

# HOLLISTER URBAN AREA WATER AND WASTEWATER MASTER PLAN

## APPENDIX D - PROJECTED WATER DEMANDS

---

### Study Area and Planning Assumptions

Demand projections are required for the Hollister Urban Area Water and Wastewater Master Plan (project) to identify urban water supply needs and wastewater flows for the planning horizon of 2023. Future water demands were developed based on the planned land uses identified in the recently adopted City of Hollister (City) General Plan (December 2005) and the County of San Benito's (County) General Plan (most recent land use designations provided in 2006). The spatially developed water demands will also be used in the combined City and Sunnyslope County Water District (Sunnyslope) water distribution model for future conditions.

### Study Area and Other Boundaries

The study area for the project was developed by the City, County, and San Benito County Water District (District) based on lands planned for urban development which may require municipal and industrial (M&I) water service and wastewater collection and treatment services in the future. The study area is shown on **Figure 1**.

**Figure 1** also identifies the City's Planning Area boundary used in the general plan update. The planning area is similar to but more extensive than the Sphere of Influence boundary adopted by the San Benito County Local Agency Formation Commission. Lands within the City planning area have a land use designation assigned by the City. The City designations were used for this analysis instead of the County land use designations even though these lands have not yet been annexed to the City. The City land use designations indicate how the City wants lands, which will eventually be annexed, to develop. The study area includes lands that may be served in the future by either the City, Sunnyslope, or to be determined.

There are also lands outside of both the City planning area and Sunnyslope's service area east of Fairview Road. These lands designated for 1 dwelling unit per acre (du/ac) may be served treated water by Sunnyslope or the City sometime in the future but are tracked separately as a County water service area for this analysis.



## Methodology

The City, Sunnyslope, and District jointly developed the 2005 Urban Water Management Plan (UWMP) Update which provided water demand projections. However, these projections were based on population projections and are not directly associated with the general plan land uses.

The approach used to determine future water demands relies on the identification of planned future land uses which have treated water demands and the application of a water use factor, or land use unit demand, to these lands. The future demands were added to the existing (2005) demands to determine 2023 demands and interim demands.

Land use designations and densities were identified by the individual City and County general plans for vacant parcels of at least one acre, within the study area. The timing of development of these vacant lands was identified by the Planning Departments of the City and County in five year increments, with adjustments made to account for residential growth limitations and the existing building moratorium (discussed later). Demands were developed for 2023 conditions - the analysis buildout date of the City's recent general plan. However, due to the extensive availability of developable land within the study area, and the City and County growth limitations, a significant portion of the water demands will not be realized by 2023. These buildout demands were identified but do not have an associated time frame.

Use of the general plan land uses and the City's planning area boundary for future demands was a critical aspect of this analysis because the general plans reflect the two land use agencies' adopted plans and policies. In addition, the general plans have gone through public review and the environmental documentation processes.

Land use unit demands for residential land uses were calculated by Sunnyslope based on existing consumption patterns of lands which were recently developed or otherwise represent future water demand characteristics for those land use designations. Unit demands for non-residential land uses were derived from other water purveyor data with similar types of commercial and industrial uses and weather patterns. Adjustments were made to all unit demands to reflect the various allowable densities and uses, potential conservation savings, and unaccounted for water estimates. A rough estimate of water demands associated with future infill, reuse, and increased densities was added to account for limited changes to existing demands by 2023.

## Land Uses

### Vacant Lands

Aerial photographs were reviewed to determine vacant, developable parcels approximately greater than one acre within the study area. These areas, or polygons, were mapped into a geographic information system (GIS) land use layer. Land use designations indicated in the

relevant City or County general plans were identified. These land use designations do not necessarily resemble the City and Sunnyslope billing classifications; there are fewer billing classifications.

The GIS maps developed from this information were presented to the City and County planning staff for confirmation of land use designations, vacant and developable status, and timing of development. The land use categories are presented in **Table 1** along with the calculated acreages of these vacant lands by assigned general plan designations. The land use designations are also shown on **Figure 1**. A GIS database with this information also indicates the future water service provider.

**Table 1. Future Land Use Inventory**

General Plan Land Use	Allowable Density	Phasing of Development	Future Water Service Provider	Acreage
<b>Hollister Planning Area</b>				
Rural Residential	1du/5ac	2018	Hollister	107
Rural Residential	1du/5ac	2023	Sunnyslope	41
Rural Residential	1du/5ac	Buildout	Hollister	315
Rural Residential	1du/5ac	Buildout	Sunnyslope	750
Low Density Residential	1-8 du/ac	2013	Hollister	9
Low Density Residential	1-8 du/ac	2013	Sunnyslope	145
Low Density Residential	1-8 du/ac	2018	Sunnyslope	12
Low Density Residential	1-8 du/ac	2018	Hollister	92
Low Density Residential	1-8 du/ac	2018	Sunnyslope	38
Low Density Residential	1-8 du/ac	2023	Hollister	115
Low Density Residential	1-8 du/ac	2023	Sunnyslope	42
Low Density Residential	1-8 du/ac	Buildout	Sunnyslope	323
Low Density Residential	1-8 du/ac	Buildout	Hollister	552
Medium Density Residential	8-12 du/ac	2013	Sunnyslope	31
Medium Density Residential	8-12 du/ac	Buildout	Sunnyslope	68
Medium Density Residential	8-12 du/ac	Buildout	Hollister	112
High Density Residential	12-35 du/ac	2013	Hollister	8
High Density Residential	12-35 du/ac	2018	Hollister	4
High Density Residential	12-35 du/ac	Buildout	Hollister	201
West Gateway	20-35 du/ac	2018	Hollister	15
West Gateway	20-35 du/ac	2023	Hollister	11
<b>Table 1. Future Land Use Inventory (continued)</b>				
West Gateway	20-35 du/ac	Buildout	Hollister	13

General Plan Land Use	Allowable Density	Phasing of Development	Future Water Service Provider	Acreage
Mixed Use	25-45 du/ac	2013	Hollister	3
Mixed Use	25-45 du/ac	2013	Sunnyslope	8
Mixed Use	25-45 du/ac	Buildout	Sunnyslope	53
Mixed Use	25-45 du/ac	Buildout	Hollister	49
Public		2013	Sunnyslope	2
Public		2018	Hollister	47
Public		2023	Sunnyslope	8
General Commercial		2013	Hollister	26
General Commercial		2018	Hollister	10
N Gateway Commercial		2013	Hollister	78
N Gateway Commercial		2018	Hollister	82
N Gateway Commercial		2023	Hollister	69
Industrial/Airport Support		2013	Hollister	62
Industrial/Airport Support		2018	Hollister	108
Industrial		2013	Hollister	69
Industrial		2018	Hollister	366
Industrial		2023	Hollister	710
Industrial		Buildout	Hollister	274
<b>Total Acres</b>				<b>5029</b>
<b>San Benito County General Plan</b>				
SBC-Agricultural Productive	1du/5ac	2023	County	265
SBC-Agricultural Productive	1du/5ac	Buildout	County	770
SBC-Rural	1du/5ac	2023	County	113
SBC-Rural	1du/5ac	2023	Sunnyslope	7
SBC-Rural	1du/5ac	Buildout	County	76
SBC-Rural/Urban	4-12du/ac	2013	Sunnyslope	24
SBC-Rural/Urban	4-12du/ac	2018	Sunnyslope	31
<b>Total Acres</b>				<b>1286</b>
			<b>Total Future Urban Acres:</b>	<b>6315</b>



## Phasing of Future Development

**Interim Planning Periods.** Phasing of the development of future land uses was determined by management and staff from the City and County planning departments. Phasing for all future land uses was identified with the following development horizons.

- ◆ Phase 1: 2005 through 2013
- ◆ Phase 2: 2014 through 2018
- ◆ Phase 3: 2019 through 2023
- ◆ Buildout: after 2023; no specific year identified

**Wastewater Moratorium.** Phase 1 begins around 2008 for lands located within the City due to the building moratorium resulting from the Cease and Desist Order No. R3-2002-0105 issued by the California Regional Water Quality Control Board in 2002. When additional capacity is available in the City's wastewater treatment and disposal facilities early in 2008, the moratorium can be lifted and the constraint to growth would then be the City's residential growth management restrictions.

**City Growth Ordinance.** Phasing of development was reviewed against the growth limitations specified in City Growth Management Ordinance 959. The City ordinance restricts residential growth to 244 dwelling units per year until 2012 (or within 5 years after the moratorium is lifted, whichever is sooner). The City tracks the number of units which can be developed when the moratorium is lifted, which include units held in reserve.

The phasing of development of City residential lands was then reviewed assuming that units developed reflect the new construction allowed to begin in early 2008. It was assumed that the growth cap would remain in place after its expiration date. The phased residential lands were significantly overestimated for development, particularly between 2018 and 2023. Lands in the phased land use inventory were moved out of the initial phases and delayed until after 2023 to reflect the allowable units.

**County Growth Ordinance.** The County Growth Management Ordinance 751 restricts population growth to 1 percent per year for the entire county (outside of the cities of Hollister and San Juan Bastista). With a 2005 population of 18,700 for the unincorporated areas (Draft 2005 UWMP, September 1, 2005), about 185 residents can be added to the County in 2006. Assuming 2.739 people per household (pph) for unincorporated lands (State Department of Finance estimated used in the Draft 2005 UWMP), 68 housing units can be approved without an exemption from the Board of Supervisors. This analysis assumed that up to 85 percent of the allowable new units or population would be realized on county lands within the study area in 2006, gradually increasing to 2023. This results in up to 157 new people in 2006 (58 new dwelling units), and 188 new people in 2023 (69 new dwelling units). The developable County lands within the project study area are outside of the City planning area. Therefore, they are not subject to the City's wastewater moratorium.

An analysis was conducted on the phased land use inventory within the study area for conformance with the County growth limitation. The County average people per household (2.739 pph) was applied to an estimated number of dwelling units based on the phased acreages. The 2013 and 2018 populations based on the phasing of growth for the land use inventory were slightly under the allowable ordinance limit. However, the 2023 estimate was significantly underestimated versus the allowable limit (again assuming that 85 percent of the growth in the County occurs in the study area). Therefore, 220 acres of developable land initially designated for development sometime after 2023 was included in the 2023 inventory to reflect more realistic development conditions.

This resulted in an increase in population at 2013 of 131 for the study area. At 2018, the annual increase in population is 170. At 2023, the annual increase in population is 186. **Table 1 and Figure 1** present the approximate timing of development of the vacant lands in both the City and County.

## Land Use Unit Demands

Sunnyslope identified existing residential, park, and school uses within their service areas which represent land use categories for new development. Billing records for these representative lands were reviewed and consumption data compiled for a two-year period. The gross acreages for the representative lands were calculated. The consumption data were then averaged by Sunnyslope on an annual acre-foot per gross acre basis for each land use category.

Billing records from recent developments were used wherever possible because the allowable general plan residential densities and recent developments are typically higher densities than historical development. Adjustments were made to the initial single family residential land use unit demands if the unit demands based on representative lands were not at the same density as that allowed under the general plans. Recent developments also typically require more water for landscaping for the first few years; this was taken into account in reviewing the unit demands. The unit demands were adjusted to reflect a density of 80 percent of the upper range of allowable dwelling units per acre for each category to account for site constraints. The exception was rural lands with a density of 1 dwelling unit per 5 acres. These were assumed to develop at 100 percent of allowable density. Due to the lack of data specific to City consumption patterns, these unit demands were also utilized for new development within the City's service area.

Industrial and commercial unit demands based on billing records for other communities were adjusted to reflect water consumption typically found within the different types of industrial and commercial lands found in the study area. For example, lands designated as Airport Support will likely have lower water demands per acre than other industrial lands with more employees per acre. This is due to airport related services having large land requirements for airplane maintenance, sales, flight schools, etc. The resulting land use unit demands used for both the City and Sunnyslope's service areas are presented in **Table 2**.

**Table 2. Land Use Unit Factors**

Land Use Designation	Density	Initial Unit Demand (af/ac/yr)	Final Unit Demand (1)
Rural Residential	1du/5ac	0.9	0.93
SBC-Agricultural Productive	1du/5ac	0.9	0.91
SBC-Rural	1du/5ac	0.9	0.91
Low Density Residential	1-8 du/ac	2.1	2.16
SBC-Rural/Urban	4-12du/ac	3.9	4.02
Medium Density Residential	8-12 du/ac	3.9	4.02
High Density Residential	12-35 du/ac	9.0	9.27
West Gateway	20-35 du/ac	9.0	9.27
Mixed Use	25-45 du/ac	11.8	12.15
Public		2.5	2.43
General Commercial		2.1	2.04
N Gateway Commercial		2.5	2.43
Industrial/Airport Support		0.7	0.68
Industrial		2.1	2.04

(1) Adjustments:			
Unaccounted For Water = 11% minus 4% conservation		1.07	
Residential Conservation = 4%		1.03	inc. UAW
Nonresidential Conservation = 10%		0.97	inc. UAW

## Projected Water Demands

The future land use polygons were tabulated by acreage, as discussed above, and land use unit demands were applied to determine the initial demands. Adjustments were made to the initial demands to reflect conservation, unaccounted for water, and increased densities of existing urban areas.

### Conservation

The future average annual water demands in the study area will be affected by the conservation program established by the Water Resources Association of San Benito County, of which the water purveyors are members. Based on the current conservation goals described in the 2000



UWMP, about 990 acre-feet per year (afy) is anticipated to be saved through residential conservation efforts by the year 2009 (6 percent of projected 2010 residential demands). About four percent of the system losses are anticipated to be saved through leak detection and system-wide water audits. An additional 10 percent of the large landscaping and commercial and industrial demands are anticipated to be saved through conservation efforts.

This analysis applied these conservation savings to the respective land use unit demands, thus assuming that the same percentage savings can be realized by 2013. The four percent system loss estimate was applied to the unaccounted-for water estimate discussed below.

## Unaccounted For Water

Total City consumption data were compared with production data to determine the unaccounted-for-water (UAW) estimate. The UAW represents system losses including distribution system leaks, unmetered hydrant use, main flushing, and other unmetered water usage. For 2003 and 2004, the total consumption for the City was 1,201 million gallons (mgal) each year; production was 1,355 mgal, resulting in an approximate UAW estimate of 11 percent. The City estimate was applied to Sunnyslope demands also. It is difficult to estimate UAW of the study area with any accuracy because the City and Sunnyslope systems are interconnected. However, this estimate of 11 percent for the combined systems is reasonable and typical for California water systems of this age.

The UAW percentages have a tendency to increase as system facilities age if an aggressive renewal and replacement program is not implemented. However, the UAW for 2023 demands was not adjusted to reflect this. Instead, the UAW estimate applied to the unit demands to account for system losses, was reduced from 11 percent to seven percent to reflect the four percent savings associated with system loss conservation measures discussed above under conservation.

## Adjustments Made for Intensification of Urbanized Lands

Based on a review of the existing land uses and the development potential identified in the City's general plan, adjustments were made to the demands to account for the intensification of urban lands and the inclusion of low income and other special housing needs which are exempt from the City growth cap. A two percent increase over existing City and Sunnyslope demands was incorporated into the future demands analysis for 2023. This reflects an intensification of urbanized lands due to the development of small parcels not included in the land use inventory, minor general plan amendments, intensification of existing areas such as the downtown commercial and mixed use areas, as allowed under the general plan, and the development of special needs residential lands excluded from the growth caps.

An example of this intensification effect is the future Highway 25 Bypass. The bypass will likely result in some intensification of uses along the new route on lands currently experiencing

low density industrial type uses. The two percent increase in existing demands is about 140 afy which was applied to 2023 demands. It is anticipated that the increase in demands associated with intensification will be significantly greater after 2023 as the planning area builds out and infill of small and underutilized lands become more cost effective to develop. An analysis of infill after 2023 was not conducted here.

### Resulting Future Demands

The projected incremental demands to the year 2023 are presented in **Table 3** by service provider. For lands not presently in the City planning area or Sunnyslope service area, the lands were assigned to the County. The total year 2023 demands were projected to average 10,526 acre-feet (9.4 million gallons per day or mgd). Buildout demands are 16,300 afy or 14.5 mgd.

This analysis of demands provides an estimate of the potential future demands based on today’s conditions within the study area. These projections are considered reasonable and prudent demands for water system and supply planning purposes. A potential decrease in the demands may result from a more aggressive conservation program for the study area. Conversely, a potential increase in demands may result due to increased system losses if an aggressive renewal and replacement program for distribution system pipelines is not implemented.

**Table 3. Future Water Demands**

Water Service Provider	Water Demands (afy)				
	2005	2013	2018	2023	Buildout
<b>2005 Existing Demands</b>	7,965	7,965	7,965	7,965	7,965
<b>City of Hollister</b>		555	1,626	1,964	5,073
<b>Sunnyslope County Water District</b>		637	233	155	2,367
<b>County Lands (1)</b>				302	752
<b>Intensification Adjustment</b>				140	140
<b>TOTAL DEMANDS</b>	<b>7,965</b>	<b>9,157</b>	<b>9,824</b>	<b>10,526</b>	<b>16,297</b>
(1) Demands from lands outside of City Planning Area and SSCWD Service Area					

## Demand Patterns

Facilities planning is based on maximum day demands and peak hour demands. The variations in future water demands during peak summer days as well as throughout the day were assumed to remain similar to existing patterns. The hourly patterns of usage are not anticipated to change significantly between now and 2023 because of the relatively low residential conservation savings goal. This conservative approach to facilities sizing ensures that future facilities are adequately sized to meet future demands. However, because the existing outdoor residential water use for the City is about 50 percent of the total residential use and 66 percent associated with outdoor use for Sunnyslope, a greater percent savings may be realized in the future which may impact peaking factors.

Data provided by the City were used to determine the maximum day demand (MDD) peaking factor for the City system. The average day well production is 2.63 mgd. The average day Lessalt water treatment plant (WTP) production is 0.86 mgd (50 percent of total Lessalt average production), resulting in total average day demands (ADD) of 3.49 mgd. Assuming the Lessalt WTP is operating at full capacity (2.1 mgd) under maximum day conditions, 50 percent or 1.05 mgd is added to the City's maximum day well production of 7.0 mgd. This results in a MDD of 8.05 mgd. The maximum day to average day ratio is therefore 2.3.

The resulting 2023 average day demands presented above are 9.4 mgd. Using a maximum day to average day factor of 2.3, results in maximum day demands at 2023 of 22 mgd.

**Table 3. Future Water Demands**

Water Service Provider	Water Demands (afy)				
	2005	2013	2018	2023	Buildout
<b>2005 Existing Demands</b>	7,965	7,965	7,965	7,965	7,965
<b>City of Hollister</b>		555	1,626	1,964	5,073
<b>Sunnyslope County Water District</b>		637	233	155	2,367
<b>County Lands (1)</b>				302	752
<b>Intensification Adjustment</b>				140	140
<b>TOTAL DEMANDS</b>	<b>7,965</b>	<b>9,157</b>	<b>9,824</b>	<b>10,526</b>	<b>16,297</b>
(1) Demands from lands outside of City Planning Area and SSCWD Service Area					

## Comparison of Results with 2005 Urban Water Management Plan

The projected demands were compared with the results of the 2005 UWMP and are presented in **Table 4**. These analyses used slightly different phases. The UWMP demands for interim points in time were calculated for comparison with the Master Plan projections. The results indicate that the UWMP demands are about 300 to 400 afy lower than the Master Plan – an insignificant difference ranging from three to four percent.

**Table 4. Comparison of Projected Water Demands (afy)**

Water Demands (afy)						
	2005	2013	2018	2023	2030	Buildout
<b>HUAWWMP</b>	7,965	9,157	9,824	10,526		16,297
<b>2005 UWMP</b>	7,965	8,853	9,527	10,092	11,037	
<b>Difference</b>		304	297	434		

**Attachment A**  
**Hollister Urban Area Water and Wastewater Master Plan**  
**Conservation Analysis**  
**14-Jun-06**

<b>Total Demands - Lower Level of Conservation</b>					
	<b>2005</b>	<b>2013</b>	<b>2018</b>	<b>2023</b>	<b>BO</b>
<b>Demands before Conservation</b>	7965	9286	11356	12775	21914
Existing Res	5576	5144	5144	5144	5144
Existing Non-Res	2390	2065	2065	2065	2065
<b>Existing Total</b>		<b>7209</b>	<b>7209</b>	<b>7209</b>	<b>7209</b>
Projected Res		748	1476	2081	8821
Projected Non-Res		425	1610	2550	4119
<b>Projected Total</b>		<b>1173</b>	<b>3086</b>	<b>4631</b>	<b>12939</b>
<b>Total Demands</b>		<b>8381</b>	<b>10294</b>	<b>11840</b>	<b>20148</b>
Conservation Savings		10%	9%	7%	8%

Conservation estimates based on 2000 UWMP:  
4% reduction for UFW savings for existing and projected demands (UWMP).  
10% reduction of existing and projected nonresidential demands (UWMP).  
6% reduction for projected residential demands (derived from UWMP).  
417af reduction for existing residential at 2013 and 2018 (85% of UWMP estimate of 490af at 2010).

<b>Total Demands - Higher Level of Conservation</b>					
	<b>2005</b>	<b>2013</b>	<b>2018</b>	<b>2023</b>	<b>BO</b>
<b>Demands before Conservation</b>	7965	9286	11356	12775	21914
Existing Res	5576	5085	4831	4589	4589
Existing Non-Res	2390	2065	2065	2065	2065
<b>Existing Total</b>		<b>7149</b>	<b>6895</b>	<b>6654</b>	<b>6654</b>
Projected Res		597	1139	1588	6936
Projected Non-Res		425	1610	2550	4119
<b>Projected Total</b>		<b>1022</b>	<b>2750</b>	<b>4138</b>	<b>11055</b>
<b>Total Demands</b>		<b>8171</b>	<b>9645</b>	<b>10791</b>	<b>17709</b>
Conservation Savings		12%	15%	16%	19%

Conservation estimates based on GMP, 2000 UWMP, and more aggressive residential assumptions:  
4% reduction for UFW savings for existing and projected demands (UWMP).  
10% reduction of existing and projected nonresidential demands (UWMP).  
25% reduction of projected residential demands (more aggressive savings assumption).  
Assuming residential remains at 70% of total demands, the 2005 demands were reduced by 1%/yr until 2023 (GMP).