Executive Summary

INTRODUCTION

The City of Camas 2001 Water System Comprehensive Plan (Plan) provides a long-term planning strategy for the City's water utility of the six and twenty year planning periods. It has been prepared consistent with Department of Health requirements specified in Washington Administrative Code Chapter 246-290. The Department of Health, who will review this plan, considers this Plan to represent a commitment by the City to follow-up and implement the Plan's recommendations and capital improvements.

The City's water system currently consists of two surface water diversions, one water treatment filtration plant, nine groundwater wells, six storage reservoirs, six booster stations, and approximately 100 miles of distribution and transmission piping. The City's Urban Growth Area (UGA) population has grown approximately 65 percent in the last 10 years. This growth has been accompanied by significant light industrial development in the northwest portion of the City. This industrial growth includes customers with very water-intensive processes, creating an industrial customer class that makes up less than 1 percent of the total connections but consumes approximately 42 percent of the City's water. The City is anticipating continued growth in its light industrial customer class. One customer, Wafertech Industries, is anticipating increasing its current water use from 0.30 million gallons per day (MGD) to between 0.70 and 3.5 MGD within the 6-year planning period, depending upon the number of new fabrication plants that are constructed. These fabrication plants are known as expansion Phase Nos. 1 through 3 in the Plan. The actual timing and extent of Wafertech's expansion is dependent on the economy and the market for computer chips. The capital improvements required in the 6-year planning period are largely dependent upon Wafertech's expansion plans. However, the City is anticipating that growth in the light industry will continue to increase over the 20-year planning period, regardless of Wafertech's expansion plans, and that the City will be required to make significant water system improvements to accommodate this growth.

The principal issues discussed in the Plan are as follows:

- Provision of sufficient supply to meet the increasing residential and industrial water demands. This includes capacity from existing sources, obtaining new sources of supply, and acquiring sufficient water rights to meet the 6-year and 20-year planning periods.

- Development of an aggressive conservation program to reduce 6-year and 20-year water system source and water right needs, and to delay need improvements to allow the City time to locate and evaluate new supply options.

- Improvements to transmission and distribution capacity to supply the 544 Zone. This pressure zone encompasses the majority of the City's light industrial zoning and is the location of the majority of the projected growth in water consumption

- Financing for capital improvement program to meet projected growth and water system needs.

WATER DEMAND FORECASTING

Population projections suggest that the City of Camas Water Service Area will grow in population by approximately 144 percent over the next 20 years. These estimates are based upon projections from the 1994 Clark County Comprehensive Plan. According to current land use and zoning, the City will reach buildout in its current UGA in 2040. Residential and commercial consumption is projected assuming a per capita water usage of 162 gallons per capita per day (gpcd). Industrial growth is projected in the Plan assuming a buildout year of 2040 and a buildout water use of 3,000 gallons per acre per day, and based on the amount of developable land zoned for industrial use. Wafertech's water use is identified as three possible phases. This phasing was necessary for planning purposes due to the large impact on the City's water system and associated needs. Tables E-1 through E-3 illustrate the water use projections analyzed in the Plan.

Table E-1 Water Service Area Demand Projections Phase No. 1

Year	Population	Residential and Commercial (MGD)	Industrial (MGD)[1,2]	Wafertech Demand (MGD)	Avg. Day Total (MGD)	Peak Day (MGD)	Peak Hour (gpm)
1999	11,823	1.92	1.37	0.30	3.29	5.98	7,476
2000	12,636	2.04	1.40	0.30	3.45	6.28	7,846
2001	13,448	2.18	1.83	0.70	4.01	6.99	8,733
2002	14,261	2.31	1.86	0.70	4.17	7.30	9,120
2003	15,074	2.44	1.90	0.70	4.33	7.61	9,507
2004	15,887	2.57	1.93	0.70	4.50	7.92	9,894
2005	16,699	2.70	1.96	0.70	4.66	8.22	10,281
2006	**17,512**	**2.83**	**1.99**	**0.70**	**4.82**	**8.53**	**10,668**
2007	18,325	2.96	2.02	0.70	4.99	8.84	11,055
2008	19,137	3.10	2.05	0.70	5.15	9.15	11,442
2009	19,950	3.23	2.09	0.70	5.31	9.46	11,829
2010	20,763	3.36	2.12	0.70	5.48	9.77	12,216
2011	21,576	3.49	2.15	0.70	5.64	10.08	12,603
2012	22,388	3.62	2.18	0.70	5.80	10.39	12,990
2013	23,201	3.75	2.21	0.70	5.96	10.70	13,377
2014	24,014	3.88	2.24	0.70	6.13	11.01	13,765
2015	24,826	4.02	2.27	0.70	6.29	11.32	14,152
2016	25,639	4.15	2.31	0.70	6.45	11.63	14,539
2017	26,452	4.28	2.34	0.70	6.62	11.94	14,926
2018	27,264	4.41	2.37	0.70	6.78	12.25	15,313
2019	28,077	4.54	2.40	0.70	6.94	12.56	15,700
2020	**28,890**	**4.67**	**2.43**	**0.70**	**7.11**	**12.87**	**16,087**

[1]Industrial Demand includes Wafertech demand and a light industrial growth projected at 3,000 gallons per day per acre. Estimates are based upon the total area of land zoned as light industrial, with undevelopable wetlands subtracted out, and extrapolated to a buildout year of 2040.

Table E-2 Water Service Area Demand Projections Phase No. 2

Year	Population	Residential and Commercial (MGD)	Industrial (MGD)	Wafertech Demand (MGD)	Avg. Day Total (MGD)	Peak Day (MGD)	Peak Hour (gpm)
1999	11,823	1.92	1.37	0.30	3.29	5.98	7,476
2000	12,636	2.04	1.40	0.30	3.45	5.92	7,396
2001	13,448	2.18	1.83	0.70	4.01	6.99	8,733
2002	14,261	2.31	1.86	0.70	4.17	7.30	9,120
2003	15,074	2.44	1.90	0.70	4.33	7.61	9,507
2004	15,887	2.57	1.93	0.70	4.50	6.66	8,319
2005	16,699	2.70	3.36	2.10	6.06	9.62	12,031
2006	**17,512**	**2.83**	**3.39**	**2.10**	**6.22**	**9.93**	**12,418**
2007	18,325	2.96	3.42	2.10	6.39	10.24	12,805
2008	19,137	3.10	3.45	2.10	6.55	10.55	13,192
2009	19,950	3.23	3.49	2.10	6.71	10.86	13,579
2010	20,763	3.36	3.52	2.10	6.88	11.17	13,966
2011	21,576	3.49	3.55	2.10	7.04	11.48	14,353
2012	22,388	3.62	3.58	2.10	7.20	11.79	14,740
2013	23,201	3.75	3.61	2.10	7.36	12.10	15,127
2014	24,014	3.88	3.64	2.10	7.53	12.41	15,515
2015	24,826	4.02	3.67	2.10	7.69	12.72	15,902
2016	25,639	4.15	3.71	2.10	7.85	13.03	16,289
2017	26,452	4.28	3.74	2.10	8.02	13.34	16,676
2018	27,264	4.41	3.77	2.10	8.18	13.65	17,063
2019	28,077	4.54	3.80	2.10	8.34	13.96	17,450
2020	**28,890**	**4.67**	**3.83**	**2.10**	**8.51**	**14.27**	**17,837**

[1]Industrial Demand includes Wafertech demand and a light industrial growth projected at 3,000 gallons per day per acre. Estimates are based upon the total area of land zoned as light industrial, with undevelopable wetlands subtracted out, and extrapolated to a buildout year of 2040.

Table E-3 Water Service Area Demand Projections Phase No. 3

Year	Population	Residential and Commercial (MGD)	Industrial (MGD)	Wafertech Demand (MGD)	Avg. Day Total (MGD)	Peak Day (MGD)	Peak Hour (gpm)
1999	11,823	1.92	1.37	0.30	3.29	5.98	7,476
2000	12,636	2.04	1.40	0.30	3.45	5.92	7,396
2001	13,448	2.18	1.83	0.70	4.01	6.99	8,733
2002	14,261	2.31	1.86	0.70	4.17	7.30	9,120
2003	15,074	2.44	1.90	0.70	4.33	7.61	9,507
2004	15,887	2.57	1.93	0.70	4.50	5.40	6,744
2005	16,699	2.70	4.76	3.50	7.46	11.02	13,781
2006	**17,512**	**2.83**	**4.79**	**3.50**	**7.62**	**11.33**	**14,168**
2007	18,325	2.96	4.82	3.50	7.79	11.64	14,555
2008	19,137	3.10	4.85	3.50	7.95	11.95	14,942
2009	19,950	3.23	4.89	3.50	8.11	12.26	15,329
2010	20,763	3.36	4.92	3.50	8.28	12.57	15,716
2011	21,576	3.49	4.95	3.50	8.44	12.88	16,103
2012	22,388	3.62	4.98	3.50	8.60	13.19	16,490
2013	23,201	3.75	5.01	3.50	8.76	13.50	16,877
2014	24,014	3.88	5.04	3.50	8.93	13.81	17,265
2015	24,826	4.02	5.07	3.50	9.09	14.12	17,652
2016	25,639	4.15	5.11	3.50	9.25	14.43	18,039
2017	26,452	4.28	5.14	3.50	9.42	14.74	18,426
2018	27,264	4.41	5.17	3.50	9.58	15.05	18,813
2019	28,077	4.54	5.20	3.50	9.74	15.36	19,200
2020	**28,890**	**4.67**	**5.23**	**3.50**	**9.91**	**15.67**	**19,587**

[1]Industrial Demand includes Wafertech demand and a light industrial growth projected at 3,000 gallons per day per acre. Estimates are based upon the total area of land zoned as light industrial, with undevelopable wetlands subtracted out, and extrapolated to a buildout year of 2040.

WATER RIGHTS

The ability of the City to meet growth in the future will be largely predicated on the City's ability to maximize its existing water rights and to acquire new water rights; either through the Department of Ecology (DOE) application process, or through the purchase and transfer of water rights from another source. Table E-4 summarizes the City's future annual water rights analysis. Table E-5 shows the analysis of future instantaneous water rights. As the tables show, the City's future growth is limited over the 20-year planning period

by annual water rights, regardless of which Wafertech expansion phase occurs.

Table E-4 Analysis of Future Annual Water Rights

Year/ Demand Phase	Total Annual Water Right (ac-ft.)	Annual Demand (ac-ft.)[1]	Water Right Surplus (+) or Deficit (-) (ac-ft.)
2000	6,300	3,860	+2,440
2006 Ph. 1	6,300	5,399	+901
2006 Ph. 2	6,300	6,968	-668
2006 Ph. 3	6,300	8,186	-1,886
2020 Ph. 1	6,300	7,965	-1,665
2020 Ph. 2	6,300	9,533	-3,233
2020 Ph. 3	6,300	11,101	-4,801

[1]Projected water demands from Table E-1 through E-3, converted to acre-feet. Conservation is not included in Tables E-1 through E-3.

Table E-5 Instantaneous Water Right and Source Analysis

Year/ Demand Phase	Total Instantaneous Water Right (gpm)	Total Pumping Capacity (gpm)	Water Right Surplus (+) or Deficit (-) (gpm)	Peak Day Demand (gpm)	Source Capacity Surplus (+) or Deficit (-) (gpm)
2000	10,545	5,640	+3,165	4,359	+1,281
2006 Ph. 1	10,545	10,140[1]	+530	5,924	+4,621
2006 Ph. 2	10,545	10,140[1]	+530	6,895	+3,650
2006 Ph. 3	10,545	10,140[1]	+530	7,868	+2,677
2020 Ph. 1	10,545	10,545[2]	0	8,938	+1,607
2020 Ph. 2	10,545	10,545[2]	0	9,910	+635
2020 Ph. 3	10,545	10,545[2]	0	10,882	-337

(1) The effect of upgrades to Well Nos. 1, 2, 3, and 6 to full capacity results in a gain of 4,500 gpm. The total pumping capacity assumes that all existing wells are pumped at the maximum allowable withdrawal permitted by instantaneous water rights.

(2) The total pumping capacity assumes that all instantaneous water rights greater than the current pumping capacity are successfully transferred to a new or existing well(s).

WATER SUPPLY STRATEGY

The City's strategy to meet supply needs in the future consists of three parts. The first element is to maximize the use of existing sources. The second element is to identify and develop new sources. The third element is to develop an aggressive conservation program to reduce water supply needs from those shown in Tables E-1 through E-3.

EXISTING SOURCES OF SUPPLY

The City has begun capital improvements to maximize use of its existing sources. Improvements to Well Nos. 3 and 6 completed in 2001 will help the City to meet peak supply needs and give the City more operational flexibility. Replacement well permit applications have been submitted to DOE for the replacement Well Nos. 1 and 2, which will also help the City meet future demands. Well No. 4 is currently inactive due to its recent Groundwater Under the Influence of Surface Water (GWI) classification. The City is currently searching for a replacement site for Well No. 4. If a suitable replacement site cannot be located, the City will provide filtration for Well No. 4.

The majority of the City's unused water rights are associated with the diversions at Jones and Boulder Creek. The certificate for Jones and Boulder Creek allows for the continuous withdraw of 1,570 gpm. At the time of the certificate's issue, the sources were not filtered, and the sources discharged to the City's 343 Zone and Butler Reservoir. Since then, the City has added a pressure filter treatment plant and changed the discharge point to the City's 455 Zone. The higher discharge head and the head losses through the pressure filter have limited the source capacity to approximately 1,050 gpm during normal stream-flow conditions. The City is currently analyzing the following four options to maximize existing water rights at Jones and Boulder Creek:

1. Maximize the certificate amount and increase flows to the pre-filtration rate of 1,570 gpm. This option requires the replacement of approximately 4.5 miles of the 6.5 mile 10-inch steel transmission main that supplies the filter plant with 16-inch main and expansion of the filter plant.

2. Continue to use Jones and Boulder Creek at its current capacity and transfer the remaining water rights to a groundwater source.

3. Relinquish use of the creeks during low-flow summer months (June 1st through October 1st) in exchange for additional groundwater rights. This option requires the upgrade of 4.5 miles of 10-inch transmission main to 16-inch transmission main to maximize the use of Jones and

Boulder Creek during the other eight months. The City may be able to acquire the groundwater rights through a relatively quick transfer due to the environmental benefit of the relinquishing summer use of Jones and Boulder Creek.

4. Discontinue use of the sources altogether and transfer all the rights to existing sources and new groundwater sources.

The City is proposing a toe-width study and watershed assessment of the Jones and Boulder Creeks with the Department of Fish and Wildlife in its 6-year capital improvement program (CIP). A toe-width study is a method that measures stream flows and available fish habitat to determine the impact of seasonal stream flows on potential salmon spawning areas. Through analysis of seasonal stream flows and the impact on fish habitat, the City will be able to develop a long-term plan for the Jones and Boulder Creek sources.

FUTURE SOURCE DEVELOPMENT

The development of future water sources is a key to future development in the City of Camas. The City is attempting to develop traditional groundwater potable supply wells, and is also considering non-potable sources to supply industrial customers. The City completed a test drilling program (*Westside Test Well Drilling Program*, Pacific Groundwater Group, March 2001) that identified two potential wells for development. These wells are located at 4321 Parker Ave. NW and at the Meadows Golf Club and have the potential of producing 350-500 gpm each. The City is budgeting $900,000 for the development of these two wells in its 6-year CIP. The City is pursuing potential source development on the east side of the Washougal River, particularly in the area near existing Well Nos. 5 and 6. The City is budgeting $75,000 in its 6-year CIP for the exploration of sources near the Washougal River.

Finally the City is investigating the Columbia River as a potential supply of non-potable industrial water. This option will require a separate treatment, storage, transmission, and distribution system to supply Wafertech and other potential industrial customers in the northwest Camas industrial park. The City is budgeting $215,000 in its 6-year CIP for a study analyzing the cost and viability of this option.

The City will be pursuing additional water rights as a part of its strategy to meet future water needs, through the traditional water right application process, and through the purchase of water rights with a transfer to newly developed sources. The City is planning to participate in DOE's Cost Recovery Program to expedite the approved process water right applications. The City is also pursuing an increase in the annual water rights at its existing sources. The certificate for Well Nos. 7 and 8 places an annual water right limit for all the City's sources that is below the sum of the annual rights designated for each source individually. The City has not exceeded the population designated on the certificate for Well Nos. 7 and 8, but it can be shown the City will surpass the corresponding number of ERUs in the near future.

CONSERVATION PROGRAM

The City will be developing a conservation program to reduce water use needs. The City has identified a goal of 10 percent water savings over the next 10 years, similar to Seattle Public Utilities' (SPU) 1 percent program. The City has identified the following conservation program elements that it will focus on to decrease supply needs:

- Reduce lost and unaccounted for water through leak detection. The City's had a rate of lost and unaccounted for water of 27 percent over the last three years. It is suspected that much of this is due to aging pipe and high pressures in the 343 Zone. The City has plans to divide this pressure zone into two zones as part of its 6-year CIP. A water audit of the 343 Zone will help identify the location of lost and unaccounted for water.

- Update the City Sprinkling Ordinance to include conservation measures and inclined block rate structure.

- Increase education efforts by providing consumption history on billing forms, update the City's web site with enhanced conservation measures, obtain and distribute DOH water conservation brochure, continue to supply and distribute water conservation devices, and continue to supply conservation information in the City's Consumer Confidence Report.

- Install central control irrigation system and weather station for City parks, play fields, and schools; and make data and control features available to large irrigation customers.

- Institute a water audit program for commercial, industrial, municipal, residential, and irrigation customers on a voluntary basis.

- Offer rebates on water and energy-efficient appliances.

- Identify potential wastewater reuse and Class "A" reclamation opportunities.

CAPITAL IMPROVEMENT PROGRAM AND FINANCING

Due to the large number of options for future sources, the City's CIP was developed under the assumption that the City will continue to provide all of its potable supply from its existing sources. The majority of costs allocated in the City's 6-year and 20-year CIP are associated with source of supply issues and the upgrade of transmission facilities associated with the Lacamas Booster Station. CIP cost estimates for the 6-year and 20-year planning periods for each Wafertech expansion phase are provided in Chapter 7. Based upon these cost estimates the City has an estimated $9,900,000 to $13,800,000 in its 6-year CIP, depending upon which Wafertech expansion phase is implemented. Estimates for the 20-year CIP range from $7,700,000 to $10,000,000, depending upon the Wafertech expansion phase that is implemented.

The financial analysis shows that present rates and connection charges, plus adjustments for projected inflation should support the water utility and planned improvements through the end of 2006. Depending upon the financing available for water system repairs and improvements, rates should be adjusted accordingly at the start of year 2005 and 2006.

List of tables