

CHAPTER 2

BASIC PLANNING DATA

Basic planning data essential for the assessment of the Town of Friday Harbor's water demands are presented in this chapter. Information is included regarding historical growth and water demands, population projections, and future water demand projections. Information presented is used to evaluate the condition of the existing system and determine future needs based on foreseeable demographic trends for the next twenty years.

CURRENT POPULATION, NUMBER OF SERVICE CONNECTIONS, AND ERUs

The year 2000 population within the Town of Friday Harbor's incorporated area was estimated at 1,957 based on data from the State Office of Financial Management data (OFM). In the Town's 2001 Water Conservation Plan, OFM factors and Town water account data were used to estimate a total population of 2,929 being served by the Town's water system (both in-town and out-of-town connections) in the year 2001. Refer to Exhibit A at the end of this chapter for the estimated actual number of people served from 1994 to 2000.

Service Connections

The Town of Friday Harbor divides its customers into the following classes:

- SFR = single-family residential (includes SFR-RUR = low income elderly/disabled)
- MFR = multi-family residential
- COM = commercial
- IND = industrial
- PA = public authority
- Special

These classes are used for billing purposes and often differ from the zoning designations discussed in Chapter 1. The total number of connections as of February 2002 was 1,201. Refer to Exhibit B at the end of this chapter for a breakdown of number of connections by customer class.

Equivalent Residential Units

Use of Equivalent Residential Units (ERUs) is a way to express water use by non-residential water customers as an equivalent number of residential customers. The number of ERUs for the Town of Friday Harbor was calculated by dividing the amount of consumption per connection for each customer class for the year 2001 by the amount of consumption per connection for the single-family residential customer class, and then multiplying that ratio by the number of connections for each

respective customer class. In the year 2001, the estimated number of ERUs for the Town's water system was 2,285. Table 2-1 summarizes the number of ERUs per customer class.

**Table 2-1. Estimated Equivalent Residential Units for the Town of Friday Harbor
1999 – 2001**

Customer Class	No. of Connections	Water Use Per Customer Class (gallons/year)	ERUs
1999			
COM	182	26,533,860	526
IND	15	892,950	18
MFR	109	18,208,620	361
PA	55	16,425,320	326
SFR + RUR	813	40,978,200	813
Special	6	1,323,220	26
Other Uses	1	1,618,032	32
Unaccounted Water*	1	9,371,766	186
Totals	1,181	115,351,968	2,285
2000			
COM	188	26,858,140	549
IND	18	1,618,910	33
MFR	123	19,685,840	402
PA	53	15,064,670	308
SFR + RUR	806	39,457,479	806
Special	5	1,146,450	23
Other Uses	1	863,500	18
Unaccounted Water*	1	8,134,611	166
Totals	1,193	112,829,600	2,305
2001			
COM	199	26,778,560	568
IND	19	1,953,660	41
MFR	110	18,185,260	385
PA	49	15,345,690	325
SFR + RUR	819	38,640,183	819
Special	5	1,903,940	40
Other Uses	1	1,010,520	21
Unaccounted Water*	1	4,073,867	86
Totals	1,201	107,891,680	2,287

*Unaccounted water equals difference between monthly production and monthly consumption

CURRENT WATER USE AND DATA REPORTING

The Town of Friday Harbor meters customer service connections to measure water consumption. The Town's Water Department also meters the flow of water produced by the Water Treatment Plant. The difference between water production and water consumption is water lost through the

system, or unaccounted water. The unaccounted water must be included in developing both ERUs and per capita usage in order to accurately assess current and future water demands.

Table 2-2 summarizes water use by ERU over the last three years (refer to Appendix G for detailed water consumption and production reports).

Table 2-2. Water Use by ERU

Year	ERUs	Water Production (gallons/year)	Gallons/day/ERU
1999	2,289	115,351,968	138.1
2000	2,305	112,829,600	134.1
2001	2,285	107,891,680	129.3
Average			133.8

The three-year average water production per year per ERU translates to a water use rate of 133.8 gallons per day per ERU. For purposes of this report, a 133.8 gpd/ERU usage will be used to analyze system capacity.

Another useful method of assessing and predicting future water usage for the Town of Friday Harbor is by per capita usage. Per capita usage normalizes all water demands in the system to the population as a whole. As the population increases, all system uses including community, individual and water loss is anticipated to increase proportionately. The 2001 Friday Harbor Water Conservation Plan develops per capita usage based on all types of uses for the years 1994 to 2000 by dividing the total metered consumption by the estimated population served. The average per capita usage (based on water production to account for water loss) for 1999 to 2001 is presented in Table 2-3.

Table 2-3 summarizes water production, water loss, and average day demand based on production for the past three years.

Table 2-3. Water Demand Per Capita

Year	Population Served	Water Production (gallons/year)	Water Use (gallons/year)	Loss ¹ (%)	Average Daily Demand ² (gpd)	Per Capita Demand (gpcpd)
1999	2,786	115,351,968	105,980,202	8.12	316,033	113.4
2000	2,892	112,829,600	104,694,989	7.21	309,122	106.9
2001	2,929	107,891,680	103,817,813	3.78	295,594	100.9
Average				6.4 %	306,916	107.1

¹Average loss rate for 1994-2000 of 9.068%, cited in the 2001 Water Conservation Plan, will be used in this report for continuity

²Average daily demand based on water production

FUTURE POPULATION, NUMBER OF SERVICE CONNECTIONS, AND ERUs

The Town’s 2001 Water Conservation Plan established a revised growth rate for the Town of 1.4 percent. Using this growth rate, the Town projected the actual number of customers served by the Town’s water supply until the year 2020 (see Exhibit A). The estimated served population in 2008 is 3,200, and the estimated served population in 2022 is 3,806 (estimated from projected growth shown in Exhibit A).

The 2001 Water Conservation Plan also projected the annual consumption and production based on 1994-2000 data. This data can be used to predict the future number of ERUs for the 6 and 20-year timeframe (see Table 2-4). These estimates were calculated by dividing the Town’s projected water production by the average demand per ERU calculated in Table 2-2.

Table 2-4. Water Production and ERUs For 6 and 20-Year Projections

Year	Projected Water Production (MG/year) ¹	Gallons/day/ERU ²	Number of ERUs
2008	123.79	133.8	2,535
2022	142.57	133.8	2,919

¹Production includes water loss of 9.068 percent per the 2001 Water Conservation Plan

²Taken from Table 2-2

To predict the number of future service connections, the number of future ERUs was prorated according to current customer class connection data, as shown in Table 2-5.

Table 2-5. Future Service Connections for 6 and 20-Year Projections

Customer Class	Current Connections	Current ERUs	Ratio of ERU/Connections	2008		2022	
				Connections	ERUs	Connections	ERUs
COM	199	568	2.85	221	629	254	725
IND	19	41	2.18	21	46	24	53
MFR	110	385	3.50	122	427	140	492
PA	49	325	6.64	54	361	63	415
SFR	819	819	1.00	908	908	1045	1045
Special	5	40	8.07	6	45	6	52
Other	1*	21	21.42	1*	24	1*	27
Unacct Water	1*	86	86.35	1*	95	1*	110
Total	1,201	2,285	N/A	1,332	2,535	1,532	2,919

*Not an actual connection, but implied connection allows for calculation of ERUs associated with this category. This connection is not included in the total connections.

FUTURE WATER DEMAND

As discussed above, the Town's 2001 Water Conservation Plan projected the annual consumption and production based on 1994-2000 data (see Exhibit A). This data established a growth trend in water consumption of 1.014 percent, with an average production of 9.068 percent over consumption (due to water loss). This number is the loss amount which has been used in this report for future projections, as it is based on the Town's 2001 Water Conservation Plan and a longer period of data than the average loss calculated in Table 2-3.

Table 2-6 shows that the future per capita demand, as estimated in the 2001 Water Conservation Plan, is expected to decrease. This is because the population growth trend (1.4 percent annually) is slightly larger than the water consumption trend (1.014 percent). This follows with recent historical data, which show decreases in use per capita.

Table 2-6. Projected Future Water Use

Year	Projected Water Production (MG/year) ²	Projected Population Served	Use per Capita (gpcpd)
2008	123.79 MG	3,200	106.0
2022 ¹	142.57 MG	3,806	102.6

¹Extrapolated from year 2020 data as presented in the Town's 2001 Conservation Plan

²Based upon production at 9.068 percent over consumption, as presented in the Town's 2001 Conservation Plan