00
10-Mar-98	43.40	0.10
11-Mar-98	42.14	0.01
12-Mar-98	41.12	0.22
13-Mar-98	41.77	0.05
14-Mar-98	38.90	0.11
15-Mar-98	40.10	0.02
16-Mar-98	37.75	0.02
17-Mar-98	35.85	0.00
18-Mar-98	34.62	0.00
19-Mar-98	36.05	0.00
20-Mar-98	34.29	0.00
21-Mar-98	48.36	1.21
22-Mar-98	92.96	0.89
23-Mar-98	91.64	0.35

24-Mar-98	75.33	0.47
25-Mar-98	73.81	0.06
26-Mar-98	60.47	0.11
27-Mar-98	57.77	0.17
28-Mar-98	54.37	0.00
29-Mar-98	48.46	0.00
30-Mar-98	46.75	0.24
31-Mar-98	50.58	0.03
1-Apr-98	44.90	0.00
2-Apr-98	41.52	0.00
3-Apr-98	41.95	0.07
4-Apr-98	39.74	0.06
5-Apr-98	42.13	0.30
6-Apr-98	42.75	0.15
7-Apr-98	42.04	0.14
8-Apr-98	39.53	0.04
9-Apr-98	40.30	0.47
10-Apr-98	53.33	0.29
11-Apr-98	50.94	0.14
12-Apr-98	45.43	0.04
13-Apr-98	42.65	0.00
14-Apr-98	38.76	0.00
15-Apr-98	37.48	0.03
16-Apr-98	36.30	0.00
17-Apr-98	35.02	0.00
18-Apr-98	33.77	0.00
19-Apr-98	34.27	0.00
20-Apr-98	35.60	0.00
21-Apr-98	33.88	0.00
22-Apr-98	33.50	0.15
23-Apr-98	40.05	0.44
24-Apr-98	40.96	0.25
25-Apr-98	36.92	0.00
26-Apr-98	35.14	0.00
27-Apr-98	34.27	0.00
28-Apr-98	34.07	0.00
29-Apr-98	33.91	0.00
30-Apr-98	33.00	0.04
1-May-98	31.67	0.05
2-May-98	36.68	0.45
3-May-98	37.36	0.00
4-May-98	35.18	0.00
5-May-98	32.19	0.01
6-May-98	32.30	0.01
7-May-98	31.06	0.00
8-May-98	32.59	0.29
9-May-98	31.80	0.01
10-May-98	31.10	0.06
11-May-98	32.37	0.02
12-May-98	41.34	0.57
13-May-98	40.45	0.10
14-May-98	38.23	0.09
15-May-98	39.01	0.14
16-May-98	45.70	0.23
17-May-98	46.04	0.11
18-May-98	42.44	0.00

19-May-98	49.98	0.52
20-May-98	66.67	0.43
21-May-98	61.83	0.21
22-May-98	51.59	0.00
23-May-98	43.81	0.00
24-May-98	46.68	0.36
25-May-98	55.84	0.25
26-May-98	52.94	0.00
27-May-98	45.95	0.01
28-May-98	43.05	0.01
29-May-98	71.25	1.00
30-May-98	71.71	0.00
31-May-98	55.75	0.00
1-Jan-99	63.70	0.00
2-Jan-99	57.06	0.00
3-Jan-99	53.49	0.00
4-Jan-99	51.12	0.00
5-Jan-99	47.37	0.00
6-Jan-99	45.37	0.00
7-Jan-99	44.26	0.03
8-Jan-99	42.07	0.00
9-Jan-99	40.75	0.00
10-Jan-99	39.88	0.00
11-Jan-99	40.27	0.19
12-Jan-99	39.42	0.02
13-Jan-99	38.81	0.00
14-Jan-99	53.01	1.02
15-Jan-99	78.11	0.35
16-Jan-99	81.56	0.33
17-Jan-99	118.30	1.34
18-Jan-99	136.71	0.34
19-Jan-99	107.04	0.59
20-Jan-99	122.55	1.12
21-Jan-99	154.20	0.77
22-Jan-99	145.36	0.81
23-Jan-99	118.48	0.18
24-Jan-99	85.88	0.00
25-Jan-99	72.90	0.00
26-Jan-99	66.47	0.00
27-Jan-99	60.61	0.02
28-Jan-99	57.99	0.40
29-Jan-99	55.09	0.06
30-Jan-99	50.31	0.06
31-Jan-99	47.47	0.02
1-Feb-99	44.46	0.02
2-Feb-99	49.83	0.61
3-Feb-99	49.62	0.17
4-Feb-99	66.65	0.33
5-Feb-99	60.60	0.12
6-Feb-99	95.22	1.14
7-Feb-99	140.57	0.52
8-Feb-99	105.79	0.33
9-Feb-99	88.63	0.22
10-Feb-99	80.96	0.09
11-Feb-99	71.18	0.00
12-Feb-99	62.07	0.00

13-Feb-99	57.58	0.10
14-Feb-99	54.00	0.00
15-Feb-99	52.07	0.24
16-Feb-99	60.46	0.31
17-Feb-99	69.85	0.44
18-Feb-99	125.95	1.36
19-Feb-99	96.67	0.05
20-Feb-99	74.61	0.05
21-Feb-99	66.27	0.08
22-Feb-99	74.55	0.80
23-Feb-99	76.41	0.52
24-Feb-99	74.05	0.41
25-Feb-99	74.75	0.39
26-Feb-99	72.44	0.46
27-Feb-99	88.67	0.99
28-Feb-99	110.75	0.28
1-Mar-99	85.87	0.10
2-Mar-99	75.59	0.40
3-Mar-99	95.83	0.47
4-Mar-99	110.18	0.13
5-Mar-99	85.07	0.00
6-Mar-99	70.95	0.00
7-Mar-99	62.21	0.00
8-Mar-99	58.81	0.08
9-Mar-99	54.73	0.09
10-Mar-99	50.89	0.09
11-Mar-99	47.50	0.00
12-Mar-99	49.76	0.32
13-Mar-99	50.61	0.13
14-Mar-99	59.33	0.19
15-Mar-99	53.29	0.00
16-Mar-99	48.00	0.00
17-Mar-99	45.39	0.03
18-Mar-99	43.37	0.00
19-Mar-99	40.73	0.00
20-Mar-99	38.84	0.00
21-Mar-99	37.07	0.00
22-Mar-99	36.96	0.05
23-Mar-99	35.99	0.00
24-Mar-99	37.51	0.24
25-Mar-99	38.76	0.04
26-Mar-99	37.10	0.12
27-Mar-99	39.76	0.05
28-Mar-99	41.03	0.13
29-Mar-99	62.50	0.66
30-Mar-99	65.42	0.02
31-Mar-99	62.05	0.11
1-Apr-99	55.69	0.00
2-Apr-99	48.79	0.00
3-Apr-99	46.78	0.09
4-Apr-99	44.45	0.02
5-Apr-99	47.64	0.11
6-Apr-99	43.06	0.00
7-Apr-99	40.97	0.00
8-Apr-99	41.21	0.10
9-Apr-99	39.30	0.04

10-Apr-99	41.79	0.05
11-Apr-99	39.72	0.00
12-Apr-99	38.04	0.00
13-Apr-99	35.72	0.00
14-Apr-99	34.79	0.00
15-Apr-99	35.31	0.00
16-Apr-99	34.73	0.00
17-Apr-99	33.22	0.00
18-Apr-99	32.23	0.00
19-Apr-99	32.21	0.00
20-Apr-99	32.12	0.00
21-Apr-99	32.93	0.16
22-Apr-99	34.46	0.05
23-Apr-99	32.41	0.00
24-Apr-99	31.26	0.00
25-Apr-99	31.53	0.00
26-Apr-99	31.63	0.00
27-Apr-99	32.10	0.03
28-Apr-99	31.91	0.00
29-Apr-99	30.91	0.00
30-Apr-99	29.93	0.00
1-May-99	30.52	0.11
2-May-99	33.55	0.27
3-May-99	35.00	0.24
4-May-99	34.41	0.15
5-May-99	32.48	0.00
6-May-99	32.98	0.20
7-May-99	32.73	0.13
8-May-99	32.01	0.15
9-May-99	31.50	0.00
10-May-99	31.48	0.01
11-May-99	33.37	0.22
12-May-99	32.02	0.13
13-May-99	30.84	0.15
14-May-99	36.70	0.54
15-May-99	37.68	0.01
16-May-99	35.84	0.11
17-May-99	42.16	0.47
18-May-99	39.14	0.00
19-May-99	35.93	0.00
20-May-99	36.27	0.00
21-May-99	33.59	0.00
22-May-99	32.34	0.00
23-May-99	32.67	0.00
24-May-99	32.82	0.00
25-May-99	31.76	0.01
26-May-99	32.64	0.00
27-May-99	32.15	0.00
28-May-99	30.80	0.00
29-May-99	28.79	0.00
30-May-99	26.89	0.00
31-May-99	30.29	0.00
1-Jan-00	34.21	0.33
2-Jan-00	44.50	0.28
3-Jan-00	46.02	0.17
4-Jan-00	54.43	0.35

5-Jan-00	48.51	0.00	
6-Jan-00	45.46	0.12	
7-Jan-00	44.79	0.00	
8-Jan-00	42.76	0.03	
9-Jan-00	45.56	0.15	
10-Jan-00	112.33	1.80	*
11-Jan-00	121.93	0.51	*
12-Jan-00	111.33	0.79	*
13-Jan-00	164.23	1.37	*
14-Jan-00	162.92	0.26	
15-Jan-00	107.34	0.32	
16-Jan-00	102.61	0.27	
17-Jan-00	82.58	0.00	
18-Jan-00	70.14	0.00	
19-Jan-00	67.08	0.34	
20-Jan-00	70.44	0.04	
21-Jan-00	63.33	0.08	
22-Jan-00	61.54	0.01	
23-Jan-00	58.33	0.23	
24-Jan-00	96.48	1.00	*
25-Jan-00	87.63	0.13	
26-Jan-00	70.57	0.01	
27-Jan-00	60.83	0.01	
28-Jan-00	56.55	0.00	
29-Jan-00	52.48	0.00	
30-Jan-00	49.69	0.07	
31-Jan-00	48.11	0.11	
1-Feb-00	49.36	0.14	
2-Feb-00	52.78	0.00	
3-Feb-00	48.80	0.00	
4-Feb-00	50.31	0.22	
5-Feb-00	51.61	0.13	
6-Feb-00	48.41	0.01	
7-Feb-00	46.86	0.00	
8-Feb-00	48.78	0.23	
9-Feb-00	48.70	0.00	
10-Feb-00	47.83	0.37	
11-Feb-00	62.51	0.37	
12-Feb-00	80.11	0.25	
13-Feb-00	83.22	0.43	
14-Feb-00	107.74	0.59	*
15-Feb-00	89.88	0.26	
16-Feb-00	72.21	0.00	
17-Feb-00	62.19	0.00	
18-Feb-00	55.97	0.00	
19-Feb-00	50.65	0.00	
20-Feb-00	48.31	0.05	
21-Feb-00	48.57	0.07	
22-Feb-00	53.78	0.29	
23-Feb-00	52.98	0.00	
24-Feb-00	48.10	0.00	
25-Feb-00	48.96	0.51	*
26-Feb-00	80.57	0.56	*
27-Feb-00	85.62	0.17	
28-Feb-00	69.80	0.20	
29-Feb-00	77.26	0.14	

1-Mar-00	63.05	0.00
2-Mar-00	59.82	0.09
3-Mar-00	53.50	0.00
4-Mar-00	72.72	0.65 *
5-Mar-00	67.05	0.00
6-Mar-00	57.87	0.00
7-Mar-00	52.04	0.02
8-Mar-00	48.65	0.02
9-Mar-00	45.39	0.02
10-Mar-00	45.35	0.18
11-Mar-00	46.32	0.02
12-Mar-00	42.92	0.00
13-Mar-00	44.85	0.37
14-Mar-00	49.39	0.00
15-Mar-00	44.38	0.06
16-Mar-00	50.78	0.25
17-Mar-00	47.16	0.00
18-Mar-00	47.45	0.23
19-Mar-00	49.50	0.10
20-Mar-00	46.76	0.00
21-Mar-00	43.33	0.00
22-Mar-00	43.29	0.11
23-Mar-00	41.26	0.00
24-Mar-00	38.97	0.00
25-Mar-00	36.86	0.00
26-Mar-00	36.05	0.00
27-Mar-00	39.36	0.05
28-Mar-00	38.44	0.00
29-Mar-00	35.57	0.00
30-Mar-00	35.35	0.00
31-Mar-00	34.62	0.00
1-Apr-00	32.49	0.00
2-Apr-00	33.43	0.00
3-Apr-00	33.86	0.00
4-Apr-00	33.40	0.00
5-Apr-00	32.15	0.00
6-Apr-00	31.38	0.00
7-Apr-00	30.38	0.00
8-Apr-00	30.84	0.00
9-Apr-00	31.07	0.00
10-Apr-00	32.32	0.00
11-Apr-00	30.01	0.00
12-Apr-00	29.68	0.07
13-Apr-00	48.36	1.07 *
14-Apr-00	44.48	0.12
15-Apr-00	42.73	0.21
16-Apr-00	47.97	0.15
17-Apr-00	44.58	0.00
18-Apr-00	39.83	0.00
19-Apr-00	38.61	0.00
20-Apr-00	36.14	0.00
21-Apr-00	36.06	0.02
22-Apr-00	34.83	0.02
23-Apr-00	34.05	0.03
24-Apr-00	34.77	0.00
25-Apr-00	32.85	0.00

26-Apr-00	32.23	0.00
27-Apr-00	33.58	0.04
28-Apr-00	32.19	0.03
29-Apr-00	31.11	0.00
30-Apr-00	30.04	0.00
1-May-00	30.30	0.23
2-May-00	32.27	0.03
3-May-00	31.95	0.08
4-May-00	32.22	0.03
5-May-00	36.74	0.33
6-May-00	32.60	0.00
7-May-00	31.73	0.03
8-May-00	34.93	0.16
9-May-00	37.48	0.36
10-May-00	43.21	0.22
11-May-00	55.93	0.27
12-May-00	45.59	0.00
13-May-00	40.55	0.00
14-May-00	39.08	0.01
15-May-00	44.75	0.31
16-May-00	40.41	0.00
17-May-00	37.27	0.00
18-May-00	35.13	0.00
19-May-00	33.67	0.00
20-May-00	33.34	0.00
21-May-00	32.44	0.00
22-May-00	33.43	0.00
23-May-00	33.01	0.00
24-May-00	32.14	0.00
25-May-00	33.09	0.00
26-May-00	29.92	0.00
27-May-00	30.79	0.14
28-May-00	29.13	0.00
29-May-00	29.36	0.00
30-May-00	32.08	0.17
31-May-00	30.55	0.01
1-Jan-01	29.25	0.00
2-Jan-01	29.72	0.00
3-Jan-01	30.55	0.00
4-Jan-01	30.74	0.00
5-Jan-01	29.60	0.00
6-Jan-01	29.31	0.00
7-Jan-01	29.46	0.00
8-Jan-01	30.73	0.09
9-Jan-01	29.96	0.13
10-Jan-01	33.06	0.00
11-Jan-01	27.78	0.00
12-Jan-01	27.50	0.02
13-Jan-01	30.30	0.12
14-Jan-01	29.94	0.02
15-Jan-01	30.91	0.00
16-Jan-01	28.80	0.00
17-Jan-01	27.99	0.00
18-Jan-01	28.07	0.02
19-Jan-01	30.17	0.02
20-Jan-01	29.12	0.00

21-Jan-01	31.73	0.23
22-Jan-01	33.40	0.01
23-Jan-01	31.05	0.03
24-Jan-01	38.35	0.34
25-Jan-01	37.80	0.02
26-Jan-01	33.51	0.00
27-Jan-01	32.73	0.00
28-Jan-01	31.60	0.00
29-Jan-01	32.19	0.05
30-Jan-01	31.71	0.00
31-Jan-01	31.35	0.00
1-Feb-01	29.53	0.01
2-Feb-01	30.14	0.08
3-Feb-01	33.35	0.40
4-Feb-01	40.85	0.00
5-Feb-01	34.85	0.02
6-Feb-01	32.34	0.00
7-Feb-01	30.78	0.00
8-Feb-01	31.81	0.01
9-Feb-01	30.45	0.02
10-Feb-01	30.46	0.01
11-Feb-01	31.50	0.24
12-Feb-01	35.13	0.01
13-Feb-01	31.65	0.00
14-Feb-01	31.12	0.00
15-Feb-01	29.63	0.00
16-Feb-01	29.07	0.00
17-Feb-01	28.05	0.00
18-Feb-01	28.53	0.03
19-Feb-01	28.98	0.01
20-Feb-01	27.84	0.05
21-Feb-01	31.20	0.13
22-Feb-01	31.37	0.09
23-Feb-01	33.08	0.03
24-Feb-01	32.40	0.00
25-Feb-01	30.22	0.00
26-Feb-01	29.32	0.00
27-Feb-01	28.83	0.00
28-Feb-01	28.27	0.00
1-Mar-01	29.35	0.28
2-Mar-01	34.65	0.10
3-Mar-01	32.15	0.00
4-Mar-01	31.62	0.12
5-Mar-01	31.98	0.00
6-Mar-01	31.93	0.00
7-Mar-01	28.50	0.00
8-Mar-01	27.42	0.03
9-Mar-01	27.42	0.01
10-Mar-01	26.88	0.00
11-Mar-01	28.26	0.00
12-Mar-01	27.38	0.00
13-Mar-01	27.43	0.00
14-Mar-01	27.09	0.00
15-Mar-01	28.13	0.12
16-Mar-01	27.84	0.00
17-Mar-01	33.48	0.31

18-Mar-01	35.53	0.07
19-Mar-01	36.10	0.04
20-Mar-01	33.82	0.00
21-Mar-01	31.22	0.00
22-Mar-01	30.67	0.00
23-Mar-01	29.90	0.00
24-Mar-01	28.84	0.08
25-Mar-01	32.39	0.12
26-Mar-01	30.25	0.03
27-Mar-01	35.31	0.54 *
28-Mar-01	41.03	0.07
29-Mar-01	36.56	0.00
30-Mar-01	32.35	0.00
31-Mar-01	32.53	0.02
1-Apr-01	33.73	0.05
2-Apr-01	35.68	0.08
3-Apr-01	34.88	0.06
4-Apr-01	34.44	0.00
5-Apr-01	33.82	0.01
6-Apr-01	34.54	0.03
7-Apr-01	34.09	0.08
8-Apr-01	37.60	0.32
9-Apr-01	37.69	0.00
10-Apr-01	37.08	0.23
11-Apr-01	39.83	0.08
12-Apr-01	36.32	0.01
13-Apr-01	34.75	0.00
14-Apr-01	32.93	0.00
15-Apr-01	30.90	0.00
16-Apr-01	31.23	0.18
17-Apr-01	33.93	0.01
18-Apr-01	34.27	0.26
19-Apr-01	33.81	0.08
20-Apr-01	32.45	0.00
21-Apr-01	30.65	0.03
22-Apr-01	32.44	0.00
23-Apr-01	30.06	0.00
24-Apr-01	29.07	0.00
25-Apr-01	28.58	0.00
26-Apr-01	28.52	0.01
27-Apr-01	28.53	0.00
28-Apr-01	30.22	0.13
29-Apr-01	28.39	0.01
30-Apr-01	29.24	0.10
1-May-01	28.39	0.05
2-May-01	27.95	0.02
3-May-01	27.34	0.00
4-May-01	27.50	0.00
5-May-01	27.52	0.00
6-May-01	27.06	0.00
7-May-01	27.48	0.00
8-May-01	26.59	0.00
9-May-01	27.03	0.00
10-May-01	26.38	0.00
11-May-01	27.13	0.00
12-May-01	25.75	0.00

13-May-01	25.19	0.00	
14-May-01	29.76	0.46	
15-May-01	38.19	0.13	
16-May-01	33.55	0.04	
17-May-01	29.91	0.00	
18-May-01	28.58	0.00	
19-May-01	27.11	0.00	
20-May-01	28.33	0.00	
21-May-01	28.02	0.00	
22-May-01	26.45	0.00	
23-May-01	27.65	0.00	
24-May-01	27.62	0.00	
25-May-01	26.35	0.00	
26-May-01	25.10	0.00	
27-May-01	24.15	0.00	
28-May-01	25.15	0.00	
29-May-01	25.17	0.00	
30-May-01	25.75	0.00	
31-May-01	25.76	0.00	
1-Jan-02	54.56	0.37	
2-Jan-02	55.44	0.02	
3-Jan-02	49.98	0.05	
4-Jan-02	45.63	0.00	
5-Jan-02	44.18	0.27	
6-Jan-02	64.15	0.60	*
7-Jan-02	67.92	0.51	*
8-Jan-02	92.55	0.04	
9-Jan-02	65.28	0.00	
10-Jan-02	56.00	0.00	
11-Jan-02	50.65	0.00	
12-Jan-02	48.50	0.03	
13-Jan-02	45.29	0.00	
14-Jan-02	44.75	0.09	
15-Jan-02	42.37	0.00	
16-Jan-02	41.66	0.07	
17-Jan-02	40.83	0.01	
18-Jan-02	39.18	0.04	
19-Jan-02	40.69	0.10	
20-Jan-02	55.16	1.06	*
21-Jan-02	134.79	0.98	*
22-Jan-02	104.50	0.21	
23-Jan-02	80.95	0.00	
24-Jan-02	67.17	0.26	
25-Jan-02	109.90	1.02	*
26-Jan-02	102.74	0.17	
27-Jan-02	80.32	0.06	
28-Jan-02	68.74	0.00	
29-Jan-02	59.82	0.00	
30-Jan-02	54.00	0.00	
31-Jan-02	52.13	0.41	
1-Feb-02	72.99	0.16	
2-Feb-02	60.59	0.00	
3-Feb-02	54.56	0.05	
4-Feb-02	49.82	0.00	
5-Feb-02	47.13	0.05	
6-Feb-02	47.26	0.43	

7-Feb-02	90.97	1.11 *
8-Feb-02	100.45	0.20
9-Feb-02	76.46	0.00
10-Feb-02	63.09	0.03
11-Feb-02	57.50	0.01
12-Feb-02	53.58	0.00
13-Feb-02	48.86	0.00
14-Feb-02	45.57	0.00
15-Feb-02	43.33	0.00
16-Feb-02	42.95	0.10
17-Feb-02	40.74	0.00
18-Feb-02	41.01	0.01
19-Feb-02	39.90	0.05
20-Feb-02	39.00	0.00
21-Feb-02	37.66	0.00
22-Feb-02	36.87	0.31
23-Feb-02	45.90	0.00
24-Feb-02	40.47	0.00
25-Feb-02	38.31	0.00
26-Feb-02	36.44	0.00
27-Feb-02	35.43	0.00
28-Feb-02	34.28	0.00
1-Mar-02	33.17	0.00
2-Mar-02	32.57	0.00
3-Mar-02	32.77	0.00
4-Mar-02	32.78	0.00
5-Mar-02	33.57	0.29
6-Mar-02	53.75	0.77 *
7-Mar-02	56.86	0.01
8-Mar-02	45.72	0.00
9-Mar-02	41.68	0.01
10-Mar-02	40.79	0.02
11-Mar-02	49.70	0.52 *
12-Mar-02	69.57	0.28
13-Mar-02	70.25	0.26
14-Mar-02	61.21	0.01
15-Mar-02	55.90	0.11
16-Mar-02	55.81	0.13
17-Mar-02	55.17	0.02
18-Mar-02	49.71	0.00
19-Mar-02	45.14	0.00
20-Mar-02	42.92	0.00
21-Mar-02	40.47	0.00
22-Mar-02	39.45	0.01
23-Mar-02	39.08	0.12
24-Mar-02	42.34	0.01
25-Mar-02	39.06	0.00
26-Mar-02	36.70	0.00
27-Mar-02	36.60	0.00
28-Mar-02	36.01	0.00
29-Mar-02	35.31	0.00
30-Mar-02	33.01	0.00
31-Mar-02	32.95	0.00
1-Apr-02	32.84	0.00
2-Apr-02	34.05	0.00
3-Apr-02	32.84	0.00

4-Apr-02	31.18	0.00
5-Apr-02	32.40	0.02
6-Apr-02	32.22	0.00
7-Apr-02	31.89	0.00
8-Apr-02	31.43	0.00
9-Apr-02	36.02	0.32
10-Apr-02	36.62	0.08
11-Apr-02	33.34	0.11
12-Apr-02	31.90	0.00
13-Apr-02	38.04	0.63 *
14-Apr-02	54.57	0.12
15-Apr-02	43.40	0.01
16-Apr-02	41.83	0.06
17-Apr-02	42.45	0.13
18-Apr-02	43.15	0.01
19-Apr-02	38.41	0.00
20-Apr-02	35.71	0.00
21-Apr-02	34.45	0.00
22-Apr-02	33.62	0.00
23-Apr-02	32.74	0.00
24-Apr-02	31.92	0.00
25-Apr-02	30.33	0.00
26-Apr-02	30.70	0.04
27-Apr-02	30.69	0.12
28-Apr-02	28.80	0.00
29-Apr-02	29.45	0.00
30-Apr-02	29.63	0.00
1-May-02	29.79	0.00
2-May-02	28.82	0.00
3-May-02	27.40	0.00
4-May-02	26.94	0.00
5-May-02	26.98	0.00
6-May-02	28.47	0.00
7-May-02	29.33	0.00
8-May-02	28.86	0.00
9-May-02	26.23	0.00
10-May-02	25.96	0.00
11-May-02	26.72	0.00
12-May-02	26.15	0.00
13-May-02	27.16	0.00
14-May-02	26.29	0.00
15-May-02	26.57	0.00
16-May-02	25.42	0.00
17-May-02	29.35	0.38
18-May-02	26.67	0.02
19-May-02	30.05	0.54 *

112.33

111.33
164.23

107.74

134.79
109.90

MWMC Residential Flow Probabilities

Condition	Exceedance Probability	Current (2000-2002 Avg) Flow (mgd)	Log Exceedance	Log Current Flow
AAF	0.5	39.46	-0.301	1.596
$MMWWF_5$	0.083	93.50	-1.079	1.971
Peak Week	0.0192	133.22	-1.716	
$PDAF_5$	0.0027	247.09	-2.562	2.393
PIF_5	0.00011	774.69	-3.943	
Peak Week	0.0192	133.22	-1.716	2.125
PIF_5	0.00011	774.69	-3.943	2.889

MWMC Residential Flow Probabilities

Condition	Exceedance Probability	Selected (2000-2002 Avg) Flow (mgd)	Log Exceedance	Log Current Flow	Projections
AAF	0.5	39.46	-0.301	1.596	50
$MMWWF_5$	0.083	84.74	-1.079	1.928	99
Peak Week	0.0192	105.52	-1.716		119
$PDAF_5$	0.0027	167.38	-2.562	2.224	181
PIF_5	0.00011	415.22	-3.943		429
Peak Week	0.0192	105.52	-1.716	2.023	
PIF_5	0.00011	415.22	-3.943	2.618	

Attachment C

TABLE C-1

Flow Projections

MWMC Facility Plan, Eugene-Springfield

Wastewater Flow Projections - Dry Weather

Year	Estimated Population	Average Domestic Flow (MGD)	Average Industrial Flow (MGD)(1)	Average Total Flow (MGD)	Total Max. Month - Average (MGD)	Total Max. Month - Upper Limit (MGD)	Total Max. Week - Average(MGD)
2005	229,145	29.6	1.7	31.3	40.1	46.0	52.0
2010	246,255	31.8	1.7	33.5	43.0	49.4	55.7
2015	263,365	34.0	1.7	35.7	45.9	52.7	59.5
2020	280,475	36.2	1.7	37.9	48.7	56.0	63.2
2025	297,585	38.4	1.7	40.1	51.6	59.3	67.0
2050	383,135	49.4	1.7	51.1	66.0	75.8	85.7
	Factors	129			1.30	1.50	1.70

Year	Estimated Population	Total Max. Week - Upper Limit (MGD)	Total Max. Day - Average(MGD)	Total Max. Day - Upper Limit (MGD)	Total Peak Hour - Average (MGD)	Total Peak Hour - Upper Limit (MGD)
2005	229,145	66.7	69.7	96.3	84.5	119.9
2010	246,255	71.6	74.8	103.4	90.6	128.8
2015	263,365	76.4	79.8	110.4	96.8	137.6
2020	280,475	81.3	84.9	117.5	103.0	146.4
2025	297,585	86.2	90.0	124.5	109.2	155.3
2050	383,135	110.4	115.4	159.9	140.1	199.4
	Factors	2.20	2.30	3.20	2.80	4.00

Wastewater Flow Projections - Wet Weather

Year	Estimated Population	Average Domestic Flow (MGD)	Average Industrial Flow (MGD)(1)	Average Total Flow (MGD)	Total Max. Month - Average (MGD)	Total Max. Month - Upper Limit (MGD)	Total Max. Week - Average(MGD)
2005	229,145	52.5	1.7	54.2	75.2	85.7	101.4
2010	246,255	56.4	1.7	58.1	80.7	92.0	108.9
2015	263,365	60.3	1.7	62.0	86.2	98.2	116.3
2020	280,475	64.3	1.7	66.0	91.7	104.5	123.8
2025	297,585	68.2	1.7	69.9	97.1	110.8	131.2
2050	383,135	87.8	1.7	89.5	124.6	142.1	168.5
	Factors	229			1.40	1.60	1.90

Year	Estimated Population	Total Max. Week - Upper Limit (MGD)	Total Max. Day - Average(MGD)	Total Max. Day - Upper Limit (MGD)	Total Peak Hour* (MGD)
2005	229,145	127.7	148.7	174.9	
2010	246,255	137.1	159.7	187.9	
2015	263,365	146.5	170.6	200.8	
2020	280,475	155.9	181.6	213.7	
2025	297,585	165.3	192.6	226.7	277.0
2050	383,135	212.4	247.5	291.4	
	Factors	2.40	2.80	3.30	*

* Wet weather peak hour flow projections are based on collection system modelling (See the *Wet Weather Peak Flow* technical memorandum)

TABLE C-1 (continued)

Flow Projections

MWMC Facility Plan, Eugene-Springfield

Wastewater Flow Projections - Dry Weather

Year	Estimated Population	Average Domestic Flow (MGD)	Average Industrial Flow (MGD)(1)	Average Total Flow (MGD)	Total Max. Month - Average (MGD)	Total Max. Month - Upper Limit (MGD)	Total Max. Week - Average(MGD)
2005	229,145	29.6	1.7	31.3	37.2	40.1	49.0
2010	246,255	31.8	1.7	33.5	39.8	43.0	52.5
2015	263,365	34.0	1.7	35.7	42.5	45.9	56.1
2020	280,475	36.2	1.7	37.9	45.1	48.7	59.6
2025	297,585	38.4	1.7	40.1	47.8	51.6	63.1
2050	383,135	49.4	1.7	51.1	61.0	66.0	80.8
	Factors	129			1.20	1.30	1.60

Year	Estimated Population	Total Max. Week - Upper Limit (MGD)	Total Max. Day - Average(MGD)	Total Max. Day - Upper Limit (MGD)	Total Peak Hour - Average (MGD)	Total Peak Hour - Upper Limit (MGD)
2005	229,145	57.9	60.8	84.5	84.5	119.9
2010	246,255	62.1	65.2	90.6	90.6	128.8
2015	263,365	66.3	69.6	96.8	96.8	137.6
2020	280,475	70.4	74.1	103.0	103.0	146.4
2025	297,585	74.6	78.5	109.2	109.2	155.3
2050	383,135	95.6	100.5	140.1	140.1	199.4
	Factors	1.90	2.00	2.80	2.80	4.00

Wastewater Flow Projections - Wet Weather

Year	Estimated Population	Average Domestic Flow (MGD)	Average Industrial Flow (MGD)(1)	Average Total Flow (MGD)	Total Max. Month - Average (MGD)	Total Max. Month - Upper Limit (MGD)
2005	229,145	52.5	1.7	54.2	75.2	85.7
2010	246,255	56.4	1.7	58.1	80.7	92.0
2015	263,365	60.3	1.7	62.0	86.2	98.2
2020	280,475	64.3	1.7	66.0	91.7	104.5
2025	297,585	68.2	1.7	69.9	97.1	110.8
2050	383,135	87.8	1.7	89.5	124.6	142.1
	Factors	229			1.40	1.60

Year	Estimated Population	Total Max. Week - Average(MGD)	Total Max. Week - Upper Limit (MGD)	Total Max. Day - Average(MGD)	Total Max. Day - Upper Limit (MGD)
2005	229,145	101.4	75.2	148.7	174.9
2010	246,255	108.9	80.7	159.7	187.9
2015	263,365	116.3	86.2	170.6	200.8
2020	280,475	123.8	91.7	181.6	213.7
2025	297,585	131.2	97.1	192.6	226.7
2050	383,135	168.5	124.6	247.5	291.4
	Factors	1.90	1.40	2.80	3.30

TABLE C-1 (continued)
Flow and Load Projections
MWMC Facility Plan, Eugene-Springfield

BOD Loading Projections - Dry Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	42,392	2,402	44,794	57,511	65,990	87,186
2010	246,255	45,557	2,402	47,959	61,626	70,738	93,516
2015	263,365	48,723	2,402	51,125	65,741	75,486	99,847
2020	280,475	51,888	2,402	54,290	69,856	80,234	106,178
2025	297,585	55,053	2,402	57,455	73,971	84,982	112,508
2050	383,135	70,880	2,402	73,282	94,546	108,722	144,162
	Factors	0.185			1.30	1.50	2.00

BOD Loading Projections - Wet Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	42,392	2,402	44,794	57,511	70,229	99,903
2010	246,255	45,557	2,402	47,959	61,626	75,293	107,184
2015	263,365	48,723	2,402	51,125	65,741	80,358	114,464
2020	280,475	51,888	2,402	54,290	69,856	85,423	121,744
2025	297,585	55,053	2,402	57,455	73,971	90,487	129,024
2050	383,135	70,880	2,402	73,282	94,546	115,810	165,426
	Factors	0.185			1.30	1.60	2.30

TSS Loading Projections - Dry Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	46,975	2,224	49,199	67,989	86,779	119,661
2010	246,255	50,482	2,224	52,706	72,899	93,092	128,430
2015	263,365	53,990	2,224	56,214	77,810	99,406	137,199
2020	280,475	57,497	2,224	59,721	82,720	105,719	145,967
2025	297,585	61,005	2,224	63,229	87,631	112,033	154,736
2050	383,135	78,543	2,224	80,767	112,184	143,601	198,581
	Factors	0.205			1.40	1.80	2.50

TSS Loading Projections - Wet Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	59,578	2,224	61,802	79,675	121,379	180,957
2010	246,255	64,026	2,224	66,250	85,458	130,277	194,303
2015	263,365	68,475	2,224	70,699	91,241	139,174	207,649
2020	280,475	72,924	2,224	75,148	97,025	148,071	220,995
2025	297,585	77,372	2,224	79,596	102,808	156,968	234,340
2050	383,135	99,615	2,224	101,839	131,724	201,454	301,069
	Factors	0.26			1.30	2.00	3.00

(1) Industrial average month flow added to domestic max month, max week, and max day flows.

TABLE C-1 (continued)
Flow and Load Projections
MWMC Facility Plan, Eugene-Springfield

Ammonia Loading Projections - Dry Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	4,468	606	5,074	6,415	7,308	7,308
2010	246,255	4,802	606	5,408	6,849	7,809	7,809
2015	263,365	5,136	606	5,742	7,282	8,309	8,309
2020	280,475	5,469	606	6,075	7,716	8,810	8,810
2025	297,585	5,803	606	6,409	8,150	9,310	9,310
2050	383,135	7,471	606	8,077	10,318	11,813	11,813
	Factors	0.020			1.30	1.50	1.50

Ammonia Loading Projections - Wet Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)[1]	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	4,927	606	5,533	7,011	7,996	7,996
2010	246,255	5,294	606	5,900	7,489	8,548	8,548
2015	263,365	5,662	606	6,268	7,967	9,100	9,100
2020	280,475	6,030	606	6,636	8,445	9,651	9,651
2025	297,585	6,398	606	7,004	8,924	10,203	10,203
2050	383,135	8,237	606	8,843	11,315	12,962	12,962
	Factors	0.022			1.30	1.50	1.50

Phosphorous Loading Projections - Dry Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	1,833	[2]	1,833	2,566	2,564	2,564
2010	246,255	1,970		1,970	2,758	2,758	2,758
2015	263,365	2,107		2,107	2,950	2,950	2,950
2020	280,475	2,244		2,244	3,141	3,141	3,141
2025	297,585	2,381		2,381	3,333	3,333	3,333
2050	383,135	3,065		3,065	4,291	4,291	4,291
	Factors	0.008			1.40	1.40	1.40

Phosphorous Loading Projections - Wet Weather

Year	Estimated Population	Average Domestic Load (lb/d)	Average Industrial Load (lb/d)	Average Total Load (lb/d)	Total Max. Month (lb/d)	Total Max. Week (lb/d)	Total Max. Day (lb/d)
2005	229,145	2,521	[2]	2,519	3,529	3,527	3,527
2010	246,255	2,709		2,709	3,792	3,792	3,792
2015	263,365	2,897		2,897	4,056	4,056	4,056
2020	280,475	3,085		3,085	4,319	4,319	4,319
2025	297,585	3,273		3,273	4,583	4,583	4,583
2050	383,135	4,214		4,214	5,900	5,900	5,900
	Factors	0.011			1.40	1.40	1.40

(1) Industrial average month flow added to domestic max month, max week, and max day flows.
(2) Data not available.