

# **APPENDIX I**

## **SOURCE AND STORAGE ANALYSES**



# SOURCE ANALYSES

<b>Evaluation of Source Adequacy for the Skagit Valley Floor Zone (214' HGL) - 214C County, 214D Mount Vernon, 214F South Mount Vernon and Fir Island Zone (195' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(17)</sup></b>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's)	12,931	13,454	15,410	258,327
Average Day Demand (gpd)	2,072,886	2,156,672	2,470,289	41,410,405
Maximum Day Demand (gpd)	3,586,093	3,731,042	4,273,600	71,640,000
<b>Available Existing Source (gpd)</b>				
PRV Station at College Way & Monte Vista <sup>(2)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at 18th Street & Kulshan <sup>(3)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at 9th Street & Kulshan <sup>(4)</sup>	8,856,000	8,856,000	8,856,000	8,856,000
PRV Station at 9th Street & William Way <sup>(5)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at 9th Street & Highland (Tank) <sup>(6)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at 9th Street & Highland (Tank Bypass) <sup>(7)</sup>	8,856,000	8,856,000	8,856,000	8,856,000
PRV Station at Kulshan View <sup>(8)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at College Way & Laventure <sup>(9)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Hoag & Laventure <sup>(10)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Sandlewood & N. 18th Place <sup>(11)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at Blodgett <sup>(12)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Blodgett & Anderson <sup>(13)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Blodgett & Redhawk <sup>(14)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Hickox & Burkland <sup>(15)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(16)</sup></b>	<b>68,053,907</b>	<b>67,908,958</b>	<b>67,366,400</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at College and Monte Vista has a 8" PRV with a maximum flow rate of 3,900 gpm
3. The PRV Station at 18th and Kulshan has a 4" PRV with a maximum flow rate of 1,000 gpm
4. The PRV Station at 9th and Kulshan has a 10" PRV with a maximum flow rate of 6,150 gpm
5. The PRV Station at 9th and William Way has a 6" PRV with a maximum flow rate of 2,250 gpm
6. The PRV Station at 9th and Highland Tank has a 12" PRV with a maximum flow rate of 8,600 gpm
7. The PRV Station at 9th and Highland Bypass has a 10" PRV with a maximum flow rate of 6,150 gpm
8. The PRV Station at Kulshan View has a 8" PRV with a maximum flow rate of 3,900 gpm
9. The PRV Station at College andLaventure has a 8" PRV with a maximum flow rate of 3,900 gpm
10. The PRV Station at Hoag and Laventure has a 6" PRV with a maximum flow rate of 2,250 gpm
11. The PRV Station at 18th and Sandlewood has a 4" PRV with a maximum flow rate of 1,000 gpm
12. The PRV Station at Blodgett has a 6" PRV with a maximum flow rate of 2,250 gpm
13. The PRV Station at Blodgett and Anderson has a 6" PRV with a maximum flow rate of 2,250 gpm
14. The PRV Station at Blodgett and Redhawk has a 8" PRV with a maximum flow rate of 3,900 gpm
15. The PRV Station at Hickox and Burkland has a 6" PRV with a maximum flow rate of 2,250 gpm
16. Calculation based on Maximum Day Demand.
17. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Skagit Valley Floor Zone (214'HGL) - 214A Burlington, 214E Custer				
	Year			
	2014	2019	2033	Max <sup>(11)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	9,218	9,591	10,986	76,590
Average Day Demand (gpd)	1,477,713	1,537,442	1,761,012	12,277,457
Maximum Day Demand (gpd)	2,556,444	2,659,774	3,046,552	21,240,000
Available Existing Source (gpd)				
PRV Station at Rhodes Road <sup>(5)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at Cook Road & Old 99 <sup>(8)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at North Hill Blvd <sup>(9)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(10)</sup></b>	<b>18,683,556</b>	<b>18,580,226</b>	<b>18,193,448</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Dukes Hill has a 6" PRV with a maximum flow rate of 2,250 gpm
3. The PRV Station at SR9 and Marie Place has a 8" PRV with a maximum flow rate of 3,900 gpm
4. The PRV Station at SR20 and Fruitdale Road has a 6" PRV with a maximum flow rate of 2,250 gpm
5. The PRV Station at Rhodes Road has a 12" PRV with a maximum flow rate of 8,600 gpm
6. The PRV Station at First and Nelson has a 12" PRV with a maximum flow rate of 8,600 gpm
7. The PRV Station at Township and Dunlap has a 8" PRV with a maximum flow rate of 3,900 gpm
8. The PRV Station at Cook Road and Old 99 has a 6" PRV with a maximum flow rate of 2,250 gpm
9. The PRV Station at North Hill Blvd has a 8" PRV with a maximum flow rate of 3,900 gpm
10. Calculation based on Maximum Day Demand.
11. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Skagit Valley Floor Zone (214' HGL) - 214B Sedro Woolley</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(11)</sup></b>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's)	5,431	5,651	6,473	108,523
Average Day Demand (gpd)	870,674	905,866	1,037,595	17,396,532
Maximum Day Demand (gpd)	1,506,266	1,567,149	1,795,039	30,096,000
<b>Available Existing Source (gpd)</b>				
PRV Station at Dukes Hill <sup>(2)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at SR9 & Marie Place <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at SR20 & Fruitdale Road <sup>(4)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at First & Nelson <sup>(6)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at Township & Dunlap <sup>(7)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(10)</sup></b>	<b>28,589,734</b>	<b>28,528,851</b>	<b>28,300,961</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Dukes Hill has a 6" PRV with a maximum flow rate of 2,250 gpm
3. The PRV Station at SR9 and Marie Place has a 8" PRV with a maximum flow rate of 3,900 gpm
4. The PRV Station at SR20 and Fruitdale Road has a 6" PRV with a maximum flow rate of 2,250 gpm
5. The PRV Station at Rhodes Road has a 12" PRV with a maximum flow rate of 8,600 gpm
6. The PRV Station at First and Nelson has a 12" PRV with a maximum flow rate of 8,600 gpm
7. The PRV Station at Township and Dunlap has a 8" PRV with a maximum flow rate of 3,900 gpm
8. The PRV Station at Cook Road and Old 99 has a 6" PRV with a maximum flow rate of 2,250 gpm
9. The PRV Station at North Hill Blvd has a 8" PRV with a maximum flow rate of 3,900 gpm
10. Calculation based on Maximum Day Demand.
11. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Bay View Ridge Zones (230', 270' and 290' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	3,747	3,898	4,465	20,251
Average Day Demand (gpd)	600,596	624,872	715,739	3,246,243
Maximum Day Demand (gpd)	1,039,031	1,081,029	1,238,229	5,616,000
Available Existing Source (gpd)				
PRV Station at Higgins Airport Way <sup>(2)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>4,576,969</b>	<b>4,534,971</b>	<b>4,377,771</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Higgins Airport Way and Josh Wilson Road has an 8" PRV with a maximum flow rate of 3,900 gpm
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Clear Lake North Zone (284' HGL)				
	Year			
	2014	2019	2033	Max <sup>(6)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	300	313	358	24,716
Average Day Demand (gpd)	48,158	50,105	57,391	3,962,081
Maximum Day Demand (gpd)	83,314	86,681	99,286	6,854,400
Available Existing Source (gpd)				
PRV Station at Front Street and Beaver Lake <sup>(2)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Buchanan Street and Magnolia <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Buchanan Street and Maple <sup>(4)</sup>	374,400	374,400	374,400	374,400
<b>Source Surplus/(Deficiency) (gpd)<sup>(5)</sup></b>	<b>6,771,086</b>	<b>6,767,719</b>	<b>6,755,114</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Front and Beaver Lake has a 6" PRV with a maximum flow rate of 2,250 gpm from the 365' HGL zone.
3. The PRV Station at Buchanan and Magnolia has a 6" PRV with a maximum flow rate of 2,250 gpm from the 365' HGL zone.
4. The PRV Station at Buchanan and Maple has a 2" PRV with a maximum flow rate of 260 gpm from the 365' HGL zone.
5. Calculation based on Maximum Day Demand.
6. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the 322A and 322B Mount Vernon (322' HGL), and Conway (220' HGL) Zones</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(10)</sup></b>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's)	7,350	7,647	8,759	68,645
Average Day Demand (gpd)	1,178,167	1,225,788	1,404,038	11,003,931
Maximum Day Demand (gpd)	2,038,228	2,120,613	2,428,986	19,036,800
<b>Available Existing Source (gpd)</b>				
PRV Station at Waugh Road & Seneca <sup>(2)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at LaVenture Road & Kulshan <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at 18th Street & Kulshan <sup>(4)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at 9th Street & Evergreen <sup>(5)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Little Mountain Reservoir <sup>(6)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Section and LaVenture <sup>(7)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Skyridge Drive <sup>(8)</sup>	820,800	820,800	820,800	820,800
<b>Source Surplus/(Deficiency) (gpd)<sup>(9)</sup></b>	<b>16,998,572</b>	<b>16,916,187</b>	<b>16,607,814</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Waugh Road has a 4" PRV with a maximum flow rate of 1,000 gpm from the 459' HGL zone.
3. The PRV Station at LaVenture Road has a 8" PRV with a maximum flow rate of 3,900 gpm from the 459' HGL zone
4. The PRV Station at 18th Street has a 4" PRV with a maximum flow rate of 1,000 gpm from the 459' HGL zone
- 5 The PRV Station at 9th Street has a 6" PRV with a maximum flow rate of 2,250 gpm from the 459' HGL zone
- 6 The PRV Station at Little Mountain Reservoir has a 6" PRV with a maximum flow rate of 2,250 gpm from the 463' HGL zone
- 7 The PRV Station at Section and LaVenture has a 6" PRV with a maximum flow rate of 2,250 gpm from the 420' HGL zone
- 8 The PRV Station at Skyridge Drive has a 3" PRV with a maximum flow rate of 570 gpm from the 463' HGL zone
- 9 Calculation based on Maximum Day Demand.
- 10 Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the 322C Cascade Ridge 1 Zone (322' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	31	32	37	195
Average Day Demand (gpd)	4,915	5,113	5,857	31,214
Maximum Day Demand (gpd)	8,502	8,846	10,132	54,000
Available Existing Source (gpd)				
Cascade Ridge #1 Booster Station (50 gpm) <sup>(2)</sup>	54,000	54,000	54,000	54,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>45,498</b>	<b>45,154</b>	<b>43,868</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains one pump, capable of pumping 50 gpm. It is assumed the pump is running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Sedro Woolley Zone (350' HGL)</b>				
	Year			
	2014	2019	2033	Max <sup>(6)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	580	603	691	45,694
Average Day Demand (gpd)	92,937	96,694	110,755	7,324,855
Maximum Day Demand (gpd)	160,782	167,281	191,606	12,672,000
Available Existing Source (gpd)				
PRV Station at Fruitdale Road & Portabello <sup>(2)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Bassett Road & SR9 <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Bassett Road & Longtime Lane <sup>(4)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(5)</sup></b>	<b>12,511,218</b>	<b>12,504,719</b>	<b>12,480,394</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Fruitdale and Portabello has a 3" PRV and an 8" PRV with a maximum flow rate of 3,900 gpm from the 459' zone to the 350' zone.
3. The PRV Station at Bassett Road and Longtime Lane has a 1.5" PRV and a 4" PRV with a maximum flow rate of 1,000 gpm. From the 459' zone to the 350' zone
4. The PRV Station at Bassett Road and SR9 has 2", 3" and 8" PRVs with a maximum flow rate of 3,900 gpm from the 459' zone to the 350' zone.
5. Calculation based on Maximum Day Demand.
6. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the 356A Clear Lake South and Big Lake Zones (356' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	817	850	973	11,683
Average Day Demand (gpd)	130,906	136,197	156,002	1,872,832
Maximum Day Demand (gpd)	226,467	235,620	269,884	3,240,000
Available Existing Source (gpd)				
PRV Station at Beaver Lake Road <sup>(2)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>3,013,533</b>	<b>3,004,380</b>	<b>2,970,116</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Beaver Lake Road has a 2" PRV and a 6" PRV with a maximum flow rate of 2,250 gpm
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Southwest Clear Lake Zone (365' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	176	183	209	11,683
Average Day Demand (gpd)	28,178	29,317	33,581	1,872,832
Maximum Day Demand (gpd)	48,748	50,719	58,094	3,240,000
Available Existing Source (gpd)				
PRV Station at Beaver Lake Road <sup>(2)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>3,191,252</b>	<b>3,189,281</b>	<b>3,181,906</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Beaver Lake Road has a 2" PRV and a 6" PRV with a maximum flow rate of 2,250 gpm
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Hermway Heights Zone (412' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	91	94	108	234
Average Day Demand (gpd)	14,518	15,105	17,301	37,457
Maximum Day Demand (gpd)	25,116	26,131	29,931	64,800
Available Existing Source (gpd)				
Bulson Booster Station (60 gpm) <sup>(2)</sup>	64,800	64,800	64,800	64,800
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>39,684</b>	<b>38,669</b>	<b>34,869</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains one pump capable of pumping 60 gpm. It is assumed pump station is running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Hoogdal Zone (430' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	80	83	95	9,347
Average Day Demand (gpd)	12,812	13,330	15,268	1,498,266
Maximum Day Demand (gpd)	22,165	23,061	26,414	2,592,000
Available Existing Source (gpd)				
12-inch Transmission Pipeline on Fruitdale Road <sup>(2)</sup>	2,592,000	2,592,000	2,592,000	2,592,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>2,569,835</b>	<b>2,568,939</b>	<b>2,565,586</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The PRV Station at Kalloch Road and SR9 has an 8" PRV with a maximum flow rate of 3900 gpm from the 459' zone to the 430' zone. The PRV is currently bypassed to fill the Hoogdal Reservoir because the PRV is not needed due to head losses in the 12" transmission line. The source capacity is the 12" pipe flowing at 5 ft/sec, which equals 1,800 gpm.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Nookachamps Hills Zone (450' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	118	122	140	101
Average Day Demand (gpd)	18,871	19,634	22,489	16,231
Maximum Day Demand (gpd)	32,647	33,966	38,905	28,080
Available Existing Source (gpd)				
Nookachamps Hills Booster Station (26 gpm) <sup>(2)</sup>	28,080	28,080	28,080	28,080
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>(4,567)</b>	<b>(5,886)</b>	<b>(10,825)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 26 gpm. The maximum production is assumed to be 26 gpm, and is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Bow Hill Zone (456' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	48	50	57	2,921
Average Day Demand (gpd)	7,634	7,943	9,098	468,208
Maximum Day Demand (gpd)	13,208	13,741	15,740	810,000
Available Existing Source (gpd)				
Bow Hill Booster Station (750 gpm) <sup>(2)</sup>	810,000	810,000	810,000	810,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>796,792</b>	<b>796,259</b>	<b>794,260</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 750 gpm. The maximum production is assumed to be 750 gpm and is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Transmission Zone (459' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	947	985	1,128	25,963
Average Day Demand (gpd)	151,735	157,868	180,825	4,161,850
Maximum Day Demand (gpd)	262,502	273,112	312,827	7,200,000
Available Existing Source (gpd)				
Sedro Woolley Transmission Line <sup>(2)</sup>	7,200,000	7,200,000	7,200,000	7,200,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>6,937,498</b>	<b>6,926,888</b>	<b>6,887,173</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The 20-inch CCP transmission line and the 24-inch DI transmission line feed the different 459' HGL pressure zones. The smaller of the two is used to determine the available source, which is the 20-inch CCP flowing at 5 ft/sec, equalling approximately 5000 gpm.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Skyridge Zone (463' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	76	79	90	779
Average Day Demand (gpd)	12,118	12,607	14,441	124,855
Maximum Day Demand (gpd)	20,964	21,811	24,983	216,000
Available Existing Source (gpd)				
Anderson Road Booster Station (200 gpm) <sup>(2)</sup>	216,000	216,000	216,000	216,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>195,036</b>	<b>194,189</b>	<b>191,017</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains one pump capable of pumping 200 gpm. It is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

<b>Evaluation of Source Adequacy for the Tinas Coma - Burlington Hill Zone (506' and 415' HGL)</b>				
	<b>Year</b>			
	<b>2014</b>	<b>2019</b>	<b>2033</b>	<b>Max<sup>(4)</sup></b>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	66	69	78	1,013
Average Day Demand (gpd)	10,557	10,984	12,581	162,312
Maximum Day Demand (gpd)	18,264	19,002	21,766	280,800
Available Existing Source (gpd)				
Tinas Coma Booster Station (260 gpm) <sup>(2)</sup>	280,800	280,800	280,800	280,800
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>262,536</b>	<b>261,798</b>	<b>259,034</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 260 gpm. The maximum production is assumed to be 260 gpm, and is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

**Evaluation of Source Adequacy for the Eaglemont (560' HGL), Central Mount Vernon, (420' HGL) and  
356B Skagit Highland (356' HGL) Zones**

	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	3,028	3,151	3,609	5,842
Average Day Demand (gpd)	485,419	505,040	578,481	936,416
Maximum Day Demand (gpd)	839,775	873,719	1,000,773	1,620,000
Available Existing Source (gpd)				
Fir/Waugh Booster Station (1500 gpm) <sup>(2)</sup>	1,620,000	1,620,000	1,620,000	1,620,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>780,225</b>	<b>746,281</b>	<b>619,227</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 1,500 gpm. The maximum production is assumed to be 1,500 gpm, and is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Cascade Ridge 2 Zone (592' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	37	39	45	779
Average Day Demand (gpd)	6,000	6,243	7,151	124,855
Maximum Day Demand (gpd)	10,380	10,800	12,370	216,000
Available Existing Source (gpd)				
Cascade Ridge #2 Booster Station (200 gpm) <sup>(2)</sup>	216,000	216,000	216,000	216,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>205,620</b>	<b>205,200</b>	<b>203,630</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains one pump, capable of pumping 200 gpm. It is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Eagle's Nest Zone (645' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	193	218	250	209
Average Day Demand (gpd)	31,000	35,000	40,000	33,488
Maximum Day Demand (gpd)	200,000	210,000	230,000	216,000
Available Existing Source (gpd)				
Eagle's Nest Booster Station (150 gpm) <sup>(2)</sup>	216,000	216,000	216,000	216,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>16,000</b>	<b>6,000</b>	<b>(14,000)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 150 gpm. The maximum production is assumed to be 200 gpm maximum and it is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Lake 16 Zone (684' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	57	59	68	389
Average Day Demand (gpd)	9,151	9,521	10,906	62,428
Maximum Day Demand (gpd)	15,832	16,471	18,867	108,000
Available Existing Source (gpd)				
Lake 16 Booster Station (100 gpm) <sup>(2)</sup>	108,000	108,000	108,000	108,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>92,168</b>	<b>91,529</b>	<b>89,133</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains two pumps, each capable of pumping 100 gpm. The maximum production is assumed to be 100 gpm maximum, and it is assumed to be running 18 hours per day
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Panorama Zone (705' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	42	44	50	78
Average Day Demand (gpd)	6,762	7,035	8,058	12,486
Maximum Day Demand (gpd)	11,698	12,171	13,941	21,600
Available Existing Source (gpd)				
Finished Water Pumps at WTP <sup>(2)</sup>	21,600	21,600	21,600	21,600
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>9,902</b>	<b>9,429</b>	<b>7,659</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. This zone is fed from the finished water pumps at the WTP.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

Evaluation of Source Adequacy for the Cascade Ridge 3 Zone (858' and 720' HGL)				
	Year			
	2014	2019	2033	Max <sup>(4)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's)	41	43	49	779
Average Day Demand (gpd)	6,588	6,855	7,851	124,855
Maximum Day Demand (gpd)	11,398	11,858	13,583	216,000
Available Existing Source (gpd)				
Cascade Ridge #3 Booster Station (200 gpm) <sup>(2)</sup>	216,000	216,000	216,000	216,000
<b>Source Surplus/(Deficiency) (gpd)<sup>(3)</sup></b>	<b>204,602</b>	<b>204,142</b>	<b>202,417</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. The station contains one pump, capable of pumping 200 gpm. It is assumed to be running 18 hours per day.
3. Calculation based on Maximum Day Demand.
4. Maximum ERUs to be served with Existing Sources, based on maximum production rate.

# STORAGE ANALYSES

**Evaluation of Storage Adequacy for the Skagit Valley Floor Zone (214' HGL) - 214C County, 214D Mount Vernon, 214F South Mount Vernon and Fir Island Zone (195' HGL)**

	Year			
	2014	2019	2033	Max <sup>(12)</sup>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERUs) <sup>(2)</sup>	12,931	13,454	15,410	16,730
Average Day Demand (gpd)	2,072,886	2,156,672	2,470,289	2,681,876
Maximum Day Demand (gpd)	3,586,093	3,731,042	4,273,600	4,639,645
<b>Available Source (gpd)</b>				
PRV Station at College Way & Monte Vista <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at 18th Street & Kulshan <sup>(3)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at 9th Street & Kulshan <sup>(3)</sup>	8,856,000	8,856,000	8,856,000	8,856,000
PRV Station at 9th Street & William Way <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at 9th Street & Highland (Tank) <sup>(3)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at 9th Street & Highland (Tank Bypass) <sup>(3)</sup>	8,856,000	8,856,000	8,856,000	8,856,000
PRV Station at Kulshan View <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at College Way & Laventure <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Hoag & Laventure <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Sandlewood & N. 18th Place <sup>(3)</sup>	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at Blodgett <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Blodgett & Anderson <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Blodgett & Redhawk <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Hickox & Burkland <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
<b>Multi-Source Credit (gpd)<sup>(4)</sup></b>	12,384,000	12,384,000	12,384,000	12,384,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	422,115	422,115	422,115	422,115
Equalizing Storage (gal) <sup>(6)</sup>	269,382	293,540	383,966	444,974
Standby Storage (gal) <sup>(7)</sup>	5,172,453	5,381,522	6,164,088	6,692,057
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	691,497	715,655	806,081	867,089
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	5,953,950	6,187,177	7,060,169	7,649,146
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	1,365,303	1,365,303	1,365,303	1,365,303
Clearwell #2	1,365,303	1,365,303	1,365,303	1,365,303
Clearwell #3	1,818,539	1,818,539	1,818,539	1,818,539
Bulson Road Reservoir	95,865	95,865	95,865	95,865
9th and Highland Reservoir	3,000,000	3,000,000	3,000,000	3,000,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>6,953,515</b>	<b>6,929,357</b>	<b>6,838,930</b>	<b>6,777,923</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	1,365,303	1,365,303	1,365,303	1,365,303
Clearwell #2	1,365,303	1,365,303	1,365,303	1,365,303
Clearwell #3	1,818,539	1,818,539	1,818,539	1,818,539
Bulson Road Reservoir	100,000	100,000	100,000	100,000
9th and Highland Reservoir	3,000,000	3,000,000	3,000,000	3,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>1,695,197</b>	<b>1,461,969</b>	<b>588,977</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the multiple PRVs off of the transmission pipe.
- Multi source credit calculation assumed largest source is off-line.
- Required operational storage is based on an assumed 3 feet of water.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction inside the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 214 HGL Zone. Also, 56% of the total WTP Clearwell volume was distributed to this pressure zone to provide storage.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Skagit Valley Floor Zone (214' HGL) - 214A Burlington, 214E Custer				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	9,218	9,591	10,986	11,318
Average Day Demand (gpd)	1,477,713	1,537,442	1,761,012	1,814,335
Maximum Day Demand (gpd)	2,556,444	2,659,774	3,046,552	3,138,800
Available Source (gpd)				
PRV Station at Rhodes Road <sup>(3)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at Cook Road & Old 99 <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at North Hill Blvd <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
Multi-Source Credit (gpd) <sup>(4)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	468,750	468,750	468,750	468,750
Equalizing Storage (gal) <sup>(6)</sup>	127,822	132,989	152,328	156,940
Standby Storage (gal) <sup>(7)</sup>	3,687,323	3,836,363	4,394,237	4,527,292
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	596,572	601,739	621,078	625,690
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	4,373,895	4,528,102	5,105,315	5,242,982
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	973,294	973,294	973,294	973,294
Clearwell #2	973,294	973,294	973,294	973,294
Clearwell #3	1,296,395	1,296,395	1,296,395	1,296,395
9th and Highland Reservoir	2,000,000	2,000,000	2,000,000	2,000,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>4,646,410</b>	<b>4,641,243</b>	<b>4,621,905</b>	<b>4,617,292</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	973,294	973,294	973,294	973,294
Clearwell #2	973,294	973,294	973,294	973,294
Clearwell #3	1,296,395	1,296,395	1,296,395	1,296,395
9th and Highland Reservoir	2,000,000	2,000,000	2,000,000	2,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>869,087</b>	<b>714,880</b>	<b>137,668</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the PRV stations off of the transmission pipe.
- Multi source credit calculation assumed largest source is off-line.
- Required operational storage is based on an assumed 3 feet of water.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction inside the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 214 HGL Zone. Also, 40% of the total WTP Clearwell volume was distributed to this pressure zone to provide storage.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Skagit Valley Floor Zone (214' HGL) - 214B Sedro Woolley				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	5,431	5,651	6,473	10,731
Average Day Demand (gpd)	870,674	905,866	1,037,595	1,720,221
Maximum Day Demand (gpd)	1,506,266	1,567,149	1,795,039	2,975,983
<b>Available Source (gpd)</b>				
PRV Station at Dukes Hill <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at SR9 & Marie Place <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at SR20 & Fruitdale Road <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at First & Nelson <sup>(3)</sup>	12,384,000	12,384,000	12,384,000	12,384,000
PRV Station at Township & Dunlap <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Multi-Source Credit (gpd)<sup>(4)</sup></b>	12,384,000	12,384,000	12,384,000	12,384,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	468,750	468,750	468,750	468,750
Equalizing Storage (gal) <sup>(6)</sup>	75,313	78,357	89,752	148,799
Standby Storage (gal) <sup>(7)</sup>	2,172,584	2,260,399	2,589,100	4,292,451
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	544,063	547,107	558,502	617,549
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	2,806,647	2,897,507	3,237,602	5,000,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Dukes Hill Reservoir	5,000,000	5,000,000	5,000,000	5,000,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>4,455,937</b>	<b>4,452,893</b>	<b>4,441,498</b>	<b>4,382,451</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Dukes Hill Reservoir	5,000,000	5,000,000	5,000,000	5,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>2,193,353</b>	<b>2,102,493</b>	<b>1,762,398</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the PRV stations off of the transmission pipe.
- Multi source credit calculation assumed largest source is off-line.
- Required operational storage is based on an assumed 3 feet of water.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$\text{PHD} : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction inside the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 214 HGL Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Bayview Ridge Zones (230', 270' and 290' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	3,747	3,898	4,465	4,630
Average Day Demand (gpd)	600,596	624,872	715,739	742,218
Maximum Day Demand (gpd)	1,039,031	1,081,029	1,238,229	1,284,036
Available Source (gpd)				
PRV Station at Higgins Airport Way (3,900 gpm) <sup>(3)</sup>	5,616,000	5,616,000	5,616,000	5,616,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	297,246	297,246	297,246	297,246
Equalizing Storage (gal) <sup>(6)</sup>	51,952	54,051	61,911	64,202
Standby Storage (gal) <sup>(7)</sup>	1,498,662	1,559,237	1,785,977	1,852,048
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	349,198	351,297	359,157	361,448
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	1,937,859	2,000,535	2,235,135	2,303,496
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Bay View Standpipe	102,658	0	0	0
Bay View Ridge Reservoir	1,323,563	1,323,563	1,323,563	1,323,563
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>1,077,023</b>	<b>972,266</b>	<b>964,406</b>	<b>962,115</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Bay View Standpipe	171,888	0	0	0
Bay View Ridge Reservoir	2,303,496	2,303,496	2,303,496	2,303,496
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>537,525</b>	<b>302,961</b>	<b>68,361</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the PRV at Higgins Airport Way and Josh Wilson Road
- Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
- Required operational storage is based on an assumed 3 feet of water in the Reservoir.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial and industrial construction outside of UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customers in the 270 HGL and 290 HGL Zones.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the ClearLake North Zone (284' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	300	313	358	2,157
Average Day Demand (gpd)	48,158	50,105	57,391	345,818
Maximum Day Demand (gpd)	83,314	86,681	99,286	598,265
Available Source (gpd) <sup>(3)</sup>				
PRV Station at Front Street (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Buchanan and Magnolia (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Buchanan and Maple (260 gpm)	374,400	374,400	374,400	374,400
Multi-Source Credit (gpd) <sup>(4)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	52,174	52,174	52,174	52,174
Equalizing Storage (gal) <sup>(6)</sup>	4,166	4,334	4,964	69,911
Standby Storage (gal) <sup>(7)</sup>	120,168	125,026	143,207	862,915
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	56,340	56,508	57,138	122,085
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	191,508	196,534	215,345	1,000,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Buchanan Hill Reservoir	1,000,000	1,000,000	1,000,000	1,000,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>943,660</b>	<b>943,492</b>	<b>942,862</b>	<b>877,915</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Buchanan Hill Reservoir	1,000,000	1,000,000	1,000,000	1,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>808,492</b>	<b>803,466</b>	<b>784,655</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the PRV stations from the 365 HGL zone, which are fed from the PRV station at Beaver Lake Road off the transmission pipe.
4. Multi source credit calculation assumed largest source is off-line.
5. Required operational storage is based on an assumed 3 feet of water in the Buchanan Hill Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 min for residential construction outside of UGA.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~184 ft) in the 284 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the 322A and 322B Mount Vernon (322' HGL) and Conway (220' HGL) Zones				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	7,350	7,647	8,759	12,085
Average Day Demand (gpd)	1,178,167	1,225,788	1,404,038	1,937,241
Maximum Day Demand (gpd)	2,038,228	2,120,613	2,428,986	3,351,427
<b>Available Source (gpd)<sup>(3)</sup></b>				
PRV Station at Waugh Road (1,000 gpm)	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at LaVenture Road (3,900 gpm)	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at 18th Street (1,000 gpm)	1,440,000	1,440,000	1,440,000	1,440,000
PRV Station at 9th Street (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Little Mountain Reservoir (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Section and LaVenture (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
PRV Station at Skyridge Drive (570 gpm)	820,800	820,800	820,800	820,800
<b>Multi-Source Credit (gpd)<sup>(4)</sup></b>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	93,750	593,750	593,750	593,750
Equalizing Storage (gal) <sup>(6)</sup>	263,404	277,135	328,531	482,271
Standby Storage (gal) <sup>(7)</sup>	2,939,867	3,058,696	3,503,483	4,833,979
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	357,154	870,885	922,281	1,076,021
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	3,387,022	4,019,581	4,515,764	6,000,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Division Street Reservoir #1	330,288			
Division Street Reservoir #2		1,651,442	1,651,442	1,651,442
		0	0	0
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>(26,866)</b>	<b>780,557</b>	<b>729,162</b>	<b>575,421</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Division Street Reservoir #1	1,000,000			
Division Street Reservoir #2		6,000,000	6,000,000	6,000,000
		0	0	0
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(2,387,022)</b>	<b>1,980,419</b>	<b>1,484,236</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the multiple PRV stations from the transmission line, 463' HGL and 420' HGL zones.  
 The PRV Station at Waugh Road has a 4" PRV with a maximum flow rate of 1,000 gpm from the 459' HGL zone.  
 The PRV Station at LaVenture Road has a 8" PRV with a maximum flow rate of 3,900 gpm from the 459' HGL zone  
 The PRV Station at 18th Street has a 4" PRV with a maximum flow rate of 1,000 gpm from the 459' HGL zone  
 The PRV Station at 9th Street has a 6" PRV with a maximum flow rate of 2,250 gpm from the 459' HGL zone  
 The PRV Station at Little Mountain Reservoir has a 6" PRV with a maximum flow rate of 2,250 gpm from the 463' HGL zone  
 The PRV Station at Section and LaVenture has a 6" PRV with a maximum flow rate of 2,250 gpm from the 420' HGL zone  
 The PRV Station at Skyridge Drive has a 3" PRV with a maximum flow rate of 570 gpm from the 463' HGL zone
- Multi source credit calculation assumed largest source is off-line.
- Required operational storage is based on an assumed 3 feet of water.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  
 $PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$   
 (C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
 (N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction in the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~243 ft) in the 322 HGL Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the 322C Cascade Ridge 1 Zone (322' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	31	32	37	97
Average Day Demand (gpd)	4,915	5,113	5,857	15,624
Maximum Day Demand (gpd)	8,502	8,846	10,132	27,029
Available Source (gpd)				
Cascade Ridge #1 Booster Station (50 gpm) <sup>(3)</sup>	54,000	54,000	54,000	54,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	21,141	21,141	21,141	21,141
Equalizing Storage (gal) <sup>(6)</sup>	1,013	1,084	1,352	4,873
Standby Storage (gal) <sup>(7)</sup>	12,263	12,759	14,614	38,986
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	22,154	22,225	22,493	26,014
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	49,417	49,984	52,108	80,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #1	74,516	74,516	74,516	74,516
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>52,362</b>	<b>52,290</b>	<b>52,022</b>	<b>48,502</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #1	80,000	80,000	80,000	80,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>30,583</b>	<b>30,016</b>	<b>27,892</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the Cascade Ridge #1 Booster Station, and is assumed to be running 18 hours per day.
- Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
- Required operational storage is based on storage tank level when pump turns on, for the Cascade Ridge #1 Reservoir this is a level of 25 feet.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~221 ft) in the 322 Cascade Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Sedro Woolley Zone (350' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	581	604	692	(153)
Average Day Demand (gpd)	92,937	96,694	110,755	(24,400)
Maximum Day Demand (gpd)	160,782	167,281	191,606	(42,212)
<b>Available Source (gpd)<sup>(3)</sup></b>				
PRV Station at Fruitdale Road & Portabello (3,900 gpm)	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Bassett Road and SR9 (3,900 gpm)	5,616,000	5,616,000	5,616,000	5,616,000
PRV Station at Bassett Road and Longtime Lane (1,000 gpm)	1,440,000	1,440,000	1,440,000	1,440,000
<b>Multi-Source Credit (gpd)<sup>(4)</sup></b>	5,616,000	5,616,000	5,616,000	5,616,000
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	1,000	1,000	1,000	1,000
Equalizing Storage (gal) <sup>(6)</sup>	8,039	8,364	9,580	0
Standby Storage (gal) <sup>(7)</sup>	232,344	241,735	276,887	(61,000)
Fire Flow Storage (gal) <sup>(8)</sup>	60,000	60,000	60,000	60,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	9,039	9,364	10,580	1,000
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	301,383	311,099	347,468	0
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	0	0	0	0
Clearwell #2	0	0	0	0
Clearwell #3	0	0	0	0
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>(9,039)</b>	<b>(9,364)</b>	<b>(10,580)</b>	<b>(1,000)</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	0	0	0	0
Clearwell #2	0	0	0	0
Clearwell #3	0	0	0	0
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(301,383)</b>	<b>(311,099)</b>	<b>(347,468)</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
- Available source is assumed to be the multiple PRV stations from the transmission line  
The PRV Station at Fruitdale and Portabello has a 3" PRV and a 8" PRV with a maximum flow rate of 3,900 gpm. From the 459' zone to the 350' zone  
The PRV Station at Bassett Road and SR9 has 2", 3" and 8" PRVs with a maximum flow rate of 3,900 gpm from the 459' zone to the 350' zone.  
The PRV Station at Bassett Road and Longtime Lane has a 1.5" PRV and a 4" PRV with a maximum flow rate of 1,000 gpm. From the 459' zone to the 350' zone
- Multi source credit calculation assumed largest source is off-line.
- Required operational storage is an assumed amount based on the size of the zone.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  
PHD : (Maximum Day Demand per ERU / 1440) \* [(C) \* (N) + F] + 18  
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,000 gpm x 1 hour for single family and duplex construction within the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 350 Zone. In this case, there is no existing storage.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the 356A Clear Lake South and Big Lake Zones (356' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	817	850	973	1,082
Average Day Demand (gpd)	130,906	136,197	156,002	173,480
Maximum Day Demand (gpd)	226,467	235,620	269,884	300,121
Available Source (gpd)				
PRV Station at Beaver Lake Road (2,250 gpm) <sup>(3)</sup>	3,240,000	3,240,000	3,240,000	3,240,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	56,061	56,061	56,061	56,061
Equalizing Storage (gal) <sup>(6)</sup>	11,323	11,781	13,494	15,006
Standby Storage (gal) <sup>(7)</sup>	326,647	339,850	389,270	432,883
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	67,384	67,842	69,555	71,067
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	484,032	497,692	548,826	593,950
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Big Lake Reservoir West	69,851	69,851	69,851	69,851
Big Lake Reservoir East 1	70,000	70,000	70,000	70,000
Big Lake Reservoir East 2	70,000	70,000	70,000	70,000
Nokkachamps Hills Reservoir	118,383	118,383	118,383	118,383
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>260,850</b>	<b>260,393</b>	<b>258,680</b>	<b>257,168</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Big Lake Reservoir West	140,000	140,000	140,000	140,000
Big Lake Reservoir East 1	70,000	70,000	70,000	70,000
Big Lake Reservoir East 2	70,000	70,000	70,000	70,000
Nokkachamps Hills Reservoir	313,950	313,950	313,950	313,950
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>109,919</b>	<b>96,258</b>	<b>45,125</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- Available source is assumed to be the PRV on Beaver Lake Road
- No multi-source credit
- Required operational storage is based on an assumed 3 feet of water in tanks.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hour for outside of the UGA and commercial/industrial construction.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~273 ft) in the 356 Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Southwest Clear Lake Zone (365' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	176	183	209	1,373
Average Day Demand (gpd)	28,178	29,317	33,581	220,077
Maximum Day Demand (gpd)	48,748	50,719	58,094	380,734
Available Source (gpd) <sup>(3)</sup>				
PRV Station at Beaver Lake Road (2,250 gpm)	3,240,000	3,240,000	3,240,000	3,240,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	52,174	52,174	52,174	52,174
Equalizing Storage (gal) <sup>(6)</sup>	2,437	2,536	2,905	19,037
Standby Storage (gal) <sup>(7)</sup>	70,313	73,155	83,793	549,157
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	54,611	54,710	55,079	71,211
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	214,924	217,865	228,872	710,368
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Buchanan Hill Reservoir	309,030	309,030	309,030	309,030
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>254,419</b>	<b>254,320</b>	<b>253,951</b>	<b>237,819</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Buchanan Hill Reservoir	710,368	710,368	710,368	710,368
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>495,443</b>	<b>492,503</b>	<b>481,496</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the PRV on Beaver Lake Road
4. No multi-source credit
5. Required operational storage is based on an assumed 3 feet of water in the Buchanan Hill Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 1,500 gpm x 1 hour for outside of the UGA and commercial/industrial construction.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~279 ft) in the 365 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Hermway Heights Zone (412' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	91	94	108	86
Average Day Demand (gpd)	14,518	15,105	17,301	13,791
Maximum Day Demand (gpd)	25,116	26,131	29,931	23,859
Available Source (gpd)				
Bulson Booster Station (60 gpm) <sup>(3)</sup>	64,800	64,800	64,800	64,800
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	7,500	7,500	7,500	7,500
Equalizing Storage (gal) <sup>(6)</sup>	3,349	3,561	4,352	3,087
Standby Storage (gal) <sup>(7)</sup>	36,226	37,690	43,171	34,413
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	10,849	11,061	11,852	10,587
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	62,075	63,751	70,023	60,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Hermway Heights Reservoir	60,000	60,000	60,000	60,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>49,151</b>	<b>48,939</b>	<b>48,148</b>	<b>49,413</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Hermway Heights Reservoir	60,000	60,000	60,000	60,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(2,075)</b>	<b>(3,751)</b>	<b>(10,023)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the Bulson Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in Hermway Heights Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
 (C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
 (N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~300 ft) in the 412 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Hoogdal Zone (430' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	80	83	95	167
Average Day Demand (gpd)	12,812	13,330	15,268	26,807
Maximum Day Demand (gpd)	22,165	23,061	26,414	46,377
Available Source (gpd)				
12-inch Transmission Pipeline on Fruitdale Road <sup>(3)</sup>	2,592,000	2,592,000	2,592,000	2,592,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	15,789	15,789	15,789	15,789
Equalizing Storage (gal) <sup>(6)</sup>	1,108	1,153	1,321	2,319
Standby Storage (gal) <sup>(7)</sup>	31,970	33,262	38,099	66,892
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	16,897	16,942	17,110	18,108
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	63,867	65,204	70,209	100,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Hoogdal Reservoir	36,154	36,154	36,154	36,154
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>19,257</b>	<b>19,212</b>	<b>19,044</b>	<b>18,046</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Hoogdal Reservoir	100,000	100,000	100,000	100,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>36,133</b>	<b>34,796</b>	<b>29,791</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
- The PRV Station at Kalloch Road and SR9 has an 8" PRV with a maximum flow rate of 3900 gpm. The PRV is currently bypassed to fill the Hoogdal Reservoir because the PRV is not needed due to head losses in the 12" transmission line. The source capacity is the 12" pipe flowing at 5 ft/sec, which equals 1,800 gpm.
- Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
- Required operational storage is based on storage tank level when pump turns on, for the Skyline and 29th Street Reservoirs this is a level of 30 feet.
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~354 ft) in the 430 HGL Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Nookachamps Hills Zone (450' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	118	122	140	(88)
Average Day Demand (gpd)	18,871	19,634	22,489	(14,026)
Maximum Day Demand (gpd)	32,647	33,966	38,905	(24,266)
Available Source (gpd)				
Nookachamps Hills Booster Station (26 gpm) <sup>(3)</sup>	28,080	28,080	28,080	28,080
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	20,000	20,000	20,000	20,000
Equalizing Storage (gal) <sup>(6)</sup>	8,743	9,018	10,047	0
Standby Storage (gal) <sup>(7)</sup>	47,088	48,992	56,116	(35,000)
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	28,743	29,018	30,047	20,000
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	90,831	93,010	101,163	0
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>		0	0	0
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>(28,743)</b>	<b>(29,018)</b>	<b>(30,047)</b>	<b>(20,000)</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>		0	0	0
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(90,831)</b>	<b>(93,010)</b>	<b>(101,163)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the Nookachamp Hills Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is an assumed amount based on the size of the zone.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of UGA and 1 lot per 2.5 acres or less.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 450 HGL Zone. In this case, there is no existing storage.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Bow Hill Zone (456' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	48	50	57	1,866
Average Day Demand (gpd)	7,634	7,943	9,098	299,044
Maximum Day Demand (gpd)	13,208	13,741	15,740	517,346
Available Source (gpd)				
Bow Hill Booster Station (750 gpm) <sup>(3)</sup>	810,000	810,000	810,000	810,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	137,931	137,931	137,931	137,931
Equalizing Storage (gal) <sup>(6)</sup>	660	687	787	25,867
Standby Storage (gal) <sup>(7)</sup>	19,050	19,820	22,702	746,202
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	138,591	138,618	138,718	163,798
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	247,642	248,438	251,420	1,000,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Bow Hill Reservoir	1,000,000	1,000,000	1,000,000	1,000,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>861,409</b>	<b>861,382</b>	<b>861,282</b>	<b>836,202</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Bow Hill Reservoir	1,000,000	1,000,000	1,000,000	1,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>752,358</b>	<b>751,562</b>	<b>748,580</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the Bow Hill Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in the Bow Hill Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 1,500 gpm x 1 hours for outside of UGA and commercial/industrial construction.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~287 ft) in the 456 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Transmission Zone (459' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	947	985	1,128	311
Average Day Demand (gpd)	151,735	157,868	180,825	49,817
Maximum Day Demand (gpd)	262,502	273,112	312,827	86,183
Available Source (gpd)				
Sedro Woolley Transmission Line <sup>(3)</sup>	7,200,000	7,200,000	7,200,000	7,200,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	100,000	100,000	100,000	100,000
Equalizing Storage (gal) <sup>(6)</sup>	52,950	54,718	61,338	23,564
Standby Storage (gal) <sup>(7)</sup>	378,623	393,927	451,211	124,308
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	152,950	154,718	161,338	123,564
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	621,573	638,646	702,549	337,872
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	101,403	101,403	101,403	101,403
Clearwell #2	101,403	101,403	101,403	101,403
Clearwell #3	135,066	135,066	135,066	135,066
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>184,921</b>	<b>183,153</b>	<b>176,534</b>	<b>214,308</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Clearwell #1	101,403	101,403	101,403	101,403
Clearwell #2	101,403	101,403	101,403	101,403
Clearwell #3	135,066	135,066	135,066	135,066
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(283,702)</b>	<b>(300,774)</b>	<b>(364,677)</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
- Available source is assumed to be the Sedro Woolley transmission pipeline
- Multi source credit calculation assumed largest source is off-line. No credit applies in this scenario.
- Required operational storage is assumed based on the amount of customers in this zone
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  
 $PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$   
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction inside the UGA
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 459 HGL Zone. Also, 4% of the total WTP Clearwell volume was distributed to this pressure zone to provide storage.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Skyridge Zone (463' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	76	79	90	741
Average Day Demand (gpd)	12,118	12,607	14,441	118,712
Maximum Day Demand (gpd)	20,964	21,811	24,983	205,372
Available Source (gpd)				
Anderson Road Booster Station (200 gpm) <sup>(3)</sup>	216,000	216,000	216,000	216,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	109,375	109,375	109,375	109,375
Equalizing Storage (gal) <sup>(6)</sup>	1,048	1,091	1,249	34,404
Standby Storage (gal) <sup>(7)</sup>	30,237	31,459	36,034	296,221
Fire Flow Storage (gal) <sup>(8)</sup>	60,000	60,000	60,000	60,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	110,423	110,466	110,624	143,779
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	200,660	201,925	206,658	500,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Little Mountain Reservoir	500,000	500,000	500,000	500,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>389,577</b>	<b>389,534</b>	<b>389,376</b>	<b>356,221</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Little Mountain Reservoir	500,000	500,000	500,000	500,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>299,340</b>	<b>298,075</b>	<b>293,342</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the Anderson Road Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in the Little Mountain Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 1,000 gpm x 1 hour for single family and duplex construction within the UGA.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~349 ft) in the 463 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Tinas Coma - Burlington Hill Zone (506' and 415' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	66	69	78	311
Average Day Demand (gpd)	10,557	10,984	12,581	49,856
Maximum Day Demand (gpd)	18,264	19,002	21,766	86,251
Available Source (gpd)				
Tinas Coma Booster Station (260 gpm) <sup>(3)</sup>	280,800	280,800	280,800	280,800
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	41,282	41,282	41,282	41,282
Equalizing Storage (gal) <sup>(6)</sup>	913	950	1,088	4,313
Standby Storage (gal) <sup>(7)</sup>	26,344	27,409	31,394	124,405
Fire Flow Storage (gal) <sup>(8)</sup>	60,000	60,000	60,000	60,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	42,195	42,232	42,370	45,595
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	128,539	129,641	133,764	230,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Tinas Coma Reservoir	176,152	176,152	176,152	176,152
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>133,957</b>	<b>133,920</b>	<b>133,782</b>	<b>130,557</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Tinas Coma Reservoir	230,000	230,000	230,000	230,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>101,461</b>	<b>100,359</b>	<b>96,236</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU.
3. Available source is assumed to be the Tinas Coma Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in Tinas Coma Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 1,000 gpm x 1 hours for single family and duplex construction within the UGA.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~407 ft) in the 506 HGL Zone.
12. Maximum ERUs supported by Available Storage.

<b>Evaluation of Storage Adequacy for the Eaglemont (560' HGL), Central Mount Vernon (420' HGL) and 356B Skagit Highland (356' HGL) Zones</b>				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
<b>Projected ERUs and Demand<sup>(1)</sup></b>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	3,028	3,151	3,609	9,043
Average Day Demand (gpd)	485,419	505,040	578,481	1,449,574
Maximum Day Demand (gpd)	839,775	873,719	1,000,773	2,507,762
<b>Available Source (gpd)</b>				
Fir/Waugh Booster Station (1500 gpm) <sup>(3)</sup>	1,620,000	1,620,000	1,620,000	1,620,000
<b>Multi-Source Credit (gpd)<sup>(4)</sup></b>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	1,034,483	1,034,483	1,034,483	1,034,483
Equalizing Storage (gal) <sup>(6)</sup>	41,989	43,686	50,039	258,410
Standby Storage (gal) <sup>(7)</sup>	1,211,262	1,260,221	1,443,479	3,617,107
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	1,076,472	1,078,169	1,084,522	1,292,893
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	2,377,734	2,428,390	2,618,000	5,000,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Eaglemont Reservoir	4,105,040	4,105,040	4,105,040	4,105,040
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>				
	<b>3,028,568</b>	<b>3,026,871</b>	<b>3,020,518</b>	<b>2,812,147</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Eaglemont Reservoir	5,000,000	5,000,000	5,000,000	5,000,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>				
	<b>2,622,266</b>	<b>2,571,610</b>	<b>2,382,000</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
3. Available source is assumed to be the Fir/Waugh Booster Station. The 420' and 356' zones are served by PRVs from the 560' zone.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in the Eaglemont Reservoir.
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD].  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction within the UGA.
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the Eaglemont Zone. Based on water meter GPs data, the highest meter elevation in the 560 zone is 549.5 feet at 5219 Eaglemont Drive, P# 042154710
12. Maximum ERUs supported by Available Storage.

<b>Evaluation of Storage Adequacy for the Cascade Ridge 2 Zone (592' HGL)</b>				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	37	39	45	2
Average Day Demand (gpd)	6,000	6,243	7,151	277
Maximum Day Demand (gpd)	10,380	10,800	12,370	478
Available Source (gpd)				
Cascade Ridge #2 Booster Station (200 gpm) <sup>(3)</sup>	216,000	216,000	216,000	216,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	4,286	4,286	4,286	4,286
Equalizing Storage (gal) <sup>(6)</sup>	519	540	619	24
Standby Storage (gal) <sup>(7)</sup>	14,972	15,577	17,843	690
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	4,805	4,826	4,905	4,310
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	34,777	35,403	37,747	20,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #2	20,000	20,000	20,000	20,000
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>15,195</b>	<b>15,174</b>	<b>15,095</b>	<b>15,690</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #2	20,000	20,000	20,000	20,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(14,777)</b>	<b>(15,403)</b>	<b>(17,747)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
3. Available source is assumed to be the Cascade Ridge #2 Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on storage tank level when pump turns on, for the Cascade Ridge #2 Reservoir this is a level of 11 feet
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
 (C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
 (N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~507 ft) in the 592 Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Eagle's Nest Zone (645' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	193	218	250	728
Average Day Demand (gpd)	31,000	35,000	40,000	116,728
Maximum Day Demand (gpd)	200,000	210,000	230,000	201,940
Available Source (gpd)				
Eagle's Nest Booster Station (150 gpm) <sup>(3)</sup>	216,000	216,000	216,000	216,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	87,077	87,077	87,077	87,077
Equalizing Storage (gal) <sup>(6)</sup>	10,000	10,500	11,500	20,356
Standby Storage (gal) <sup>(7)</sup>	77,354	87,335	99,812	291,271
Fire Flow Storage (gal) <sup>(8)</sup>	90,000	90,000	90,000	90,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	97,077	97,577	98,577	107,433
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	264,431	274,912	288,389	488,704
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Eagle's Nest Standpipe	280,804	280,804	280,804	280,804
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>183,727</b>	<b>183,227</b>	<b>182,227</b>	<b>173,371</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Eagle's Nest Standpipe	488,704	488,704	488,704	488,704
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>224,273</b>	<b>213,792</b>	<b>200,315</b>	<b>0</b>

Notes:

- Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
- Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
- Available source is assumed to be the Eagle's Nest Booster Station and is assumed to be running 18 hours per day.
- Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
- Required operational storage is based on an assumed 3 feet of water in the Eagle's Nest Standpipe
- Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
- Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
- Required fire flow storage = 1,500 gpm x 1 hours for commercial, industrial and multi-family construction within the UGA.
- Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
- Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~ 545 ft) in the 645 HGL Zone.
- Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Lake 16 Zone (684' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	57	59	68	81
Average Day Demand (gpd)	9,151	9,521	10,906	12,961
Maximum Day Demand (gpd)	15,832	16,471	18,867	22,422
Available Source (gpd)				
Lake 16 Booster Station (100 gpm) <sup>(3)</sup>	108,000	108,000	108,000	108,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	11,538	11,538	11,538	11,538
Equalizing Storage (gal) <sup>(6)</sup>	792	824	943	1,121
Standby Storage (gal) <sup>(7)</sup>	22,835	23,758	27,213	32,341
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	12,330	12,362	12,481	12,659
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	50,164	51,119	54,694	60,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Lake 16 Standpipe	54,426	54,426	54,426	54,426
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>42,096</b>	<b>42,064</b>	<b>41,945</b>	<b>41,767</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Lake 16 Standpipe	60,000	60,000	60,000	60,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>9,836</b>	<b>8,881</b>	<b>5,306</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
3. Available source is assumed to be the Lake 16 Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on an assumed 3 feet of water in the Lake 16 Standpipe
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  
 $PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$   
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~ 568 ft) in the 684 HGL Zone.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Panorama Zone (705' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	42	44	50	(66)
Average Day Demand (gpd)	6,762	7,035	8,058	(10,635)
Maximum Day Demand (gpd)	11,698	12,171	13,941	(18,399)
Available Source (gpd)				
Finished Water Pumps at WTP <sup>(3)</sup>	21,600	21,600	21,600	21,600
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	11,538	11,538	11,538	11,538
Equalizing Storage (gal) <sup>(6)</sup>	4,219	4,342	4,803	0
Standby Storage (gal) <sup>(7)</sup>	16,873	17,555	20,108	(26,538)
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	15,757	15,880	16,341	11,538
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	47,630	48,435	51,448	0
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
	0	0	0	0
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>(15,757)</b>	<b>(15,880)</b>	<b>(16,341)</b>	<b>(11,538)</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
	0	0	0	0
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(47,630)</b>	<b>(48,435)</b>	<b>(51,448)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
3. Available source are the finished water pumps at the WTP.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is assumed based on number of customers in this zone
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  

$$PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer in the 705 HGL Zone. In this case, there is no existing storage.
12. Maximum ERUs supported by Available Storage.

Evaluation of Storage Adequacy for the Cascade Ridge 3 Zone (858' and 720' HGL)				
	Year			
	2014	2019	2033	Max <sup>(12)</sup>
Projected ERUs and Demand <sup>(1)</sup>				
Equivalent Residential Units (ERU's) <sup>(2)</sup>	41	43	49	18
Average Day Demand (gpd)	6,588	6,855	7,851	2,905
Maximum Day Demand (gpd)	11,398	11,858	13,583	5,026
Available Source (gpd)				
Cascade Ridge #3 Booster Station (200 gpm) <sup>(3)</sup>	216,000	216,000	216,000	216,000
Multi-Source Credit (gpd) <sup>(4)</sup>				
<b>Required Storage Components</b>				
Operational Storage (gal) <sup>(5)</sup>	7,500	7,500	7,500	7,500
Equalizing Storage (gal) <sup>(6)</sup>	570	593	679	251
Standby Storage (gal) <sup>(7)</sup>	16,440	17,104	19,592	7,249
Fire Flow Storage (gal) <sup>(8)</sup>	15,000	15,000	15,000	15,000
<b>Required Storage Criteria</b>				
Greater than 30 psi at highest meter (gal) <sup>(9)</sup>	8,070	8,093	8,179	7,751
Greater than 20 psi at highest meter (gal) <sup>(10)</sup>	39,510	40,197	42,771	30,000
<b>Existing Storage Greater Than 30 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #3	0	0	0	0
<b>Storage Surplus/(Deficiency) at 30 psi (gal)</b>	<b>(8,070)</b>	<b>(8,093)</b>	<b>(8,179)</b>	<b>(7,751)</b>
<b>Existing Storage Greater Than 20 psi (gal)<sup>(11)</sup></b>				
Cascade Ridge Reservoir #3	30,000	30,000	30,000	30,000
<b>Storage Surplus/(Deficiency) at 20 psi (gal)</b>	<b>(9,510)</b>	<b>(10,197)</b>	<b>(12,771)</b>	<b>0</b>

Notes:

1. Projected demands as presented in Chapter 4. ERUs calculated as Average Day Demand / ERU water use factor (160 gpd/ERU).
2. Number of ERUs are based on Average Day Demand divided by 160 gpd per ERU
3. Available source is assumed to be the Cascade Ridge #3 Booster Station, and is assumed to be running 18 hours per day.
4. Multi source credit calculation assumed largest source is off-line. No credit in this scenario.
5. Required operational storage is based on storage tank level when pump turns on, for the Cascade Ridge #3 Reservoir this is a level of 10.5 feet
6. Required equalization storage is the greater of either [(PHD - Total Available Source) \* 150 minutes] or [5% of MDD]  

$$PHD : (\text{Maximum Day Demand per ERU} / 1440) * [(C) * (N) + F] + 18$$
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)  
(N is the number of ERUs)
7. Required standby storage for existing source = greater of (2\*ADD - Multi source credit) or 200 gallons per day per ERU. PUD has a goal of 2\*MDD per ERU, equivalent to 600 gallons per ERU.
8. Required fire flow storage = 500 gpm x 30 minutes for outside of the UGA and 1 lot per 2.5 acres or less
9. Total required storage greater than 30 psi is equal to the total of operational and equalizing storage
10. Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
11. The storage volume available in existing reservoirs at 30 and 20 psi is calculated based on the elevation of the highest customer (~789 ft) in the 858/790 Zone.
12. Maximum ERUs supported by Available Storage.