

Appendix C – Calculations

Chapter 3

Service Area Population and Demographics

Census Designated Place (CDP)	2015	2020	2025	2030	2035
Amesti CDP	3,587	3,663	3,740	3,820	3,901
Aptos Hills-Larkin Valley CDP	322	329	336	343	350
Corralitos CDP	1,340	1,368	1,397	1,427	1,457
Day Valley CDP	488	499	509	520	531
Freedom CDP	2,789	2,848	2,908	2,970	3,033
Interlaken CDP	4,756	4,857	4,960	5,065	5,173
Pajaro Dunes CDP	96	98	100	102	104
Watsonville city	52,019	54,713	57,547	60,528	63,663
Unincorporated County	570	582	594	607	620
Total	65,966	68,957	72,093	75,382	78,833
2015 Population	City of Watsonville				
Compound Growth Rates	http://ambag.org/sites/default/files/documents/FINAL%20Adopted%20Forecast%20and%20Documentation.pdf				
Watsonville	1.01%				
Unincorporated County	0.42%				
Compound Growth Formula	$N = N_0 \times (e)^{kt}$				

Figure 1 – (Service Area Population and Demographics), Projected Populations for the City’s WSA.

Chapter 4

Water Uses by Sector

1. Use Rates
 - a. Residential –
 - i. Calculated: (GPCD)
 1. 2000-2015= $\frac{((\text{MG from PWS Stat.s}) * 1000000)}{365} / \text{population}$
 2. 2016-2035=Average 2011-2015
 - b. Commercial/institutional –
 - i. Calculated: (gallons/connection/day)
 1. 2000-2015= $\frac{((\text{MG from PWS Stat.s}) * 1000000)}{365} / \text{connections}$
 2. 2016-2035=Average 2011-2015
 - c. Industrial –
 - i. Calculated: (gallons/connection/day)
 1. 2000-2015= $\frac{((\text{MG from PWS Stat.s}) * 1000000)}{365} / \text{connections}$
 2. 2016-2035=Average 2011-2015
 - d. Landscape –
 - i. Calculated: (gallons/connection/day)
 1. 2000-2015= $\frac{((\text{MG from PWS Stat.s}) * 1000000)}{365} / \text{connections}$
 2. 2016-2035=(Average 2011-2015)-30%¹
 - e. Other –
 - i. Calculated: (gallons/connection/day)
 1. 2000-2015= $\frac{((\text{MG from PWS Stat.s}) * 1000000)}{365} / \text{connections}$

¹ It is estimated that the design requirements in the 2015 MWEL0 will result in a 30% water use reduction as compared to the 2010 MWEL0.

- 2. 2016-2035=Average 2011-2015
 - f. Agriculture –
 - i. Calculated: (gallons/connection/day)
 - 1. 2000-2015= $\left(\frac{\text{MG from PWS Stat.s} \times 1000000}{365}\right) / \text{connections}$
 - 2. 2016-2035=Average 2011-2015
- 2. Customers
 - a. Residential –
 - i. Calculated: (population)
 - 1. Refer to “Baseline Population Calculation Method” in Appendix C
 - b. Commercial/institutional –
 - i. 2000-2015 Connections from PWS Stat.s
 - ii. 2016-2035=linear trend of 2000-2015 data
 - c. Industrial –
 - i. 2000-2015 Connections from PWS Stat.s
 - ii. 2016-2035=linear trend of 2000-2015 data
 - d. Landscape –
 - i. 2000-2015 Connections from PWS Stat.s
 - ii. 2016-2035=linear trend of 2000-2015 data
 - e. Other –
 - i. 2000-2015 Connections from PWS Stat.s
 - ii. 2016-2035=Average 2011-2015
 - f. Agriculture –
 - i. 2000-2015 Connections from PWS Stat.s
 - ii. 2016-2035=linear trend of 2000-2015 data
- 3. Water Demand
 - a. Residential –
 - i. Calculated: (AF/year)
 - 1. $\left(\frac{\text{Residential use rate} \times \text{residential population}}{1000000} \times 365\right) \times 1000000 / 325851$
 - b. Commercial/institutional –
 - i. Calculated: (mgd)
 - 1. $\left(\frac{\text{Commercial/institutional use rate} \times \text{Commercial/institutional connections}}{1000000} \times 365\right) \times 1000000 / 325851$
 - c. Industrial –
 - i. Calculated: (mgd)
 - 1. $\left(\frac{\text{Industrial use rate} \times \text{Industrial connections}}{1000000} \times 365\right) \times 1000000 / 325851$
 - d. Landscape –
 - i. Calculated: (mgd)
 - 1. $\left(\frac{\text{Landscape use rate} \times \text{Landscape connections}}{1000000} \times 365\right) \times 1000000 / 325851$
 - e. Other –
 - i. Calculated: (mgd)
 - 1. $\text{Other use rate} \times \text{Other connections} / 1000000$
 - f. Agriculture –
 - i. Calculated: (mgd)
 - 1. $\text{Agriculture use rate} \times \text{Agriculture connections} / 1000000$
 - g. Water Losses –
 - i. 2000-2015 from PWS Stat.s = total potable – (total urban retail + agricultural irrigation)
 - ii. 2016-2035= linear trend of 2000-2015 data

Distribution System Water Losses

Year	Total	Water Losses	
		mg/year	%
2006	2578.9	212.52	8%
2007	2812.42	193.75	7%
2008	2869.18	206.59	7%
2009	2528.82	117.58	5%
2010	2430.83	168.56	7%
2011	2378.98	41.25	2%
2012	2528.06	272.62	11%
2013	2707.57	115.14	4%
2014	2449.36	153.63	6%
2015	2238.55	68.22	3%
Average			6%

Data from City Public Water System Statistics, 2006-2015.

Figure 3- (Distribution System Water Losses)

Chapter 5

Service Area Population

Persons-per-connection were calculated for years 2000, 2010 and 2015, by dividing the City's estimated population by known residential connections. A linear trend was created for persons-per-connection ($y = -0.0204x + 46.047$). The linear trend was then applied to the years 2001 through 2009. Then the populations, for 2001 through 2009, were calculated by multiplying the persons-per-connection by the known residential connections.

POPULATION (Z=RY)	RESIDENTIAL CONNECTIONS (R)	PERSONS/CONNECTIONS (Y)	YEAR (X)
59003	11089	5.3209	2000
58517	11196	5.2266	2001
58445	11226	5.2062	2002
59502	11474	5.1858	2003
61572	11920	5.1654	2004
69982	13602	5.1450	2005
70412	13740	5.1246	2006
70275	13768	5.1042	2007
68306	13436	5.0838	2008
69136	13654	5.0634	2009
64657	14006	4.6164	2010
65966	12835	5.1395	2015

PERSONS/CONNECTIONS (Y)

