

CHAPTER 5
PROJECTED WASTEWATER FLOWS AND LOADINGS

This chapter contains information on population and wasteload projections for the planning area. As presented in Chapter 2, the planning period is 20 years and encompasses the years 2010 through 2030. Population and wasteload projections are used to evaluate the existing facilities at the Rice Lake WWTP and then develop wastewater treatment alternatives for the plant.

EXISTING AND FUTURE POPULATION

According to the Wisconsin Department of Administration (DOA), the estimated 2007 population of the City of Rice Lake was 8,653 people. Table 5-1 presents historical population data for the City. The 2001 – 2007 populations were determined by the DOA as an official population estimate.

**Table 5-1
Rice Lake WWTP
Historical Population Data**

Year	Population
1970	7,278
1980 Census	7,691
1990 Census	7,998
2000 Census	8,312
2001	8,375
2002	8,391
2003	8,424
2004	8,490
2005	8,603
2006	8,636
2007	8,653

To determine the Rice Lake population in the year 2030, a population estimate template was obtained from the West Central Wisconsin Regional Planning Commission. This template is

based on the DOA Demographic Services population projection methodology, and uses an arithmetic growth method to create linear population forecast through a chosen year. The template calculations can be seen in Appendix B. The estimated populations for the years 2010 – 2030 are shown in Table 5-2. The 2030 population of 9,669 persons will be used to determine design flows and loadings for the facility plan.

**Table 5-2
Rice Lake WWTP
Facility Plan Population Projections**

Year	Population
2010	8,786
2015	9,006
2020	9,227
2025	9,448
2030	9,669

WASTELOAD PROJECTIONS

The influent wasteload to the treatment plant is comprised of residential, commercial and industrial wasteloads plus infiltration/inflow (I/I) and a variety of hauled-in wastes. The industrial wasteload includes industries in which wastewater is not monitored because it is equivalent to domestic strength wastewater. The wastewater from these industries, as well as residential and commercial wasteloads, is classified as Category A in the City’s sewer user charge system.

The City currently has two monitored industries that discharge higher strength wastewater, McCain Foods USA and Birchwood Manufacturing. These industries are considered to be Category B users under the City’s sewer user charge system and are charged higher rates to account for the higher strength wastewater they discharge.

In order to project wasteloads to the year 2030, it is necessary to project the annual average loadings and then use historical peaking factors to estimate the maximum month, peak day, and peak hour loadings. Appendix C provides details on the projected annual average wasteloads for flow, BOD₅ and TSS. The 2030 annual average loadings are based on the current wasteloads for the Category A customers (commercial, residential and non-monitored industrial), including annual average I/I. The increase in Category A loadings to the year 2030 is based on per capita unit loads for the expected 1,016 person increase. The per capita unit loads are 116 gpcd, 0.18

lbs BOD₅/capita/day, 0.20 lbs TSS/capita/day, and 0.01 lbs TP/capita/day. The per capita unit loads were determined in accordance with NR 110 code.

Birchwood Manufacturing’s current discharge permit was used to as the future flows and loadings. A meeting with McCain Foods was held to determine the future flows and loadings for the food processor. These loadings were used to determine McCain’s new discharge permit with the WWTP and are shown in Chapter 4. The future loading calculations for the Birchwood Manufacturing and McCain Foods are shown in Appendix C.

In order to account for future unidentified industrial wasteloads, NR 110 allows an estimate of up to 10% of total design flow for towns with less than 10,000 people. This 10% value was used for future industrial loadings in the projections in Appendix C.

The hauled-in wastes can be attributed to holding tanks, septic tanks, portable toilets, leachate and grease traps. The treatment plant currently has a hauled-in waste receiving station, and accepts hauled in waste from throughout Barron County. It is anticipated that the City will continue to accept hauled-in wastes at the current volumes as long as it does not continue to cause treatment plant upsets.

Table 5-3 presents a summary of the 2030 projected flows and wasteloads for the Rice Lake WWTP.

**Table 5-3
Rice Lake WWTP
Year 2030 Flow and Wasteload Projections**

Parameter	Units	Annual Average ¹	Maximum Month		Peak Day		Peak Hour	
			Ratio ²	Value	Ratio ²	Value	Ratio ²	Value
Flow	(mgd)	1.871	1.2	2.2	2.0	3.7	3.1	5.8
BOD ₅	(lbs/day)	7,539	1.3	9,800	2.0	15,078	-	-
TSS	(lbs/day)	6,825	1.3	8,873	3.1	21,158	-	-
Total-P	(lbs/day)	115	1.3	150	1.6	184	-	-

Notes:

1. Based on projections in Appendix C.
2. Based on historical ratios in Table 4-2.