Hollister Urban Area Water and Wastewater Master Plan

November 2008

City of Hollister
San Benito County
San Benito County Water District
Sunnyslope County Water District

HDR

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1.0 Introduction

This Hollister Urban Area Water and Wastewater Master Plan (Master Plan) provides a comprehensive plan and implementation program to meet the existing and future water resources needs of the Hollister Urban Area. This Master Plan was initiated through a Memorandum of Understanding (MOU) developed by the City of Hollister, San Benito County, and the San Benito County Water District (SBCWD). The technical and economic analyses completed for the development of this Master Plan are summarized in this report. References, technical memorandums, detailed analyses, and related information are included in the separately bound appendices.

1.1 Background

Northern San Benito County has a diverse and complex water supply composed of imported surface water from San Luis Reservoir, a substantial groundwater basin, numerous river and creek channels for groundwater recharge, and significant opportunities for water recycling. Since 2002, wastewater treatment and disposal have become a constraint to development of the Hollister Urban Area due to a sewer growth moratorium. In addition, improved water supply quality and reliability are required for the long-term economic growth of the area. Numerous previous and ongoing studies support the facilities plans, analyses, and recommendations described in this Master Plan.

1.1.1 Existing Conditions

The Hollister Urban Area is located in San Benito County, California, approximately 50 miles southeast of the City of San Jose and 40 miles east of Monterey Bay as shown in Figure 1-1. The Hollister Urban Area includes the City of Hollister and adjacent unincorporated areas of San Benito County designated for urban development.

Due to its unique climate, fertile soils, and water supplies, agriculture is the county's largest industry. According to the county Agricultural Commissioner's Annual Report for 2007, the gross value of agricultural production was over $293 million. The top five crops in 2007 were lettuce (salad), nursery stock, miscellaneous vegetable and row crops, grapes (wine), and bell peppers. Typical irrigation of row crops is shown in Photograph 1-1.

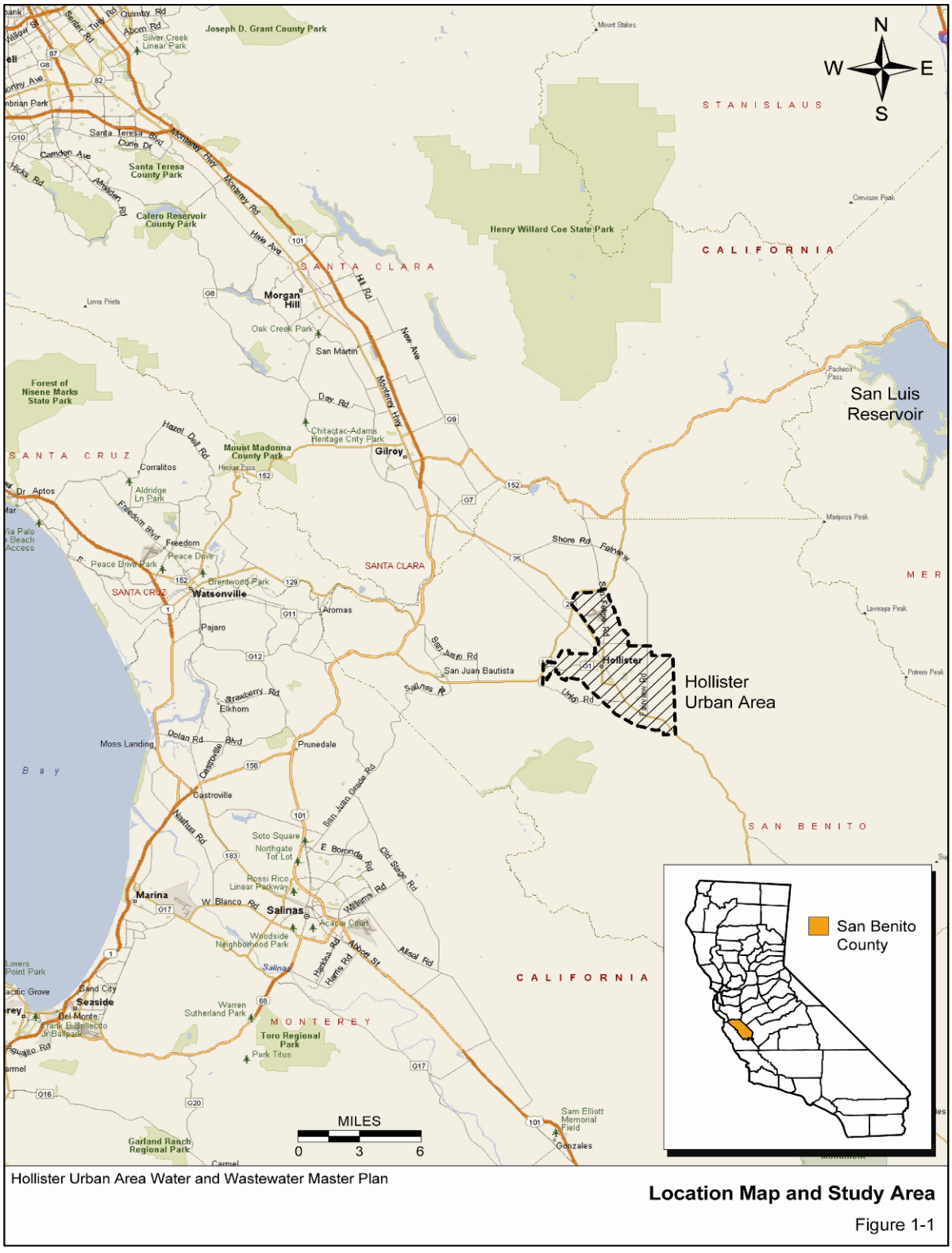


Figure 1-1: Location Map

Photograph 1-1: San Benito County Row Crop Irrigation

According to the City of Hollister General Plan (December, 2005), San Benito County was the fastest growing county in California during the 1990s, with the majority of that growth concentrated in the City of Hollister. With the proximity of the City of San Jose and Silicon Valley, the area is increasingly becoming a bedroom community for commuters. Currently, approximately one-half of residents commute to areas outside San Benito County.

1.1.2 Previous and Ongoing Studies

Numerous studies and reports have been prepared regarding water supply, wastewater treatment and disposal, and recycled water in the Hollister Urban Area. To avoid duplication of effort and provide consistency with ongoing plans and programs, pertinent previous studies have been used in the development of this Master Plan, as appropriate. Some of the key previous and ongoing studies which form the basis for this Master Plan are as follows:

- Groundwater Management Plan Update for the San Benito County Part of the Gilroy-Hollister Groundwater Basin (July 2003)
- Urban Water Management Plan Update (Final Draft, June 2008)
- City of Hollister Long-term Wastewater Management Plan for the Domestic Wastewater Treatment Plant and the Industrial Wastewater Treatment Plant (Draft, March 2007)
- Sunnyslope County Water District Long-term Wastewater Management Plan (January 2006)

- San Benito County Regional Recycled Water Project Feasibility Study (May 2005)
- Recycled Water Feasibility Study Update (Draft, March 2008)
- Pajaro River Watershed Integrated Water Resources Management Plan (In progress)

Pertinent information from these studies is summarized in Chapters 4 and 6, along with descriptions of how these studies impacted or contributed to this Master Plan. A complete list of previous studies and other references and sources of data are included in Appendix A.

1.1.3 Memorandum of Understanding

A partnership was formed between the City of Hollister, San Benito County, SBCWD, and SSCWD (hereafter referred to as the MOU Parties) to undertake the development of this Master Plan for the Hollister Urban Area. The City, County and SBCWD executed a Statement of Intent and a MOU in 2004 to initiate of this effort. The MOU was subsequently amended in 2008 to include SSCWD. The Statement of Intent, MOU, and MOU amendment are included in Appendix B.

The MOU describes the principles, objectives, and assumptions that will form the basis of this Master Plan, focusing on the following goals:

- Improve municipal, industrial, and recycled water quality
- Increase the reliability of the water supply
- Coordinate infrastructure improvements for water and wastewater systems
- Implement goals of the Groundwater Management Plan
- Integrate recommendations of the Long-term Wastewater Management Plans (LTWMP) with the Master Plan
- Support economic growth and development consistent with the City of Hollister and San Benito County General Plans and Policies
- Consider regional issues and solutions

The MOU also established the institutional framework for completing this Master Plan as shown in Figure 1-2.

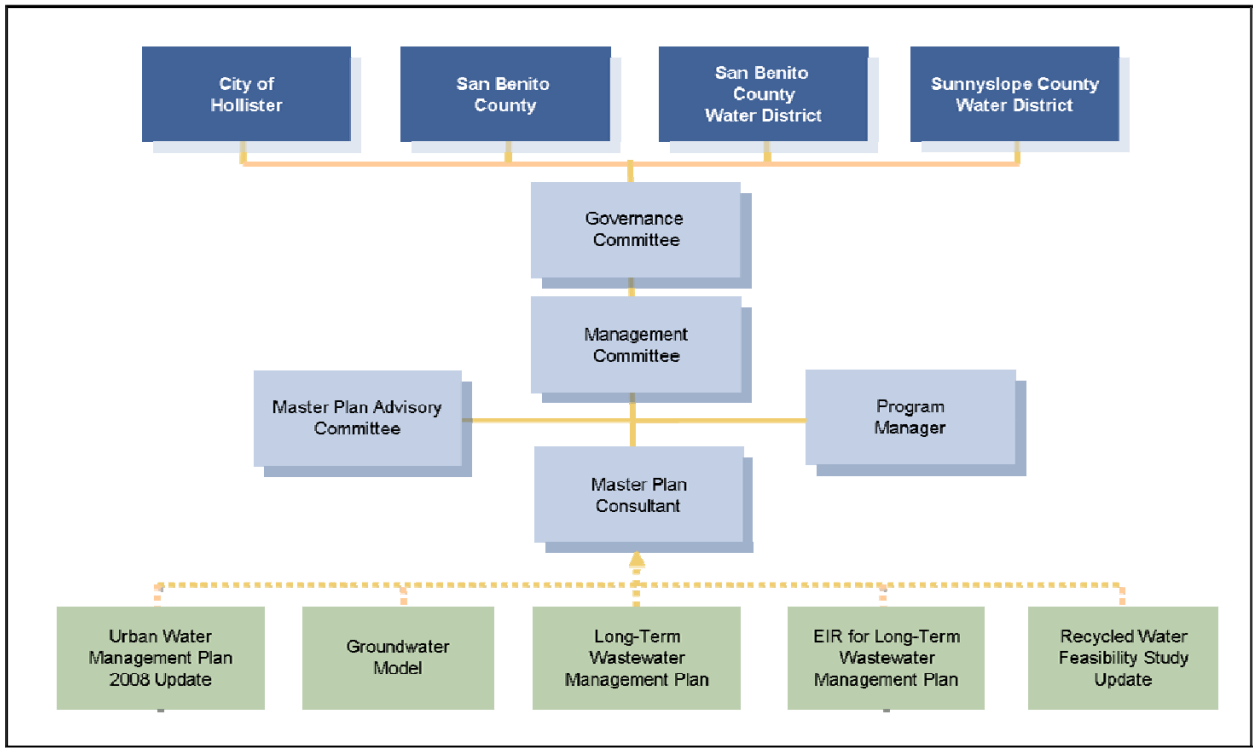


Figure 1-2: Hollister Urban Area Water and Wastewater Master Plan Organization Chart

1.2 Problem Definition

The Hollister Urban Area has a diverse and complex water supply system composed of groundwater, local rivers and creeks, imported surface water, and significant opportunities for recycled water use. Although treated drinking water meets all primary federal and state drinking water regulations, hardness and minerals in the water supply need to be reduced. The reliability of imported surface water has declined significantly and the sustainability of local supplies requires review. The high level of minerals in the treated wastewater limits both disposal and recycling options due to adverse impacts to crops and groundwater. Based on this problem definition, the water resource issues that must be addressed in the Hollister Urban Area include the following:

- Quality of drinking water and recycled water
- Reliability of water supply
- Coordination of water and wastewater system improvements

- Regional balance of water resources including high groundwater areas

Each of these water resource issues contributing to the problem definition are described in more detail in the following subsections.

1.2.1 Quality of Drinking Water and Recycled Water

Municipal and industrial water supply in the Hollister Urban Area is served by a combination of local groundwater and imported surface water from the Federal Central Valley Project (CVP). Historically, total dissolved solids (TDS) concentrations in groundwater range from 800 to 1,200 milligrams per liter (mg/L) and imported CVP surface water has TDS concentrations ranging from 250 to 300 mg/L. Historically, total hardness concentrations in the groundwater range from 100 to 480 mg/L as calcium carbonate ($CaCO_3$) and CVP sources have a hardness concentration of approximately 110 mg/L as $CaCO_3$. Although treated water meets all primary federal and state drinking water limits, hardness and minerals in the water supply need to be reduced.

TDS is usually not a health concern, but can be a taste, odor, and color concern for drinking water. At levels over 500 mg/L, TDS can cause gastrointestinal irritation to consumers not used to these levels. Excess sodium may affect those restricted to low sodium diets or those suffering from toxemia. Other concerns include scaling on sinks and fixtures, leaving white spots on cars, deposits in and corrosion of hot water heaters and pipes, and reduced effectiveness of detergent and shampoo. The buildup in water using appliances can shorten appliance life and increase costs to consumers. Preliminary estimates indicate that local groundwater supplies may reduce the life expectancy of residential appliances by up to 25 percent, as compared with a water supply having a TDS level of 500 mg/L. Other residential costs include home softeners, bottled water, and increased use of soap and detergents.

The following treated water objectives were established in the MOU to provide an improved water quality for municipal and industrial supply:

- TDS concentrations not greater than 500 mg/L
- Hardness not greater than 120 mg/L

Photograph 1-2: High Mineral Content of Groundwater Impacts Residential Customers

Significant differences between groundwater and surface water quality exist with regard to constituent concentrations such as TDS, hardness, and nitrates. One of the project objectives is to develop a long-term plan for providing a predictable supply of high quality water that meets the goals established in the MOU.

Treated wastewater effluent typically has TDS concentrations of approximately 1,200 mg/L at the City of Hollister Wastewater Treatment Plant and up to 1,800 mg/L at the two wastewater treatment plants serving the Ridgemark area of the SSCWD. This relatively high mineral content limits both disposal and recycling options due to adverse impacts to groundwater and crops. A target treated effluent TDS concentration of 500 mg/L (with a maximum limit of 700 mg/L) was established in the MOU to increase recycling and disposal opportunities.

1.2.2 Reliability of Water Supply

Imported surface water is supplied to the Hollister Urban Area from the CVP through the San Luis Reservoir, the San Felipe Division facilities, and the Hollister Conduit. As a result of over-commitments of CVP supplies and supply limitations imposed by environmental constraints, the reliability of imported CVP supplies has been reduced since surface water was first delivered to the County in 1987. For example, in critically dry years, agricultural deliveries may be reduced to less than 20 percent of contract entitlements and municipal supplies may be reduced to approximately 60 percent of contract entitlements. In multiple dry year conditions, agricultural supplies may not be available and municipal supplies may be reduced to 50 percent. Based on current trends, it is likely that the reliability of imported surface water supplies will continue to decline in the future. Therefore, a long-term plan is

required for a reliable water supply to meet projected growth defined by the City and San Benito County General Plans.

1.2.3 Coordination of Water and Wastewater System Improvements

The City of Hollister and adjacent areas have experienced significant growth over the past 15 years, up until the sewer growth moratorium was imposed in 2002. During the period from 1990 to 2002, the City experienced an average annual population growth rate of approximately 5.5 percent. This growth has resulted primarily from increasing pressure for housing for workers employed in the San Francisco Bay Area and other nearby communities.

The General Plans adopted by the City and San Benito County anticipate continued significant growth until 2023. Based on data from the California Department of Finance, the County population is projected to increase from 57,490 in 2005 to 76,901 in 2023. The water and wastewater facilities required to serve the needs projected in the General Plans must be coordinated to coincide with the timing of the new residential, commercial, and industrial development to provide the required level of service and minimize costs. The projected land use from the General Plans is shown on Exhibit I at the end of this report.

1.2.4 Regional Balance of Water Resources Including High Groundwater Areas

Groundwater pumping for agricultural irrigation began in the Hollister Valley in 1878. Since that time, groundwater levels in some areas have declined as much as 180 feet. To compensate for groundwater declines, groundwater recharge and the use of imported surface water have been implemented by the SBCWD.

The use of imported CVP surface water beginning in June 1987 has stabilized groundwater levels and, in some locations (especially the Bolsa and San Juan Subbasins), created problematic high groundwater conditions. As described in the previous subsection, the local groundwater supplies have high levels of minerals resulting in the need for numerous residential softeners. The high mineral content of the groundwater, coupled with residential softener residuals being introduced into the wastewater stream, create high levels of TDS in the wastewater and limit wastewater disposal and recycling options.

Previous analyses have concluded that the existing available water supplies are sufficient to meet projected demands over the timeframe of the current General Plans (through 2023) under

normal (non-drought) conditions. However, due to water quality, reliability, and wastewater disposal issues, a more effective balance in the use of available water supplies is required. Therefore, this Master Plan is based on an integrated approach to optimize water supply, wastewater management, and water recycling.

1.3 Objective

The objective of this Master Plan is to provide a long term vision, through 2023, of water and wastewater management actions and infrastructure improvements for management of those resources for the Hollister Urban Area. As described in the MOU, this Master Plan provides a comprehensive plan including: (1) capacity and estimated cost of physical facilities, and (2) an implementation program including institutional agreements, engineering, California Environmental Quality Act (CEQA) compliance, permitting, financing, coordination with ongoing projects and programs, stakeholder outreach, and scheduling.

1.4 Scope of Work

Detailed technical and economic analyses were completed to achieve the Master Plan objectives. The following tasks and subtasks comprise the scope of work for this Master Plan:

- Task 1: Confirm planning assumptions and establish evaluation criteria
  - Subtask 1.1: Kickoff meeting
  - Subtask 1.2: Summarize related work
  - Subtask 1.3: Problem definition
  - Subtask 1.4: Validate principles and objectives
  - Subtask 1.5: Establish evaluation criteria and methodology
  - Subtask 1.6: Summarize land use and demand projections
  - Subtask 1.7: Prepare Part 1 Technical Memorandum
- Task 2: Alternative development and evaluation
  - Subtask 2.1: Describe existing urban water resources and systems

- Subtask 2.2: Summarize existing and planned wastewater collection, treatment and disposal options
- Subtask 2.3: Develop urban water resources alternatives
- Subtask 2.4: Evaluate urban water resources alternatives
- Subtask 2.5: Prepare Part 2 Technical Memorandums

- Task 3: Develop implementation plan
  - Subtask 3.1: Describe recommended plan
  - Subtask 3.2: Finalize institutional requirements
  - Subtask 3.3: Develop preliminary financial plan
  - Subtask 3.4: Define permitting and CEQA requirements
  - Subtask 3.5: Develop implementation schedule
  - Subtask 3.6: Prepare Master Plan report
- Task 4: Common elements
  - Subtask 4.1: Project management
  - Subtask 4.2: Key stakeholder coordination
  - Subtask 4.3: Public involvement

1.5 Stakeholder Involvement

The development of a comprehensive and responsive Master Plan involved extensive communications with key stakeholders. A Communications Plan was developed outlining the stakeholder involvement components of this Master Plan. The goals of the Communications Plan were as follows:

- Inform stakeholders of Master Plan issues and potential solutions
- Increase opportunities for public participation
- Ensure and sustain successful implementation of the results

There are three primary groups of stakeholders involved in this Master Plan project: the agencies represented by the Governance Committee, the Management Committee, and the

public. The composition and responsibilities of each of these groups is discussed in the following subsections.

1.5.1 Governance Committee

The Hollister City Council, San Benito County Board of Supervisors, SBCWD Board of Directors, and SSCWD Board of Directors are the final Master Plan decision-makers, providing policy level direction for the Master Plan as indicated in Figure 1-2. The Governance Committee members represent these decision-making bodies (two members from each agency) and also represent their respective customers, which vary in size, complexity, resources, values, and needs.

1.5.2 Management Committee

The Management Committee directed the day-to-day management of this Master Plan project. Each of the MOU Parties (i.e., City, County, SBCWD, and SSCWD) has one representative on the Management Committee. A program manager was retained to assist the Management Committee in completing this Master Plan as shown in Figure 1-2.

1.5.3 Public

The public was highly involved in the master planning effort. The general public and end users include: homeowners, environmental organizations, developers, special interest groups, local business owners, agricultural operators, drinking water and sewer customers, and political organizations.

Five public workshops were held to provide opportunities for the public to understand the process and provide input on key aspects of this Master Plan. The five public meetings were held on the following dates:

- November 16, 2005
- March 22, 2006
- October 24, 2006
- April 4, 2007
- September 23, 2008

In addition, fact sheets were used as communication tools to help explain complex issues associated with the project. The fact sheets and public meeting materials are included in Appendix C.

1.6 Report Organization

This Master Plan provides a summary of pertinent background information, an evaluation of existing facilities, alternatives development and evaluation, and the recommended plan. In an effort to provide a practical review document for project implementation, a summary of previous interim reports and analyses conducted during this project are included. Figure 1-2 illustrates that this Master Plan relies on other key studies as a foundation for this effort. Separately bound appendices to this report provide additional background information, detailed technical and economic data, and further documentation for conclusions and recommendations.

This Master Plan is organized into nine chapters. The chapters follow the work completed for each phase of the project.

- Background
  - Chapter 1 - Introduction
  - Chapter 2 - Existing Water Facilities
  - Chapter 3 - Existing Wastewater Facilities
- Development and Evaluation of Alternatives
  - Chapter 4 - Basis of Planning
  - Chapter 5 - Development of Alternatives
  - Chapter 6 - Evaluation of Alternatives
- Recommended Program
  - Chapter 7 - Water Master Plan
  - Chapter 8 - Wastewater Master Plan
  - Chapter 9 - Implementation Program

An Executive Summary precedes Chapter 1 for use in communicating the Master Plan results.

1.7 Project Team

The project team for completion of this Master Plan included HDR Engineering, Inc.; Karen E. Johnson, Water Resources Planning; RMC Water and Environment; and Gus Yates, Consulting Hydrologist.

1.8 Acknowledgements

During the development of this Master Plan, the project team received invaluable assistance and cooperation from many agencies and individuals. We gratefully acknowledge the following, for their interest and participation:

- Governance Committee
- Management Committee
- City of Hollister Staff
- San Benito County Staff
- San Benito County Water District Staff
- Sunnyslope County Water District Staff

1.9 Abbreviations

To conserve space and improve the text, the following abbreviations have been used in this Master Plan:

ac	acre
ac-ft	acre-feet
ADD	average daily demand
ADWF	average dry weather flow
AIPS	advanced integrated pond system
af/yr	acre-feet per year
ASR	aquifer storage and recovery
BOD	biological oxygen demand

$CaCO_3$	calcium carbonate
CCR	Consumer Confidence Report
CEQA	California Environmental Quality Act
cfs	cubic feet per second
City	City of Hollister
City Council	Hollister City Council
County	San Benito County
CVP	Central Valley Project
D/DBP	Disinfectant/Disinfectant Byproducts
Delta	San Joaquin Delta
DHS	California State Department of Health Services
DPMC	dual-powered, multicellular
du	dwelling units
DWR	California State Department of Water Resources
DWTP	domestic wastewater treatment plant
ea	each
EIR	Environmental Impact Report
ENR	Engineering News Record Construction Cost Index
EPA	U.S. Environmental Protection Agency
fps	feet per second
ft	feet
GMP	Groundwater Management Plan
gpd/du	gallons per day per dwelling unit
gpm	gallons per minute
GWUDI	groundwater under the direct influence of surface water
hp	horsepower
hr	hour
H&SC	Health and Safety Code

I/I	inflow and infiltration
IESWRT	Interim Enhanced Surface Water Treatment Rule
in	inch
IRWMP	Integrated Regional Water Management Plan
ISO	Insurance Services Office
IWTP	industrial wastewater treatment plant
LOD	Level of Development
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LTWMP	Long-term Wastewater Management Plan
Master Plan	Hollister Urban Area Water and Wastewater Master Plan
MBR	membrane bioreactor
MCL	maximum contaminant level
MDD	maximum daily demand
mgal	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
M&I	municipal and industrial
MOU	memorandum of understanding
MSL	mean sea level
NPDES	National Pollution Discharge Elimination System
OCAP	Operation Criteria and Plan
O&M	operation and maintenance
PHD	peak hour demand
PPWD	Pacheco Pass Water District
PRPS	pressure reducing pressure sustaining
PRV	pressure reducing valve
psi	pounds per square inch

PUD	Planned Unit Development
PVWMA	Pajaro Valley Water Management Agency
PWWF	peak wet weather flow
RM	Residential Multiple
RWQCB	California Regional Water Quality Control Board, Central Coast Region
SBCWD	San Benito County Water District
SBR	sequencing batch reactor
SSCWD	Sunnyslope County Water District
SSO	sanitary sewer overflow
State	State of California
SWP	State Water Project
SWTR	Surface Water Treatment Rule
TDS	total dissolved solids
Three Parties	City of Hollister, San Benito County, and San Benito County Water District
Title 22	Title 22 of the California Code of Regulations
TM	Technical Memorandum
TSS	total suspended solids
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
VESP	Vibratory Shear Process
WDR	waste discharge requirements
WRA	Water Resources Association of San Benito County
WTP	water treatment plant
WWTP	wastewater treatment plant
yr	year

2.0 Existing Water Facilities

This chapter provides an overview of the existing water facilities that provide municipal and industrial (M&I) water to the Hollister Urban Area, including water supply systems, treatment facilities, and transmission and distribution systems. The two major water systems are operated by the City of Hollister and the SSCWD. Although the two agencies maintain specific service areas, their water supply and distribution systems are interconnected and can exchange water as necessary to satisfy customer demand. The existing water facilities are shown in detail on Exhibit II at the end of this report.

2.1 Regional Water Supplies

Water supplies for the Hollister Urban Area are groundwater, local surface water, and imported CVP surface water as described below.

2.1.1 Groundwater

Both the City and SSCWD utilize groundwater wells for M&I supply. Groundwater is supplied by an extensive aquifer that in recent years has recovered from overdraft conditions experienced in the 1960s and 1970s. The Groundwater Management Plan Update (2003) estimates that in normal years the safe yield of the groundwater basin is 54,000 acre-feet per year. This estimated safe yield is for Zone 6, and the Bolsa, Paicines, and Tres Pinos groundwater subbasins.

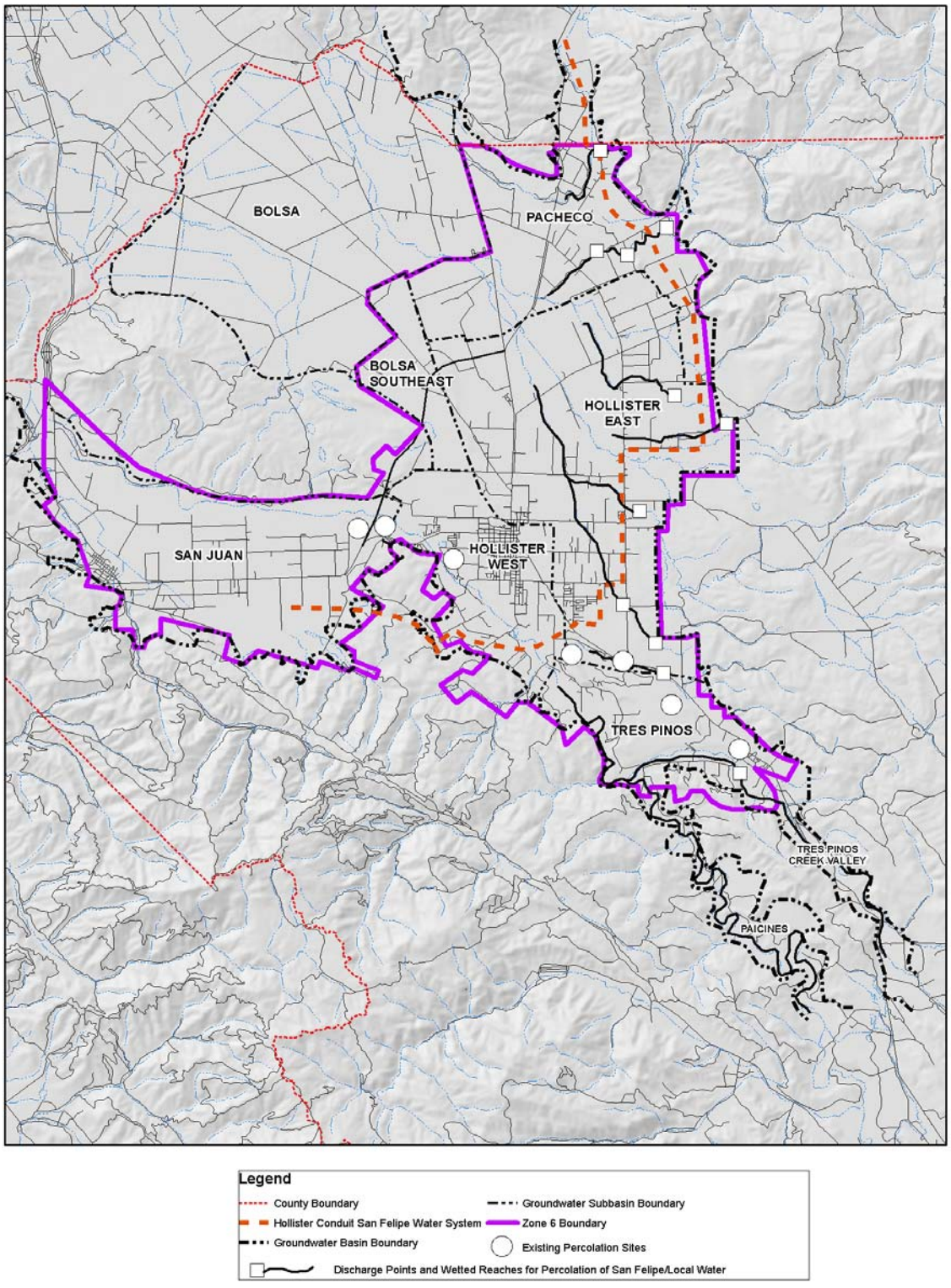
Groundwater in the Study Area is part of the Gilroy-Hollister groundwater basin which underlies the broad valley that extends from the northern part of San Benito County into the southern part of Santa Clara County. The San Benito River and Tres Pinos Creek enter the valley from the southeast, and the Paicines and Tres Pinos Creek Valley groundwater basins are smaller basins located along those waterways upstream of the main basin. Figure 2-1 shows the boundaries of the three basins and the names and boundaries of their subbasins, which were delineated in 1996 based on a combination of infrastructure subdivisions (San Felipe subsystem), political boundaries (Zone 6), and geologic structures (faults).

The SBCWD has jurisdiction throughout San Benito County, and has formed three zones of benefit to obtain funds to support surface water management and groundwater replenishment

activities. Zone 1 covers the entire county and provides the funding base for certain District administrative expenses. Zone 3 generally covers the San Benito River Valley to the confluence with the Pajaro River, from the Highway 25 bridge nine miles south of the town of Paicines to San Juan Bautista, and the Tres Pinos Creek Valley from Paicines to the San Benito River. Zone 3 provides the funding base for operation of Hernandez and Paicines Reservoirs and related percolation and groundwater management activities. Zone 6 includes the Pacheco, Bolsa Southeast, San Juan, Hollister West, Hollister East, and Tres Pinos Subbasins (Figure 2-1 and Figure 2-2) and provides the funding base for importation and distribution of San Felipe water and related groundwater management activities.

The SBCWD prepares an annual report describing the groundwater conditions in the San Benito County part of the Gilroy-Hollister groundwater basin, the Paicines groundwater basin, and Tres Pinos Valley groundwater basin. The annual report documents water use, groundwater levels, groundwater budgets, and water quality, and analyzes their spatial patterns and long-term trends.

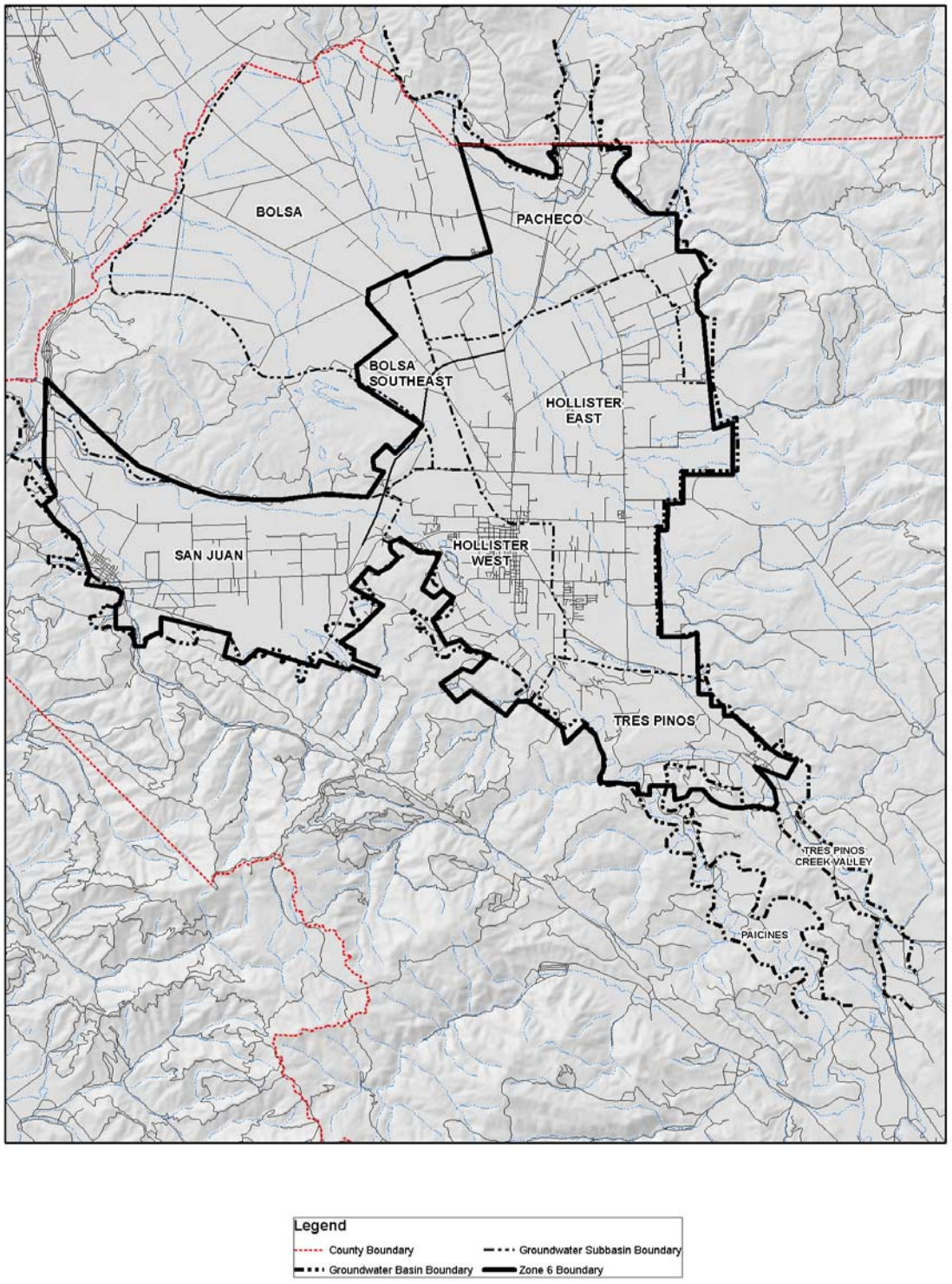
The historical groundwater elevations for each of the subbasins are presented in Figure 2-3. As shown in Figure 2-3, groundwater elevations since 1977 have been relatively stable for the Pacheco (north of County line), Bolsa, Tres Pinos, and Hollister West Subbasins. Groundwater levels have been rising for the Hollister East, Pacheco (south of County line), San Juan, and Bolsa Southeast Subbasins. When the water table approaches or reaches the land surface, it creates saturated soil conditions that can impair crop growth, weaken the foundations of structures, and cause nuisance seeps and boggy areas. In the case of orchards, water tables within about eight feet of the land surface can adversely affect some tree types. The areas where groundwater is relatively shallow are the southern and western part of the San Juan Valley, a broad arc extending from San Felipe Lake southeast to Spring Grove Road, and an area along the Pajaro River.



Hollister Urban Area Water and Wastewater Master Plan

Existing Projects and Activities

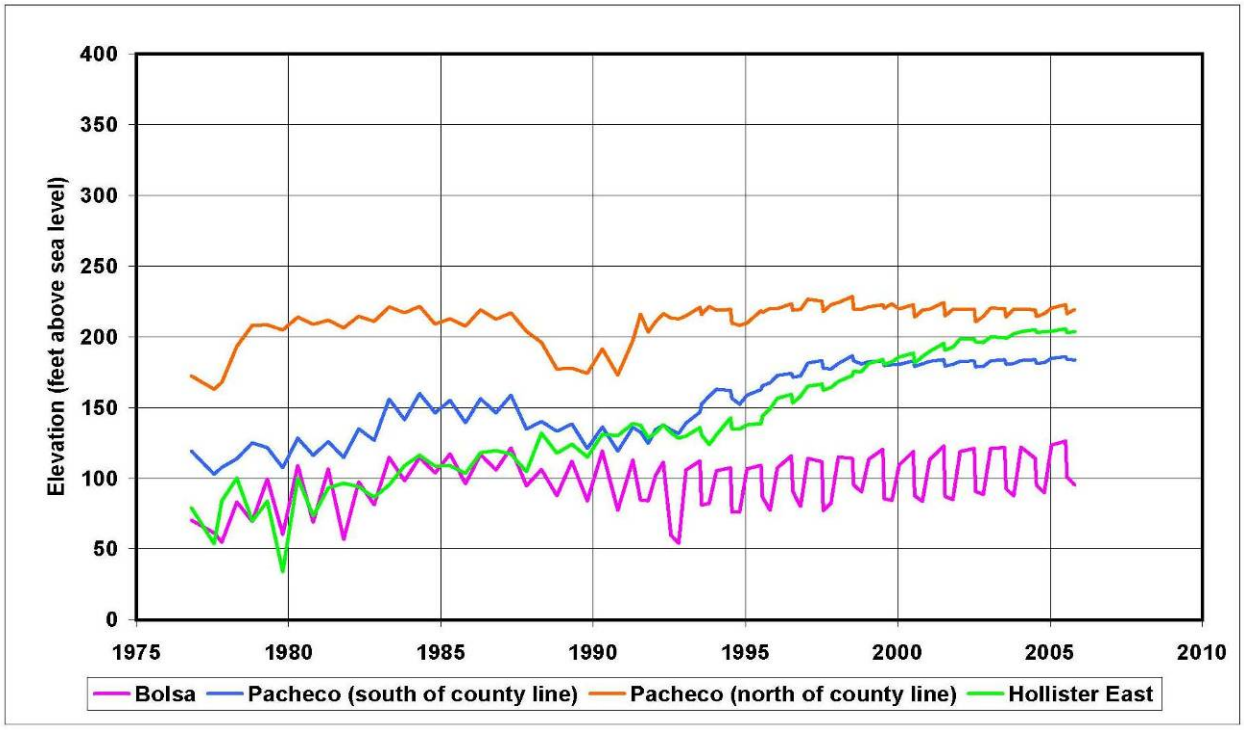
Figure 2-1



Hollister Urban Area Water and Wastewater Master Plan

Zone 6 Boundary

Figure 2-2



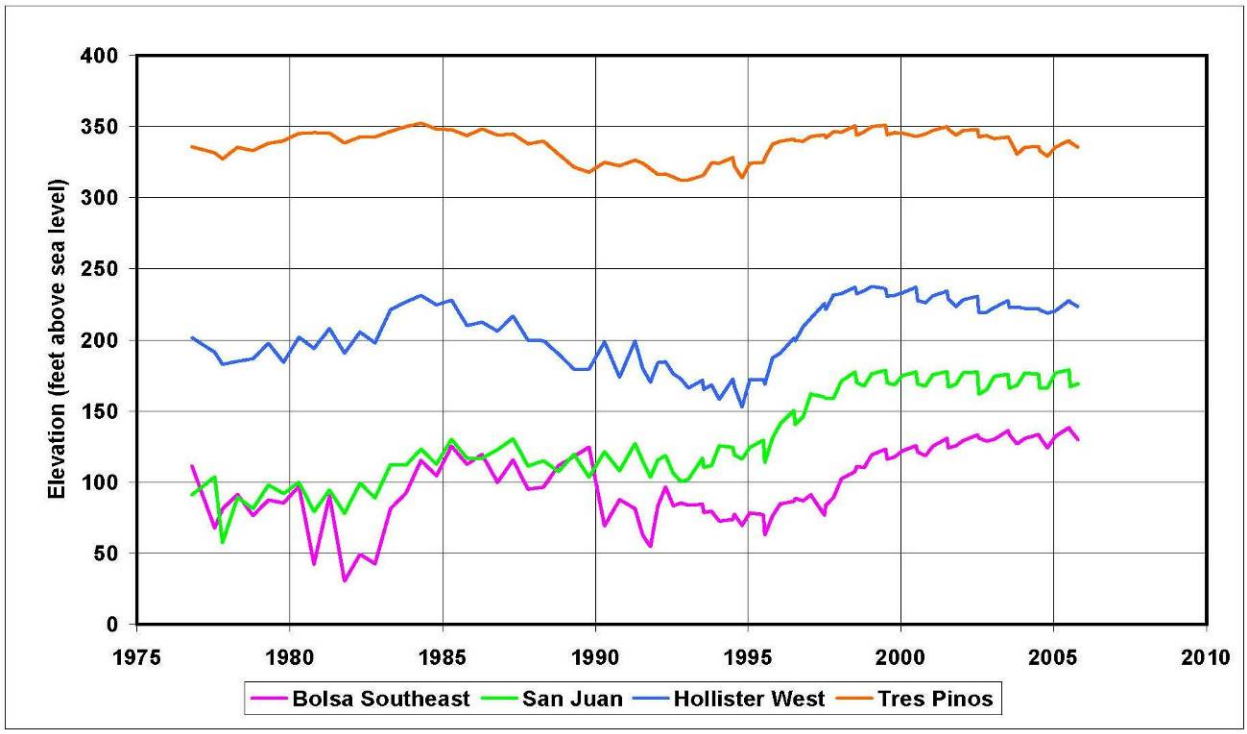


Figure 2-3: Hydrographs of Average Groundwater Elevation in Subbasins During Water Years 1977 to 2005

Source: SBCWD Annual Groundwater Report for Water Year 2005 (Gus Yates, December 2005)

The groundwater has a high mineral content with some wells exceeding 1,200 mg/L TDS compared to the California recommended secondary drinking water standard of 500 mg/L. The salinity patterns and trends are monitored annually by the SBCWD through a network of 18 wells. The salinity database also includes wells from other agencies, although those wells are sampled less frequently. Table 2-1 summarizes the approximate salt balance for the groundwater basin in 2005. These estimates reflect the historical trend of salt inputs greatly exceeding salt removal; this imbalance will gradually increase the salinity of the groundwater. It has already affected shallow groundwater and is expected to spread to deeper zones in the future.

Table 2-1: Estimated Salt Balance

Source of Salt Input/Removal	Annual Salt Load (tons)
Salt Input	
Municipal Wastewater	2,465
Rural Domestic Septic Systems	137
San Felipe Water Used for All Purposes	8,667
Agricultural Soil Amendments	8,860
Agricultural Fertilizers	5,167
Urban Fertilizers and Chemicals	1,008
Percolation From Creeks and Rivers	11,318
Atmospheric Deposition	183
Groundwater Inflow	4,071
Total Inputs	**41,876**
Salt Removal	
Local Rainfall Runoff	1,623
Groundwater Discharge to Creeks and Rivers	11,588
Total Removal	**13,211**

2.1.2 Local Surface Water Supplies

The primary sources of local surface water supply are Hernandez Reservoir and Paicines Reservoir. Both of these reservoirs are owned and operated by the SBCWD. Hernandez Reservoir has a capacity of 17,200 af and is located on the San Benito River, 43 miles southeast of Hollister, and stores runoff from the upper San Benito River watershed.

Hernandez Reservoir is designed and operated to supplement the groundwater supply in northern San Benito County. Groundwater storage benefits resulting from Hernandez Reservoir releases do not simply equal the amount of water released from the reservoir because the

releases commingle with natural runoff and base flow along the 66 miles of river channel between the reservoir and the downstream end of the groundwater basin where the river joins the Pajaro River. Under low- to moderate-flow conditions, the groundwater recharge benefit attributable to the project equals total recharge minus recharge that would have occurred without the reservoir. Under high-flow conditions when natural runoff creates continuous outflow to the Pajaro River, releases provide no recharge benefit because the natural flow already exceeds the percolation capacity of the river channel. Furthermore, some of the released water is lost to seepage and evapotranspiration between the reservoir and the Paicines basin, and the lost water does not contribute any benefits to Zone 3 water users.

Paicines Reservoir, with a capacity of 2,870 af, is an offstream reservoir between the San Benito River and Tres Pinos Creek approximately 5 miles south of Tres Pinos as shown on Figure 2-1. It is filled by water diverted from the San Benito River, with some of the diversions consisting of natural runoff and some consisting of rediversion of water stored and released from Hernandez Reservoir. The stored water is released for percolation to Tres Pinos Creek and the San Benito River to provide additional groundwater recharge during the dry season.

2.1.3 Imported Surface Water

The SBCWD also purchases imported CVP surface water from the United States Bureau of Reclamation (USBR). The current SBCWD contract with the USBR is for a total supply of 43,800 acre-feet per year (af/yr), of which 35,550 af/yr is for agricultural use and 8,250 af/yr is for M&I use. The current contract extends until the year 2027 and may be renewed thereafter. The SBCWD recently completed an amendatory contract and is working with the USBR on a renewal contract. The purpose of the amendatory contract is to provide amendments to the existing contract until the renewal contract is in place. The USBR is working to resolve issues related to environmental lawsuits regarding certain already executed long-term renewal contracts and finalize its CVP Operational Criteria and Plan (OCAP) which must be completed before it can execute new long-term renewal contracts. The renewal contract is expected to be finalized in 2008.

CVP water is imported through the Sacramento River-San Joaquin River Delta to San Luis Reservoir and conveyed through the Hollister Conduit as shown in Figure 2-1. The Hollister

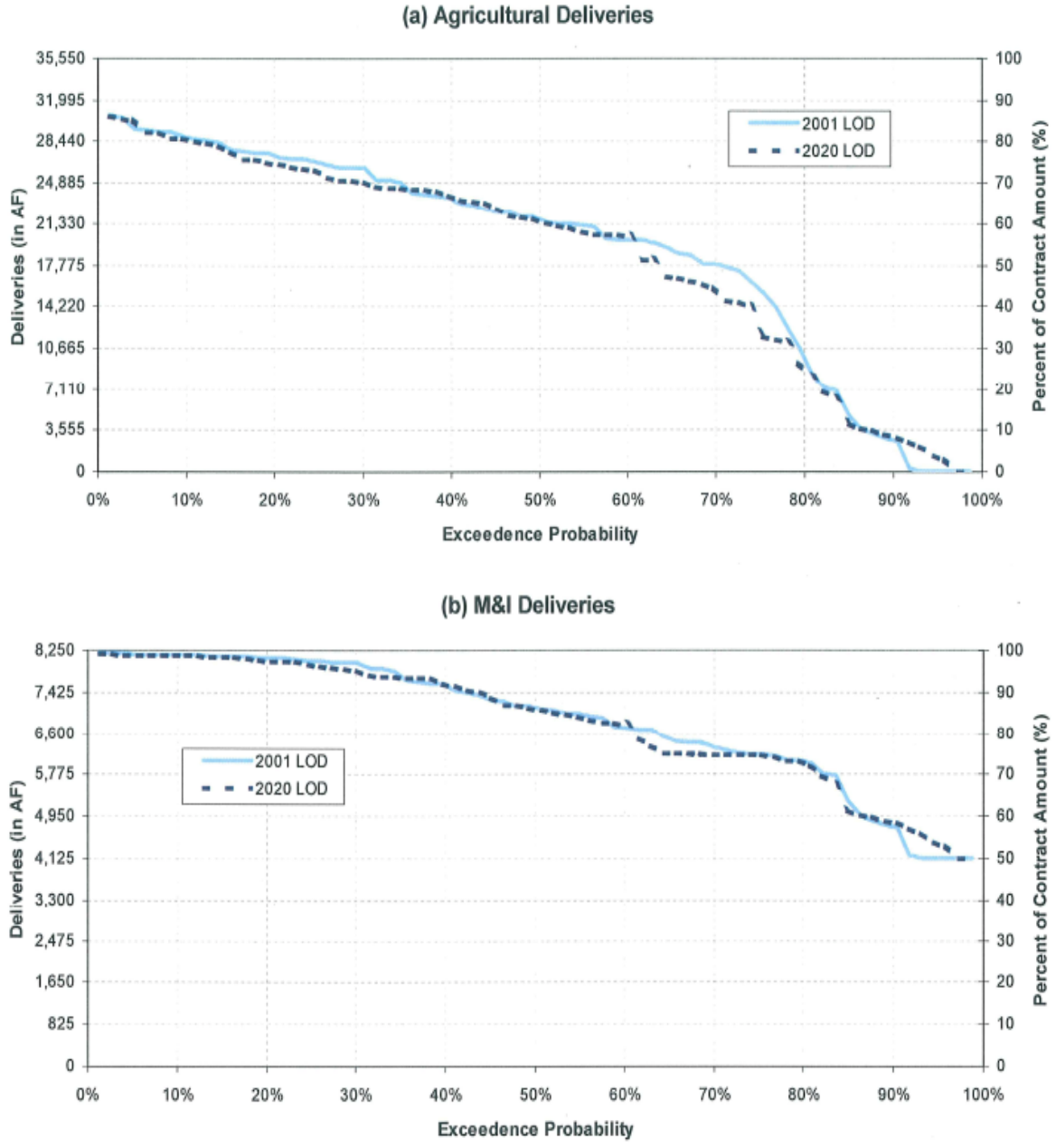
Conduit is a component of the San Felipe Division of the CVP. Water conveyed from the San Luis Reservoir to the Hollister Urban Area is diverted through the 1.8 mile long Pacheco Tunnel Reach 1 to the Pacheco Pumping Plant. At the pumping plant, the water is lifted to the 5.3-mile long high-level section of the Pacheco Tunnel Reach 2. Water flows through the tunnel and through the Pacheco Conduit to the bifurcation of the Santa Clara and Hollister Conduits. The Santa Clara Conduit conveys Santa Clara Valley Water District's CVP allocation north to its service area.

Imported surface water is conveyed through the Hollister Conduit to the Hollister Urban Area. The Hollister Conduit is a pressurized pipeline consisting of 60-inch and 42-inch diameter pipeline. The Hollister Conduit has a design capacity of 83 cfs and extends approximately 19.5 miles from the bifurcation with the Santa Clara Conduit to the terminus at San Justo Reservoir. San Justo Reservoir is located south of the City of Hollister and has a storage capacity of 10,300 af. Imported water is delivered to agricultural, municipal, and industrial customers in the Pacheco, Bolsa Southeast, San Juan, Hollister East, Hollister West, and Tres Pinos Subbasins which comprise Zone 6 as shown in Figure 2-2. Water is delivered through 120 miles of pressurized laterals and has also historically been released at controlled rates to local creeks and the San Benito River. Releases for groundwater recharge have diminished in recent years due to the widespread recovery of groundwater levels. Zebra mussels, an invasive species, were discovered in San Justo reservoir in January 2008. The SBCWD is working with the USBR, the Department of Fish and Game, the County and Santa Clara Valley Water District (SCVWD) to develop a plan to mitigate the zebra mussels.

As a result of over-commitments of CVP supplies and supply limitations imposed by environmental constraints, the reliability of imported CVP supplies has been reduced. The USBR utilizes a Shortage Policy to allocate supplies in below normal, dry, and critical years. In 2003, the SBCWD completed an independent review of the reliability of imported CVP surface water supplies. The results of that independent review are presented in Figure 2-4. The results of that review indicate that in critically dry years, agricultural deliveries may be reduced to less than 20 percent of contract allocations and M&I supplies may be reduced to approximately 60 percent of contract allocations. In multiple dry year conditions, agricultural supplies may not be available and M&I supplies may be reduced to 50 percent.

Figure 2-4

Exceedence Probability of Simulated CVP Deliveries to the San Benito County Water District (OCAP Study, June 2003)



Notes:
OCAP = Operations Criteria and Plan
LOD = Level of Development

Since the 2003 reliability analysis, two significant developments have occurred, as reported by the DWR's Final State Water Project Delivery Reliability Report, 2007. The first is the realization that climate change is altering hydrologic conditions in the State. The second is the December 2007 final federal court order to set new rules that will protect the delta smelt, a rare fish found only in the Sacramento-San Joaquin River Delta. The order followed an August 2007 decision to reduce pumping from the delta for at least one year while state and federal agencies prepare a new biological opinion regarding the impacts of Delta pumping on the delta smelt. The decision resulted in a significant curtailment of water deliveries for both the State Water Project (SWP) and the CVP, underscoring the fragility and unreliability of the Delta as a major water supply source for California.

Following the December 2007 federal court order, the DWR conducted a reliability analysis and updated the State Water Project Delivery Reliability Report. The analysis found that SWP deliveries would decrease in 93% of future years and highlighted that reductions would amount to a 20% reduction from current levels one in four years and greater than a 30% reduction in one in six years. Although these findings are specific to SWP deliveries, they are likely indicative of future CVP deliveries as well.

Based on these changes, the reliability of imported CVP surface water supplies for SBCWD was updated. The updated exceedance probability curves, presented in Figure 2-5, are based on the assumption that the maximum delivery will be based on historic use, a figure agreed upon with the USBR. For M&I supply, SBCWD's historic use has been set at 6,966 af/yr, which is based on usage in 2002, 2003 and 2005, and includes water transfers. For agricultural supply, the historic use has been set at 19,134 af/yr.

The results of the exceedance probability update indicate that in critically dry years, agricultural deliveries may be reduced to nothing and M&I supplies may be reduced to less than 50 percent of contract allocations. In multiple dry year conditions, M&I supplies may be reduced to one third of the contract allocation.

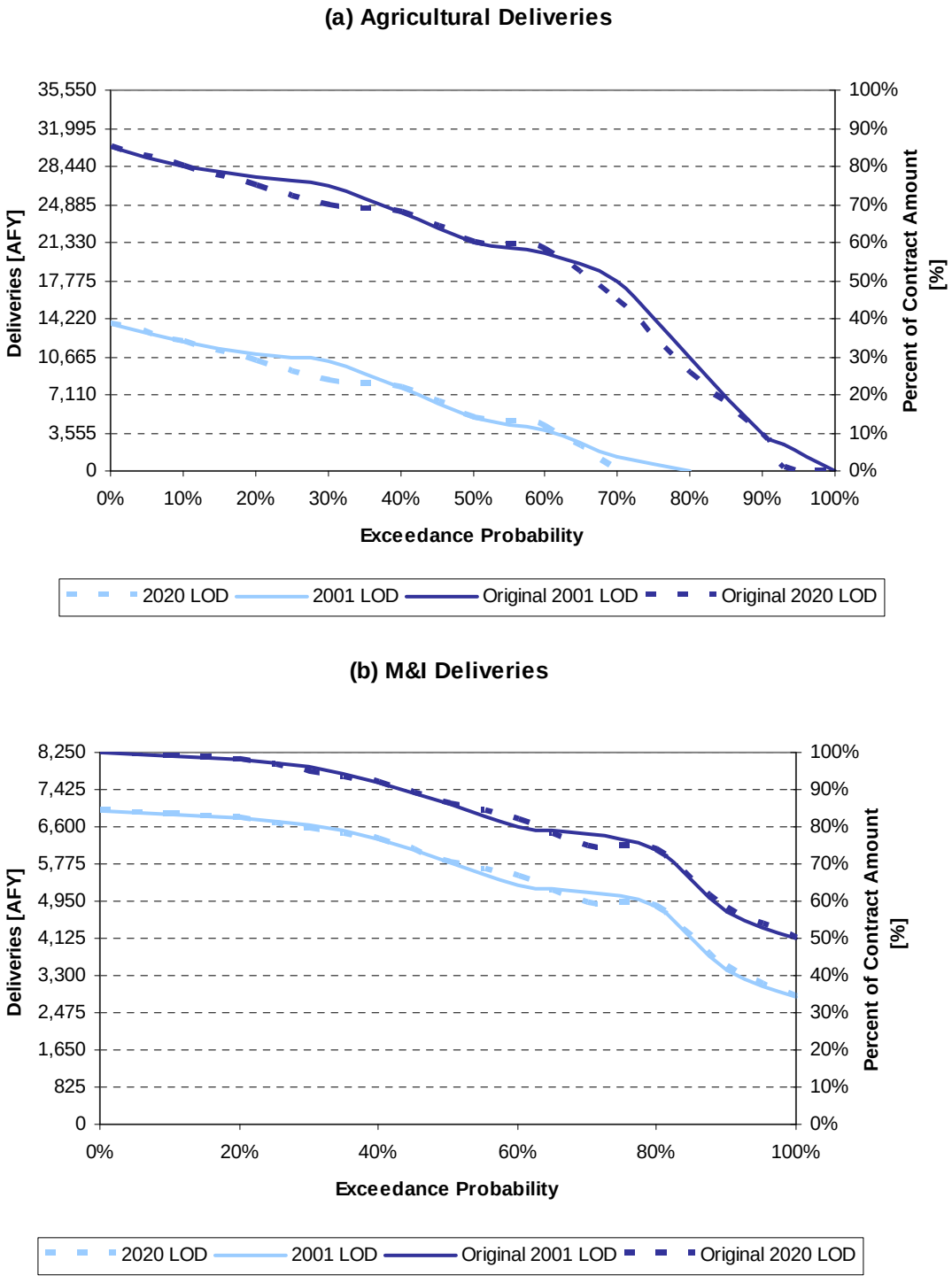


Figure 2-5: Updated Exceedance Probability of Simulated CVP Deliveries to San Benito County Water District

On an annual basis, the SBCWD allocates CVP supplies to local customer accounts. The steps in this allocation process are as follows:

- The SBCWD has established entitlements to contract for San Felipe Distribution System Water from the District. The entitlements to contract are established by the action of the District Board of Directors and are based on the use distinctions of the District's CVP Water Supply Contract: Irrigation or Agricultural and Municipal and Industrial. Under the terms of the CVP Contract, all water use not meeting the specific terms for irrigation are classed as municipal and industrial. The District further divides its users into five types of customers:
  - Agricultural, Monthly
  - Agricultural, Small User
  - Domestic, Monthly
  - Domestic, Small User
  - Municipal, Monthly

  The current total entitlement for all accounts is 37,955 af/yr (28,192 af/yr irrigation and 9,763 af/yr M&I).
- Every year, each user submits a request to SBCWD for the quantity of water required.
- The SBCWD makes an allocation to each user based upon water supply availability. CVP supply plus carry-over storage and other supplies are available as determined by the District. If the allocation is 50 percent or less of the amount requested, the issue is referred to the SBCWD Board of Directors for resolution.

2.2 City of Hollister Water Facilities

The Hollister Water Company was established in 1890 to provide drinking water to the residents of Hollister using shallow wells. In 1895 the water company began importing water from wells in Cienega Valley Springs. The City bought the water company in 1945 and the City's first deep well was drilled in 1928. Unlike the high quality of water coming from Cienega Valley, the water produced by the deep wells is relatively hard with high mineral content.

The City of Hollister water facilities distribute drinking water to the City's service area as shown in Figure 2-6. The major facilities are shown in Figure 2-7 and in more detail in Exhibit II at the end of this report.

2.2.1 Groundwater Wells

The City has eight groundwater wells, Wells 1 through 6 and Cullum Wells 1 and 2. Cullum Wells No. 1 and No. 2 are in Cienega Valley (south of the Study Area). Well No. 1 is inactive due to the presence of high levels of nitrate. Well No. 6 has problems with pumping sand and water quality issues.

A summary of well pressure ranges and pumping rates is presented in Table 2-2. Operation of Wells No. 2 through 6 is controlled by the Park Hill and Fairview Road Reservoirs water levels. These reservoirs are located in the low and middle pressure zones, respectively. Pump start and stop times for Wells No. 2 through 5 are based on Park Hill Reservoirs levels whereas Well No. 6 pump start and stop times are based on the Fairview Road Reservoir levels.

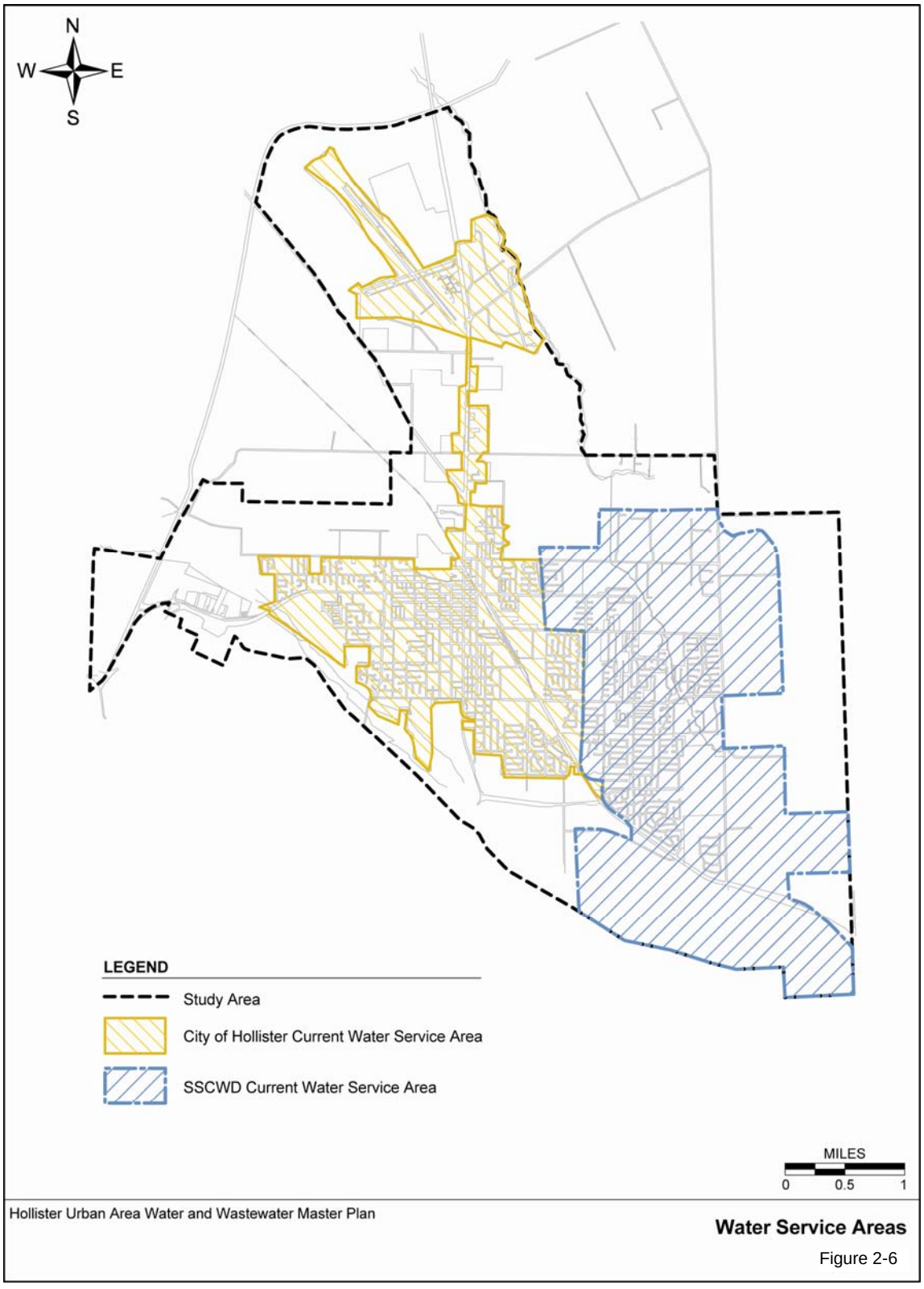
Power outages occur frequently in the Hollister area especially during the summer when water demands are at their peak. These power outages may last up to two hours or longer. To ensure that the water system is capable of providing an adequate level of service during power outages, standby power is required. Wells No. 3, 4 and 5 are equipped with standby power. The City also has portable generators to supply emergency power the other active wells.

Table 2-2: City of Hollister Wells

City of Hollister Wells	Well Pressure Ranges (psi)		Maximum Pumping Rate (gpm)
	Minimum	Maximum	
Well No. 1 San Felipe (Inactive)	50	90	2,400
Well No. 2 Bundeson	38	62	1,425
Well No. 3 Fallon	45	98	930
Well No. 4 South	50	85	1,670
Well No. 5 Nash	40	65	1,825
Well No. 6 Airline	75	110	435
Cullum No.1	13.2	36	<90
Cullum No.2	13.2	36	<90

psi – pounds per square inch

gpm – gallons per minute


N
W
E
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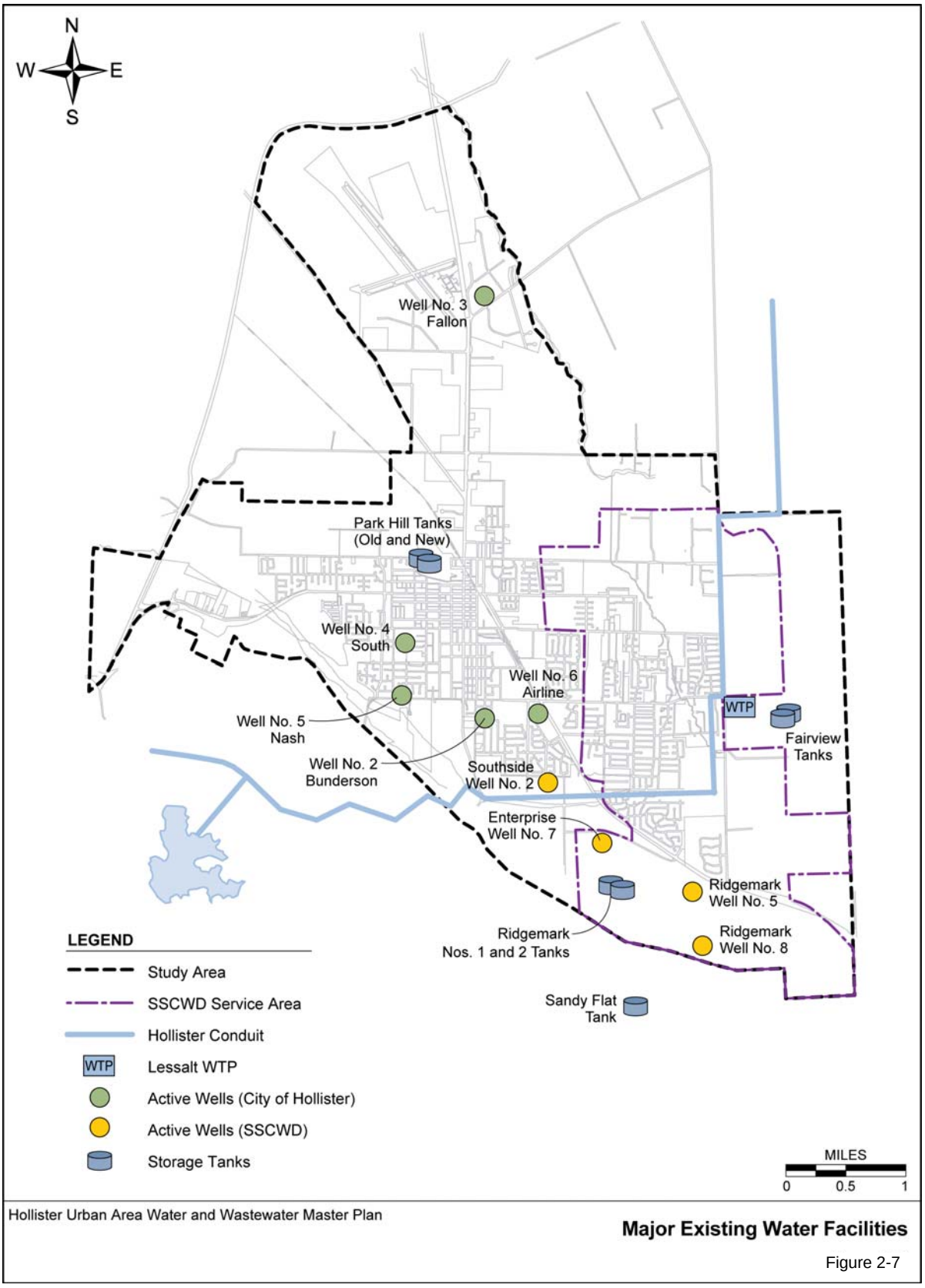
LEGEND
Study Area
City of Hollister Current Water Service Area
SSCWD Current Water Service Area
MILES
0
0.5
1
Hollister Urban Area Water and Wastewater Master Plan
Water Service Areas
Figure 2-6



Hollister Urban Area Water and Wastewater Master Plan

Major Existing Water Facilities

Figure 2-7

2.2.2 Lessalt Water Treatment Plant

The Lessalt Water Treatment Plant (WTP), a jointly-owned facility between the City and the SSCWD, was placed into operation in January 2003. The plant, shown in Photograph 2-1, was designed to treat imported CVP water using microfiltration and chlorine disinfection as shown in the process schematic in Figure 2-8. The treated water is distributed to both City and SSCWD customers.

Photograph 2-1: Lessalt Water Treatment Plant

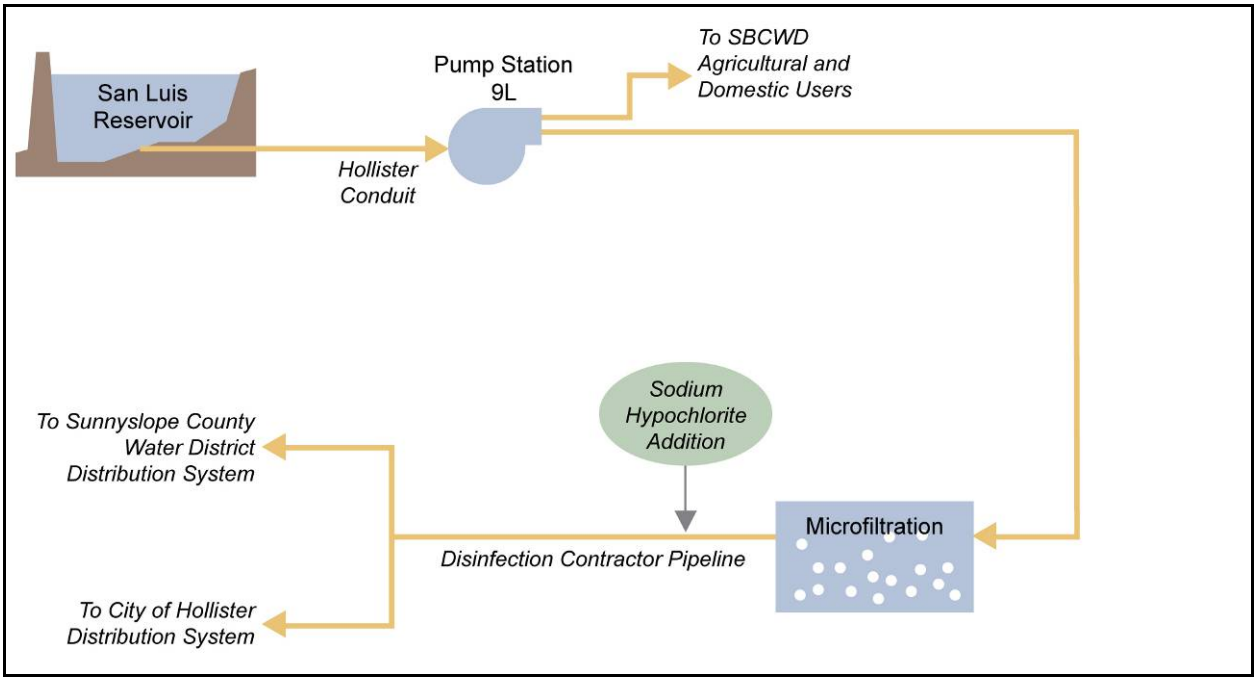


Figure 2-8: Lessalt WTP Existing Process

The Lessalt WTP was constructed to provide replacement water for groundwater and improve water quality. The CEQA review for this facility consisted of a Mitigated Negative Declaration, which stated that the Lessalt WTP was not intended to be used for new growth. As presented in the project description, wells would continue to be operated to meet peaks and maximum day demands. The City and SSCWD had programmed needs for additional water supply capacity or replacement wells. The Lessalt WTP was intended to defer the need for two new wells and provide a higher quality water with a lower mineral content.

The plant was designed with a rated capacity of 3.0 mgd capable of treating 3,360 ac-ft of imported CVP supply annually. However, in 2005 the Lessalt WTP treated only 2,375 ac-ft, or approximately 2.1 mgd on an annual average basis. Since the plant was placed in service in 2003, it has been unable to achieve its design capacity due to hydraulic constraints and treated water capacity issues related to the Stage 2 Disinfectant/Disinfection Byproducts Rule (Stage 2 D/DBP). In order to resolve these issues, the City and SSCWD have completed the Predesign Report for the Disinfection Byproduct Project (Kennedy/Jenks, Draft, May 2006).

The addition of a booster pumping station and hydropneumatic tank is recommended as part of the Disinfection Byproduct Reduction Project to eliminate the hydraulic constraints. Once installed, this pumping station will provide the ability to operate the Lessalt WTP at its rated capacity of 3.0 mgd.

The project also includes the addition of potassium permanganate and coagulant for water quality improvements. The proposed improvements to the Lessalt WTP are shown in the process schematic in Figure 2-9.

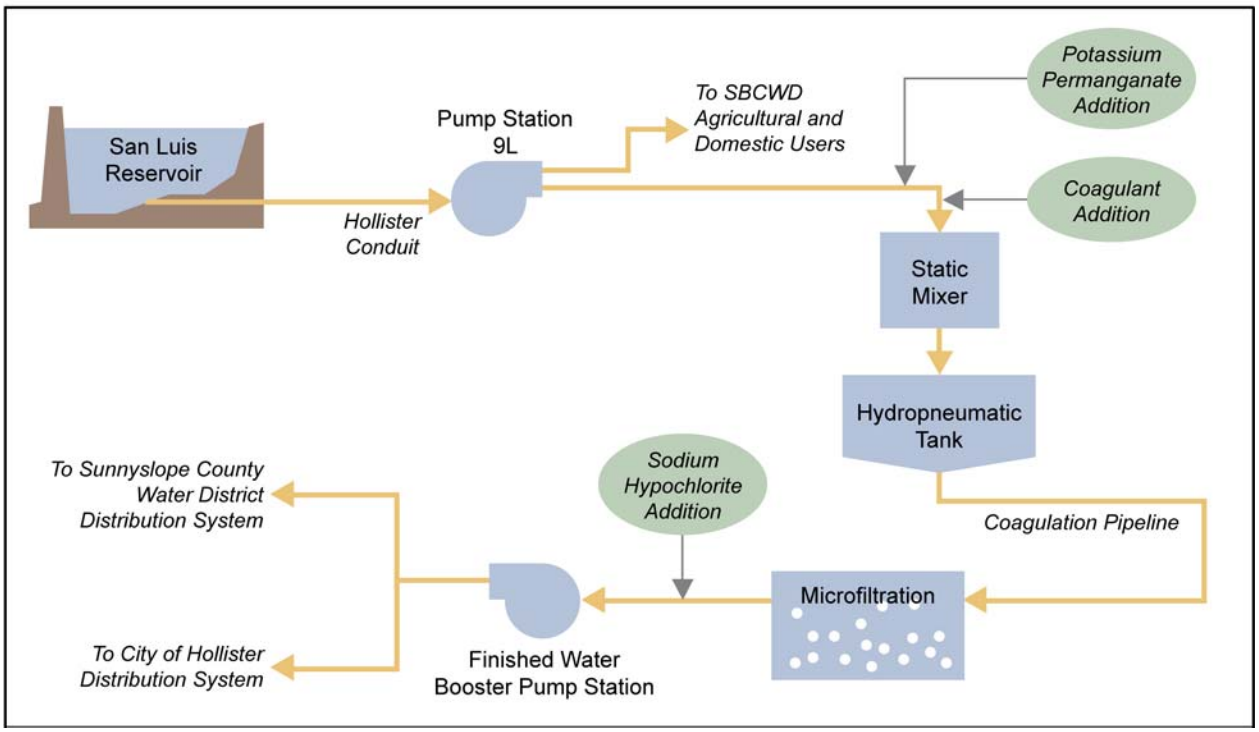


Figure 2-9: Lessalt WTP Proposed Improvements

2.2.3 Storage Reservoirs

The City has four storage reservoirs for a total capacity of 8.2 million gallons (mgal) as shown in Table 2-3. The Fairview Road Tanks shown in Photograph 2-2 consist of two tanks with a total capacity of 2.0 mgal. The facility is equally shared between the City and SSCWD with each agency having 1.0 mgal of storage. The Sandy Flat Tank is located in Cienega Valley (south of the Study Area).

Table 2-3: City of Hollister Storage Reservoirs

Storage Reservoirs	Capacity (mgal)	Overflow Elevation (ft above MSL)	Base Elevation (ft above MSL)	Diameter (feet)
Fairview Road Tanks	1.0[(a)]	550	515	100
Park Hill (Old)	2.2	425	383	95
Park Hill (New)	4.5	460	383	135
Sally Flat (Cienega)	0.5	460	400	37.7
Total	8.2			

[(a)] Fairview Road Tanks have a total capacity of 2 mgal with 1 mgal allocated to the City and to SSCWD.

Photograph 2-2: Fairview Road Tanks

2.2.4 Pressure Reducing Pressure Sustaining Stations

Pressure reducing pressure sustaining (PRPS) stations are used to maintain water pressure for supplemental flows during periods of peak demand. The City currently has two PRPS stations; one in the high pressure zone and one in the low pressure zone. Table 2-4 provides data for the City's PRPS stations.

Table 2-4: City of Hollister Pressure Reducing Pressure Sustaining Stations

PRPS Name	Downstream Pressure Zone	Size (inches)	Downstream Pressure (psi)	Elevation (ft above MSL)
Memorial Booster Pump Station/ PRPSV	Low	4	56	298
PRV at Sunset	Low	8	38	332
Santa Ana PRPSV	High	8 and 2	64 psi	282

2.2.5 Transmission and Distribution

Together, the City and SSCWD have over 128 miles of water mains for transmission and distribution. Exhibit II provides a map of the transmission and distribution pipelines as well as the three existing City/SSCWD connections. Most of these pipelines were installed in the 1960s.

Table 2-5 and Table 2-6 show the distribution of water mains by diameter and length and by location. A hydraulic profile of the distribution system is presented in Figure 2-10.

Table 2-5: Lengths of Water Mains by Diameter (City of Hollister and SSCWD)

Diameter (inches)	Length (feet)	Length (miles)
4	13,030	2.5
6	73,180	13.9
8	376,065	71.2
10	695	0.1
12	200,430	38.0
14	7,330	1.4
16	9,270	1.8
Total (rounded)	680,000	130

Table 2-6: Lengths of Water Mains by Pressure Zone (City of Hollister and SSCWD)

Zone	Length (feet)	Length (miles)
Low	328,620	62.2
Middle	265,770	50.3
High	85,625	16.2
Total (rounded)	680,000	130

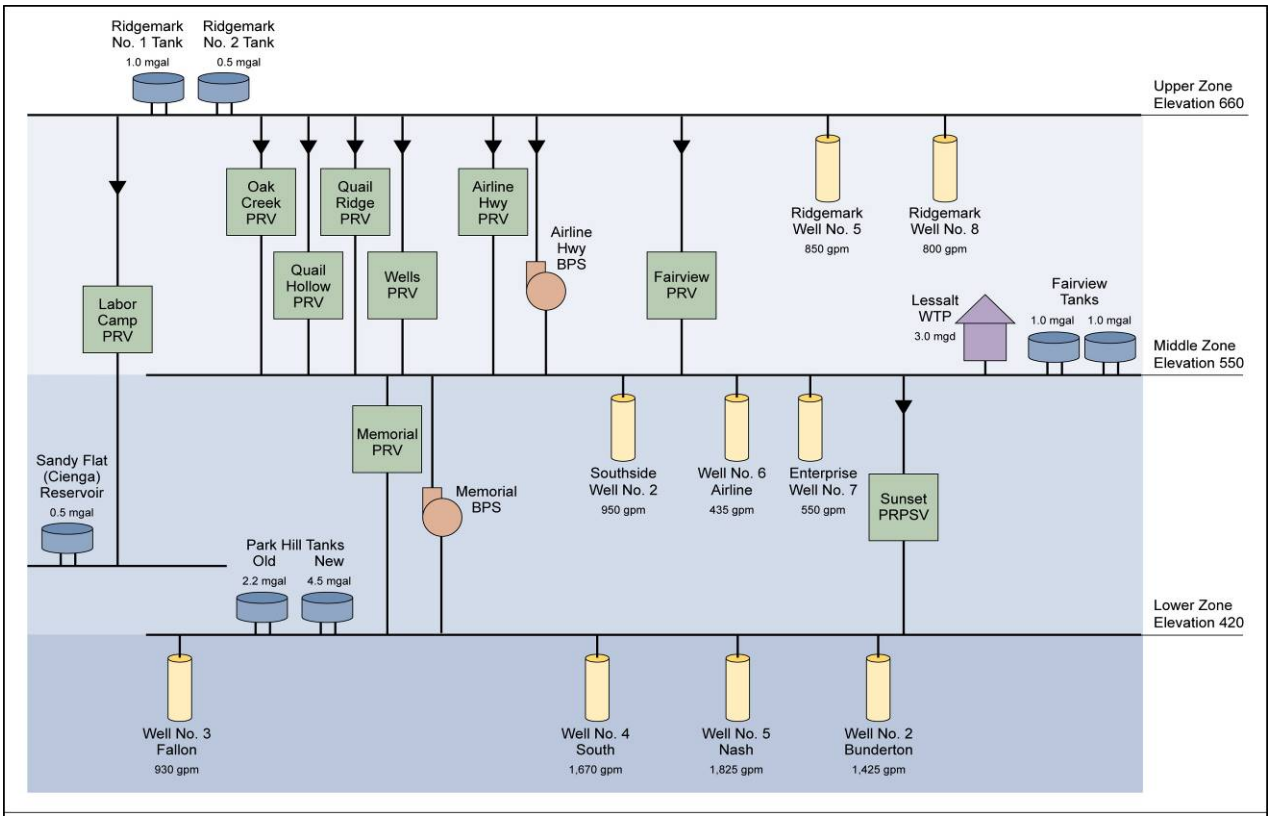


Figure 2-10: Water Distribution System Hydraulic Profile

The City of Hollister and SSCWD maintain a close interrelationship due to service area proximity and configuration of the low and middle pressure zones. There are three connection points within the SSCWD system that are tied to the City's water distribution system. The following connections allow the transfer of metered water flows between the two systems:

- Intersection of Hillcrest Road and Memorial Drive
- Intersection of Sunnyslope Road and Memorial Drive
- Intersection of Sunset Drive and Memorial Drive

Water can be transferred in either direction at the Memorial Booster Pump Station located on Hillcrest Road. However, water can only be transferred from the SSCWD to the City's system at the other two locations.

2.3 Sunnyslope County Water District Water Facilities

The following subsections provide descriptions of existing facilities which distribute treated water to the SSCWD service area.

2.3.1 Groundwater Wells

The SSCWD has a total of four groundwater wells. A summary of well pressure ranges and pumping rates is presented in Table 2-7.

2.3.2 Storage Reservoirs

The SSCWD has three reservoirs for a total capacity of 2.5 mgal. Table 2-8 provides an inventory of the SSCWD's water storage capacity. As previously described, the Fairview Road Tanks are an equally shared between the City and SSCWD; each agency has 1.0 mgal of capacity in Fairview Road Tanks.

Table 2-7: SSCWD Wells

SSCWD Wells	Well Pressure Ranges (psi)		Maximum Pumping Rate (gpm)
	Minimum	Maximum	
Southside Well No. 2	85	99	950
Ridgemark Well No. 5	83	94	850
Enterprise Well No. 7	80	93	550
Ridgemark Well No. 8	63	76	800

Table 2-8: SSCWD Storage Reservoirs

Storage Reservoirs	Capacity (mgal)	Overflow Elevation (feet above MSL)	Base Elevation (feet above MSL)	Diameter (feet)
Fairview Road Tanks	1.0[(a)]	550	515	100
Ridgemark No. 1	1.0	660	625	70
Ridgemark No. 2	0.5	460	625	45
Total	2.5			

[(a)] Fairview Road Tanks have a total capacity of 2 mgal with 1 mgal allocated to the City and to SSCWD.

2.3.3 Pressure Reducing Pressure Sustaining Stations

The SCWD has seven PRPS stations within its water service area, primarily in the low pressure zone. Data for these PRPS stations is summarized in Table 2-9.

2.4 Required Water System Improvements

Improvements to the existing water facilities within the Hollister Urban Area are required to address existing treated water storage deficiencies and regulatory requirements. These improvements will provide a level of service consistent with industry standards.

Table 2-9: SSCWD Pressure Reducing Pressure Sustaining Stations

PRPS Name	Downstream Pressure Zone	Size (inches)	Downstream Pressure (psi)	Elevation (feet above MSL)
Fairview PRPSV	Middle	6	48	460
Airline Booster Pumping Station / PRPSV	Middle	6 and 1-1/2	41	400
Quail Ridge PRPSV	Middle	6 and 2	48	435
Well No. 5 PRPSV	Middle	6 and 2	35	431
Quail Hollow PRPSV	Middle	6 and 2	35	430
Oak Creek PRPSV	Middle	6 and 2	35	430
Labor Camp PRPSV	Low - Cienega	6 and 2	36	335
Santa Ana PRPSV	Low	8 and 2	64	282

2.4.1 Existing Storage Deficiency

Public water systems are required to provide sufficient storage to meet any seasonal or diurnal variations in demand, fire flows, and emergency demands such as power outages and equipment failures. This Master Plan used operational, emergency reserve, and fire protection

storage guidelines as criteria for determining recommended treated water storage requirements. The criteria used for the storage calculations are defined in more detail in Appendix G and Chapter 7.

In addition to storage volume, treated water reservoirs in California must meet seismic design criteria to ensure they can provide the required level of service. Based upon information from the City and SSCWD, all existing treated water storage reservoirs have been designed or retrofitted to meet current seismic design criteria.

The storage evaluation indicates that the existing system is currently deficient in treated water storage. In evaluating the storage within the distribution system, there is a disproportionately high volume of storage in the Low Pressure Zone. This is problematic since storage located within the Low Pressure Zone is not available by gravity to the Middle or High Pressure Zones. Analysis of storage requirements indicates that a minimum of 2.6 million gallons of additional storage should be added to the Middle and High Pressure Zones to meet short-term needs. Table 7-5 of Chapter 7 shows that this is the minimum storage addition required through 2013.

2.4.2 Regulatory Requirements

Current drinking water regulations are in place to ensure that drinking water is free of harmful levels of microbes, contains minimal disinfection byproducts, and does not contain excess levels of organic or inorganic contaminants. All municipalities must continuously monitor their compliance with drinking water regulations. Understanding regulatory requirements is essential in developing a comprehensive and successful long-term plan for water supply and treatment.

For a treatment plant to remain in compliance, certain monitoring and reporting, treatment, and water quality standards must be met. Municipalities are also required to produce annual summary Consumer Confidence Reports (CCRs). The reports provide valuable data on each drinking water source and all levels of contaminants found. The most recent CCRs for the City and SSCWD were published in 2005.

Table 2-10 summarizes the regulations of concern within the Hollister Urban Area, based on 2005 Consumer Confidence Reports for both the City and SSCWD. Some of the rules regulate contaminants by setting maximum contaminant levels (MCLs), while others require specific treatment technologies. All regulations apply to surface water supplies or to sources that are

determined to be groundwater under the direct influence (GWUDI) of surface water. True groundwater supplies are subject to the same rules as surface water, except for the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), and the future Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The State of California retains primacy for enforcement of drinking water regulations. For some rules, the California has adopted regulations that are more stringent than federal regulations.

Specific improvements for the Lessalt WTP were described in a previous subsection. The proposed process improvements at the Lessalt WTP are required to meet the Stage 2 D/DBP Rule.

Table 2-10: Summary of Applicable Regulations and Compliance Status

Regulation	Summary	Required Compliance Date	City of Hollister (City)			Sunnyslope County Water District (SSCWD)		
			Status	Compliance?	Recommendations	Status	Compliance?	Recommendations
Surface Water Treatment Rule (SWTR)	Utilities are required to achieve minimum 3-log removal and/or inactivation of *Giardia* and 4-log removal and/or inactivation of viruses. Treated water turbidity less than 0.5 NTU for 95% samples and never exceed a maximum of 5 NTU. California Department of Health Services (DHS) requires treated water turbidity less than 0.2 NTU for 95% samples. (Turbidity requirements are superseded by new turbidity limits set by IESWTR)	1989	City/SSCWD operates the Lessalt WTP in a manner to meet removal requirements.	Yes	Continue with existing treatment and monitoring.	SSCWD/City operates the Lessalt WTP in a manner to meet removal requirements.	Yes	Continue with existing treatment and monitoring.
Total Coliform Rule (TCR)	No more than 5% positive total coliform samples in a distribution system each month.	1990	City conducts required monitoring.	Yes	Update Total Coliform Monitoring Plan to reflect estimated population served.	SSCWD conducts required monitoring.	Yes	Update Total Coliform Monitoring Plan to reflect estimated population served.
Lead and Copper Rule	90% of all samples at customer's tap must have lead levels equal or less than 0.015 mg/L and copper levels equal or less than 1.3 mg/L, respectively. If these action levels can not be met, system must implement public education and a corrosion control treatment strategy for meeting these levels.	1992	City conducts customer tap sampling.	Yes	Continue sampling for lead and copper at customer's tap per plan.	SSCWD conducts customer tap sampling.	Yes	Continue sampling for lead and copper at customer's tap per plan.
Consumer Confidence Report (CCR) and Public Notification Rules	Yearly summary report-CCR on water system must be sent to all customers by July of each year.	April 1999	Consumer Confidence Reports published annually.	Yes	Provide annual report to retail customers and DHS by July 1 of each year. Certify report information before October 1 of each year.	Consumer Confidence Reports published annually.	Yes	Provide annual report to retail customers and DHS by July 1 of each year. Certify report information before October 1 of each year.
Interim Enhanced Surface Water Treatment Rule (IESWTR)	Sanitary Survey once every 3 years; System must have specific records on file. 2-log *Cryptosporidium* removal. For membrane filtration systems, DHS requires 0.1 NTU individual filter effluent and CFE 95% of the time. Disinfection profile if TTHM > 64 µg/l or HAA5 > 48 µg/l.	Jan 2002	City conducted survey as required. Continuous monitoring at the Lessalt WTP. TTHM < 64 µg/l HAA5 < 48 µg/l.	Yes	Continue with existing monitoring.	SSCWD conducted survey as required. Continuous monitoring at the Lessalt WTP. TTHM < 64 µg/l HAA5 < 48 µg/l.	Yes	Continue with existing monitoring.
Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1D/DBPR)	TTHM/HAA5 ≤ 80/60 µg/l (Running annual averages). Chlorine and Chloramines residual maximum = 4.0 mg/L. TTHM/HAA5 compliance monitoring (4 samples per plant per quarter). For conventional systems, TOC Removal 15-50%, depending on raw water TOC and alkalinity, OR meet alternative compliance criteria.	Jan 2002	Monitors at four distribution system locations quarterly, has levels below MCL, and has developed a plan.	Yes	Continue with existing monitoring.	Monitors at four distribution system locations quarterly, has levels below MCL, and has developed a plan.	Yes	Continue with existing monitoring.

Regulation	Summary	Required Compliance Date	City of Hollister (City)			Sunnyslope County Water District (SSCWD)		
			Status	Compliance?	Recommendations	Status	Compliance?	Recommendations
Filter Backwash Recycling Rule	Notify State in writing regarding recycle practices: plant schematic, typical flows. Return all recycle flows to the head of the plant. Maintain records: Recycle notification, recycle flows, backwash flow rates, filter run lengths, recycle treatment, and design data.	Dec 2003	The City/SSCWD's membrane backwash water receives treatment. The City maintains related membrane performance data.	Yes	Continue with existing monitoring.	The SSCWD/City's membrane backwash water receives treatment. SSCWD maintains related membrane performance data.	Yes	Continue with existing monitoring.
Phase I, II, V Rules	Rules set monitoring requirements and MCLs for 16 inorganic (IOC), 30 synthetic (SOC), and 21 volatile organic contaminants (VOC).	1989-1993	Conducted required monitoring.	Yes	Continue with existing monitoring.	Conducted required monitoring.	Yes	Continue with existing monitoring.
Radionuclide Rule	Rule sets MCLs for radioactive contaminants: Beta/photon emitters $\leq$ 4 mrem/hr; Alpha emitters $\leq$ 15 pCi/L; Combined radium $\leq$ 5 pCi/L; Uranium $\leq$ 30 µg/L.	Dec 2003	City conducted gross alpha monitoring.	Yes	Monitor per requirements established by DHS.	SSCWD conducted gross alpha monitoring.	Yes	Monitor per requirements established by DHS.
Arsenic Rule	Set new MCL for arsenic $\leq$ 10 µg/L.	Jan 2006	Conducted required monitoring.	Yes	Continue with existing monitoring.	Conducted required monitoring.	Yes	Continue with existing monitoring.
Stage 2 Disinfectant and Disinfection Byproducts Rule (Stage 2 D/DBPR)	Initial Distribution System Evaluation (IDSE) requiring sampling based on population served. TTHM/HAA5 $\leq$ 80/60 µg/l as LRAA at new sampling sites (Stage 2)	2008-2010 (IDSE) 2013 (Stage 2)	The City is in the process of conducting IDSE.	NA	Finish IDSE study and get ready for monitoring at new sampling site. Implement recommended DBP Reduction Project at the Lessalt WTP.	SSCWD is in the process of conducting IDSE.	NA	Finish IDSE study and get ready for monitoring at new sampling site. Implement recommended DBP Reduction Project at the Lessalt WTP.
Long Term 2 Enhanced Surface Water Treatment Rule (LT2 ESWTR)	Two years (24 months) worth of source water *Cryptosporidium* monitoring for assignment of Bin classification (starting 2008). *Giardia*/virus inactivation profiling. Possible additional log treatment for *Cryptosporidium* depending on Bin classification (by 2013) (options include UV disinfection or membranes)	2010 (Crypto Bin) 2013 (Treatment Technique)	The City is aware of this new rule and will conduct the required monitoring for Bin classification starting 2008.	NA	Get ready for the required monitoring and possible additional treatment if needed.	SSCWD is aware of this new rule and will conduct the required monitoring for Bin classification starting 2008.	NA	Get ready for the required monitoring and possible additional treatment if needed.
Ground Water Rule	Disinfection compliance monitoring for 4-log removal of viruses. Sanitary survey every 3 years.	Late 2009	The City will conduct the required monitoring and sanitary survey beginning 2009.	NA	Get ready for the required monitoring and survey.	SSCWD will conduct the required monitoring and sanitary survey beginning 2009.	NA	Get ready for the required monitoring and survey.

3.0 Existing Wastewater Facilities

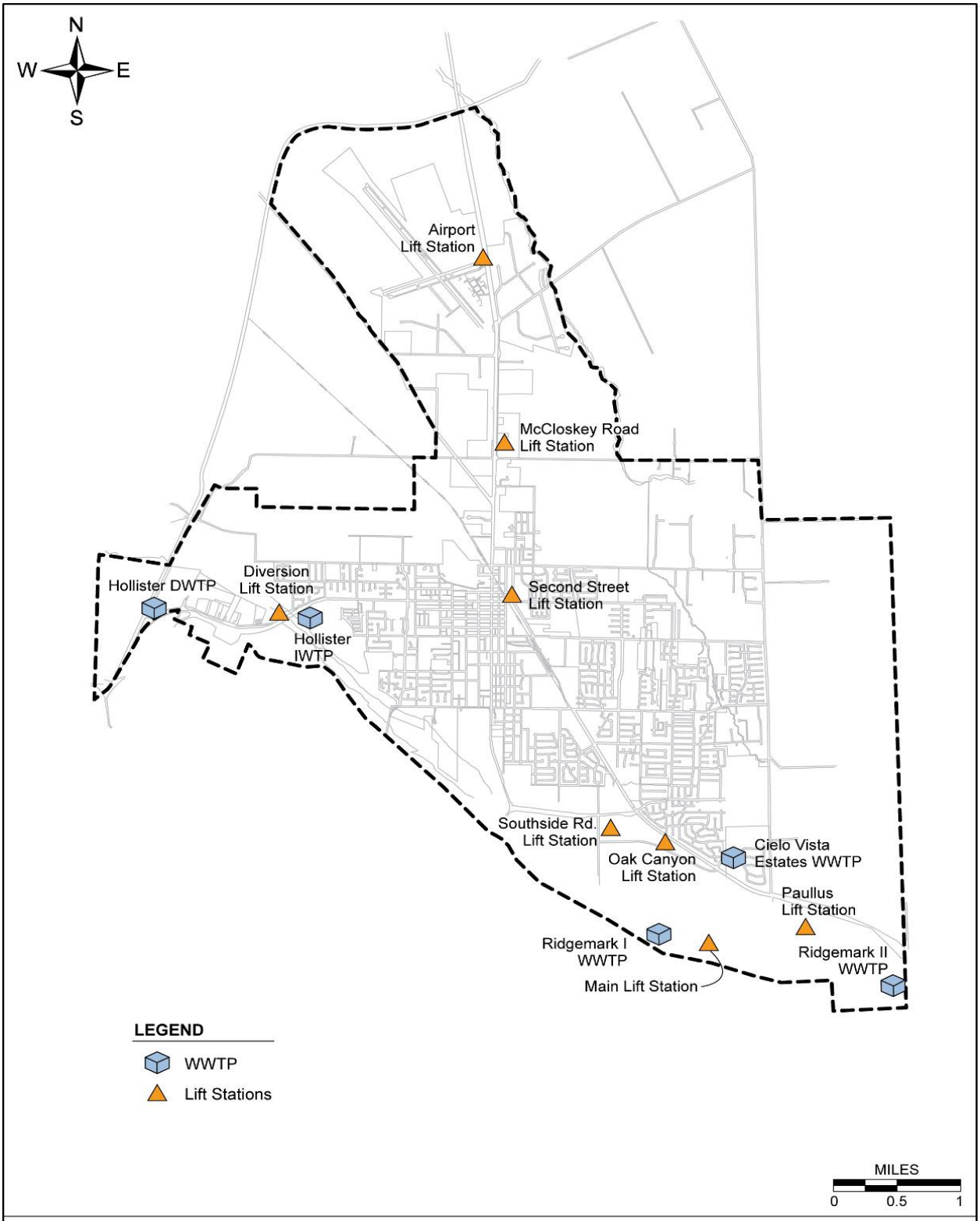
This chapter provides an overview of the existing wastewater facilities in the Hollister Urban Area, including the collection systems, treatment facilities, and disposal facilities. Five wastewater treatment plants treat the domestic, commercial, and industrial wastewater flows generated within the Hollister Urban Area. The existing wastewater facilities are owned by three separate agencies, the City of Hollister, SSCWD, and San Benito County (Cielo Vista Estates Wastewater Treatment Plant). The facility descriptions are included below and are organized by agency. The locations of these wastewater treatment plants are shown in Figure 3-1. The wastewater service areas for the City and SSCWD are shown in Figure 3-2.

3.1 City of Hollister Wastewater Facilities

The City owns and operates the domestic wastewater treatment plant (DWTP) located south of the San Benito River. The DWTP was built in 1979 to treat the City's domestic wastewater, consisting predominantly of residential and commercial customers within the City's service area. Currently, the DWTP is operating at capacity. Projected population growth and improved treatment quality are the major drivers for the upgrade and expansion of the facility.

The City also owns and operates the industrial wastewater treatment plant (IWTP) that serves the City of Hollister. The IWTP treats seasonal industrial wastewater and storm water from the downtown area. The IWTP is located west of downtown Hollister at the west end of South Street and on the north side of the San Benito River less than a mile east of the DWTP. Built in 1971, the IWTP served two canneries until 1992, when one of the canneries discontinued operation. San Benito Foods is currently the only remaining industrial discharger to the IWTP and discharges tomato cannery wastewater during the summer and early fall. The City has received permission from the RWQCB to temporarily divert excess domestic wastewater from the DWTP to the IWTP to leverage additional treatment and disposal capacity available when the cannery is not discharging wastewater.

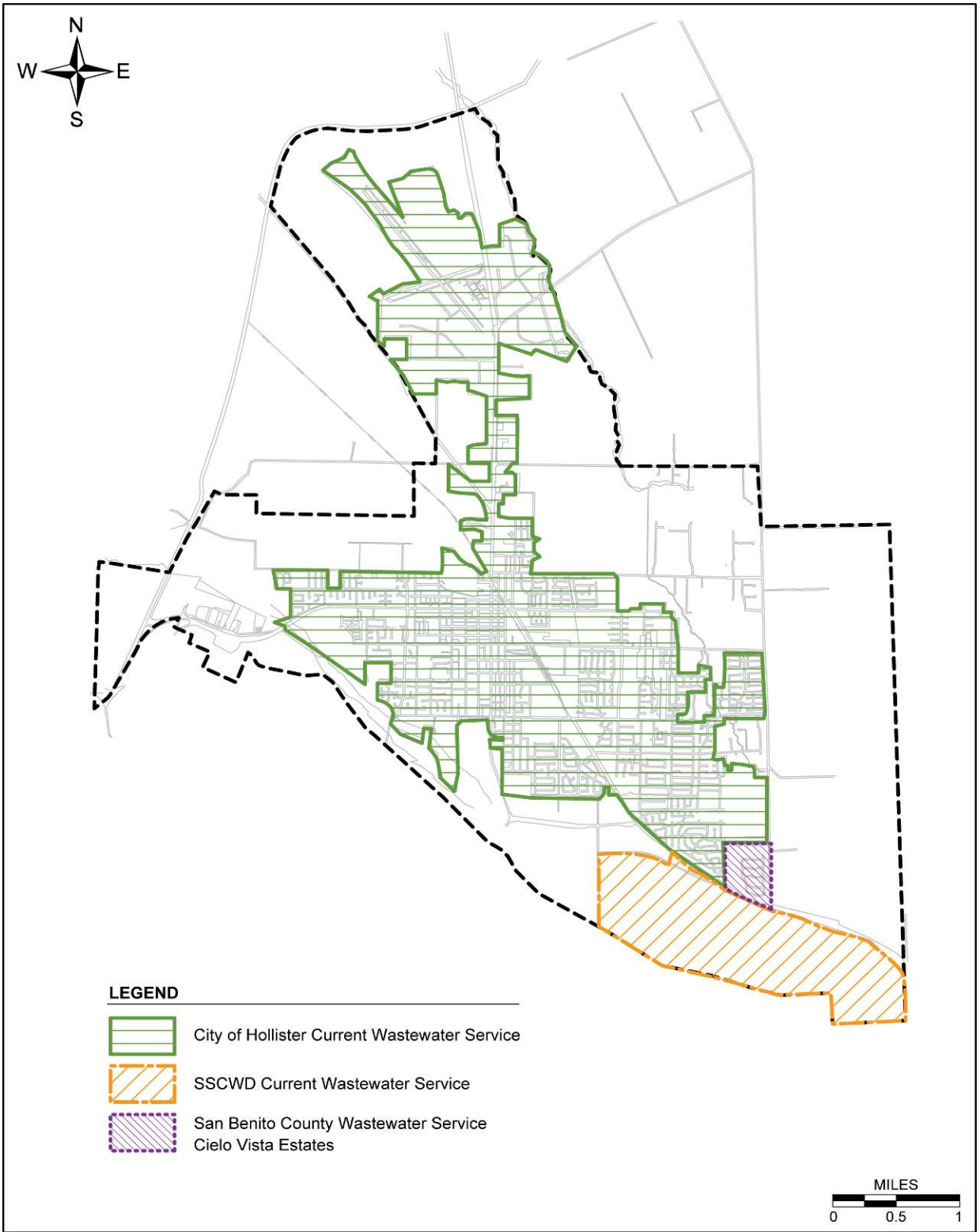
The City is responsible for the operation, maintenance, monitoring, and reporting for the IWTP and the DWTP. Table 3-1 shows the current and projected 2023 wastewater flows for the City of Hollister's two wastewater treatment plants.



Hollister Urban Area Water and Wastewater Master Plan

Lift Stations and Wastewater Treatment Facilities

Figure 3-1



Hollister Urban Area Water and Wastewater Master Plan

Wastewater Service Areas

Figure 3-2

Table 3-1: Current and Projected Wastewater Flows

Treatment Plant	Average Dry Weather Flows (mgd)	
	Current	Projected 2023
Domestic Wastewater Treatment Plant	2.69	4.04[a]
Industrial Wastewater Treatment Plant	0.66	0.66
Ridgemark Wastewater Treatment Plant	0.25	0.46

(a) Source: City LTWMP. LTWMP sited 2023 projected flows for DWTP as 4.49 mgd, which included 4.04 mgd from the City and 0.46 mgd from SSCWD.

3.1.1 Collection System

The City of Hollister's collection system consists of gravity pipelines and force mains ranging from 4- to 36-inches in diameter. Exhibit III shows the existing collection system piping and manhole locations.

The City has six lift stations: Airport Lift Station No. 1, McCloskey Lift Station No. 2, Second and East Lift Station No. 3, Lift Station No. 4, Southside Road Lift Station No. 5, and Diversion Lift Station No. 6. Lift Station No. 4 was removed from service in 2003 during collection system improvements. Diversion Lift Station No. 6 can convey flow to or from the IWTP. The locations of the active lift stations are shown in Figure 3-1.

3.1.2 City of Hollister Domestic Wastewater Treatment Plant

The DWTP was originally constructed in 1979 and became operational in 1980. At the time, the DWTP consisted of influent screening, aerated facultative primary ponds, a shallow high-rate secondary pond, two algae settling ponds, and approximately 1.6 acres of percolation beds, the only method of effluent disposal. The facility was operated as an advanced integrated pond system (AIPS) that uses microorganisms in the wastewater to convert soluble biological oxygen demand (BOD) into biomass that is removed from the wastewater by settling. The algae present in the secondary pond are the source of oxygen for the treatment process. These algae are separated from the wastewater in the settling ponds prior to percolation.

Since the DWTP became operational, a series of improvements were implemented to address various treatment and discharge deficiencies:

- In 1987, the City renovated the facility to add a new operations building and headworks equipped with an influent screen, comminutor, and flow measurement. At that time the RWQCB issued a new Waste Discharge Requirements (WDR) Order (87-47) regulating

treatment and disposal activities at the facility. The major change was to increase the permitted capacity to 2.69 million gallons per day (mgd).

- In 1994, the eastern percolation beds were renovated to increase effluent discharge capacity that had diminished over the years due to elevated treated effluent total suspended solids (TSS) levels.
- In 1996, the western percolation beds were added to increase the effluent discharge capacity.
- The City modified the flow path and operation of the DWTP several times over the years to improve effluent quality and reduce algae levels in the treated wastewater.
- In late 2002, the City began a series of capital and maintenance improvement projects to the DWTP. The first of these improvements began in late 2002 with the development of a 50 mgal emergency storage pond. In early 2003, the City started a biosolids removal project in one of the two aerated facultative primary ponds to dispose of biosolids that had accumulated since the pond became operational in 1980.

3.1.2.1 Interim Improvements

In response to the Cease and Desist Order (No. R3-2002-0105) issued in 2002, the City constructed interim improvements at the DWTP to provide short-term improvements in plant performance until the long-term management plan could be fully implemented. Specific objectives for these interim improvements included improving effluent quality, odor control, and flow measurement. These interim improvements introduced considerable changes to the treatment process by converting the original primary pond/advanced integrated pond system into a dual powered multi-cellular lagoon (DPMC) process for improved BOD reduction and TSS control. The DPMC system is designed for the permitted 30-day average dry weather flow of 2.69 MGD. Photograph 3-1 shows the mechanical aeration in the DPMC pond.

In addition to the secondary process changes, there were additional improvements to the DWTP headworks and flow metering. To control odors and improve flow measurement, a new influent lift station was constructed equipped with a mechanical grinder, an odor control biofilter, and magnetic flow meter. These headworks improvements were designed to be incorporated into any potential wastewater treatment plant upgrades and have been operating since completion in the summer of 2003. Figure 3-3 shows a schematic of the existing DWTP facilities.

Photograph 3-1: Aeration at DWTP Pond

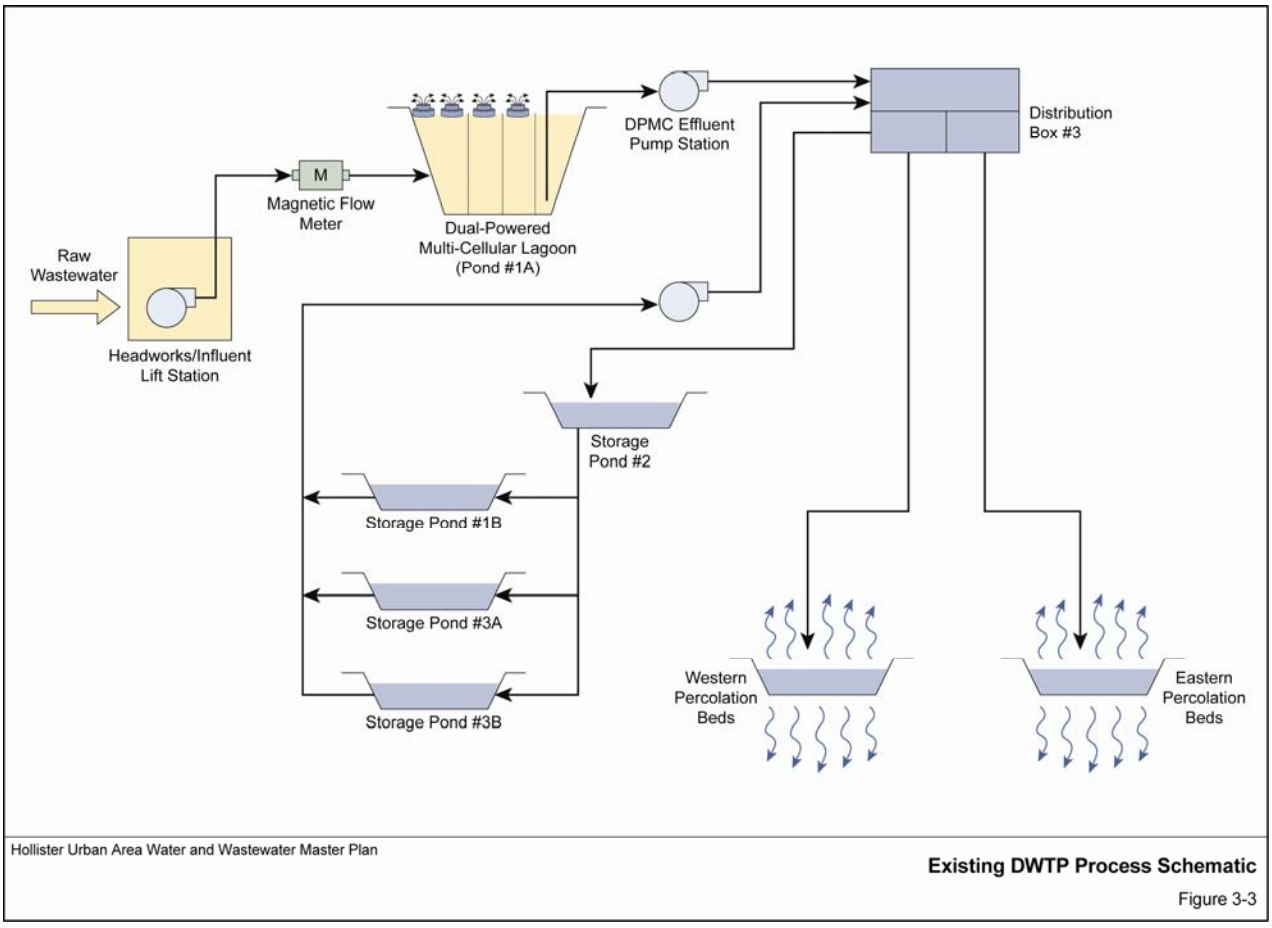


Figure 3-3: Existing DWTP Process Schematic

3.1.2.2 Regulatory Order History

The following items summarize the history of regulatory actions related to the DWTP.

- 1974: DWTP first regulated by RWQCB.
- 1987: RWQCB issues revised WDR Order (87-47) after improvements to facility headworks and other processes to increase treatment capacity to 2.69 mgd.
- 2000: RWQCB issues WDR Order (00-020) allowing temporary diversion of domestic wastewater to the IWTP until June 30, 2005 (subsequently revised to December 31, 2007). This permit also set requirements for development and implementation of a LTWMP for the DWTP and IWTP. Implementation of the LTWMP recommendations is required by December 31, 2007.
- 2002: RWQCB issues Cease and Desist Order (R3-2002-0105) in response to unauthorized discharges from the DWTP and IWTP to the San Benito River channel. During 2001 and 2002 it is estimated that 6,100 gallons of undisinfected wastewater seeped into the river channel from one of the DWTP percolation beds. On May 6, 2006, a levee of a pond at the IWTP was breached resulting in a discharge of approximately 15 million gallons of undisinfected domestic wastewater into the river channel. There were also concerns that influent flow measurements at the DWTP may not have been accurate.
- 2002: An Administrative Civil Liability Order (R3-2002-0097) accompanied the Cease and Desist Order (R3-2002-0105) that specified fines and other damages to be paid by the City resulting from these discharges.
- 2005: RWQCB issues Order R3-2005-0142 to modify the orders issued in 2000 and 2002 to provide extensions for the preparation and implementation of the LTWMP.

3.1.2.3 Effluent Disposal

Currently, seven percolation beds west of Highway 156 and eight percolation beds east of Highway 156 are the sole means of effluent disposal at the DWTP. These 15 beds cover 55.5 acres. The capacity of the percolation bed system was reevaluated in May 2002 to determine the extent that the percolation rates may have been affected by changes to DWTP operations, surrounding groundwater management practices, meteorology, and hydrogeology. Rates were compared to a 1998 assessment.

The 2002 evaluation estimated the net percolation bed capacity at 3.5 to 4.0 mgd during the summer and 2.3 to 2.7 mgd during the winter season. The City currently treats approximately

2.7 mgd at the DWTP and has insufficient capacity in its existing DWTP percolation beds during the winter season. As a result, a portion of the domestic wastewater is diverted to the IWTP during the winter, as permitted by Order 00-020 and amended by Order R3-2005-0142, to efficiently leverage the existing available treatment and percolation capacity at the IWTP. This strategy will continue for effluent disposal until implementation of a recycled water distribution system that will achieve the City's long-term effluent management goals.

3.1.3 Industrial Wastewater Treatment Plant

The IWTP was originally built in 1971 and is located approximately three-quarters of a mile to the east of the DWTP. Originally, the IWTP consisted of influent screening, two sedimentation ponds, aeration ponds, and approximately 36.1 acres of percolation ponds.

The IWTP was originally designed to treat high-strength industrial wastewater from two industrial dischargers. As of 1992, there was only one seasonal industrial discharger, San Benito Foods, discharging to the IWTP. San Benito Foods is a tomato processing facility operating during the summer and early fall months, typically July to October.

Following initial design and construction, the IWTP underwent the following series of improvements that addressed various treatment and discharger deficiencies:

- In 1973, a lagoon was created to store sludge collected in the two sedimentation ponds.
- In 1981, an additional percolation bed was constructed along the San Benito River for increased disposal capacity. However, during the winter of 1997-1998, this bed was permanently destroyed by river erosion.
- In 1988, the operational strategy of the IWTP was modified in response to improved screening processes implemented at the canneries prior to discharge into the industrial sewer – storm drain system. This resulted in a reduced loading of large solids in the influent wastewater that previously required removal. As a result, the two sedimentation ponds were bypassed and influent flows were conveyed directly to the aeration ponds. With the sedimentation ponds out of service, the sludge storage lagoon installed in 1973 was not required and was taken out of service.
- The IWTP operated in the 1988 operational mode until 2000 when the City requested, and received permission from the RWQCB, to divert peak domestic wastewater flows

for treatment and discharge at the IWTP on a temporary basis. In preparation of this modification, the City upgraded the influent headworks to the IWTP with a new mechanical screen to remove floatable solids from the influent domestic wastewater. Modifications to the secondary pond lift station were also made to allow effluent from the second aeration pond to be pumped to all operating discharge beds.

The IWTP was designed to treat a monthly average of 6.10 mgd during the canning season and 2.60 mgd the remainder of the year to secondary treatment standards utilizing the conventional aerated pond treatment system. However, the currently RWQCB permit limits flows to 3.5 mgd during the canning season and 1.72 mgd during the non-canning season.

3.1.3.1 Regulatory Order History

The following items summarize the history of regulatory actions related to the IWTP:

- 1972: IWTP was first regulated by RWQCB.
- 1986: RWQCB issues WDR Order (86-28) governing the operation of the IWTP.
- 1990: RWQCB issues WDR Order (90-90) after increases in the disposal capacity were implemented through the creation of a new percolation pond.
- 2000: RWQCB issues WDR Order (00-020) allowing temporary diversion of domestic wastewater from the DWTP to the IWTP and year-round treatment and disposal operations at the IWTP. Previously, the IWTP was operated on a seasonal basis as stormwater and cannery wastewater flows required. Effluent quality requirements were made more stringent and were to be phased in over the following two years.

3.1.3.2 TDS, Sodium, and Chlorine Compliance

Permit limits became more stringent as of May 20, 2002. Consequently, the City has reported discharge limit exceedances at the IWTP for TDS, sodium, and chloride. Removal of these dissolved constituents would typically require advanced treatment processes such as reverse osmosis, ion exchange, or electrodialysis. These processes are typically expensive, both to implement and to operate, and would require disposal of waste brine. An alternative to removing dissolved constituents at the wastewater treatment plant is source control in the wastewater collection system.

The City has been working with San Benito Foods to develop a strategy for reducing wastewater TDS levels. In March 2003, the City evaluated the ability of the IWTP to control effluent TDS by implementing limitations on wastewater characteristics discharged from San Benito Foods. The study concluded that there is a reasonable potential that the IWTP could comply with TDS discharge requirements if source control measures proposed by San Benito Foods are implemented and achieve a minimum net reduction of 20 percent of the TDS in the raw industrial wastewater.

3.2 Sunnyslope County Water District Wastewater Facilities

The SSCWD operates two wastewater treatment plants that serve residential and a few commercial businesses located near the Ridgemark Golf Course. The 2005 population of the Ridgemark sewer service area was estimated at 3,720. In 2025, the population is projected to be 5,137 based on the current service area. Future expansion of the sewer service area would result in additional population increases.

The Ridgemark (RM) wastewater treatment system consists of two separate wastewater treatment plants: the RM I and RM II. RM I was constructed in 1974 and consisted of five ponds. RM II was constructed in 1988 and consists of four ponds. A final disposal pond (Pond 6) was added near RM I during the construction of RM II. Flows can be transferred between RM I and RM II through an interconnecting force main and transfer lift stations. This pipeline provides the ability to dry out disposal ponds for maintenance.

RM I and RM II are permitted for a combined 30-day running average, dry weather flow of 0.3 mgd (May through October) and a 30-day running average, wet weather flow of 0.31 mgd (November through April). Currently, the 30-day running average dry and wet weather flows conveyed to the two treatment plants are estimated at 0.26 and 0.28, respectively. In 2025, the 30-day running average dry and wet weather flows are estimated to be 0.36 and 0.38 mgd, respectively.

3.2.1 Collection System

Three lift stations operate to convey wastewater to the treatment ponds. The Oak Canyon Lift Station pumps to the Main Lift Station at RM I and the Paullus Drive Lift Station pumps to RM II. Each of these lift stations is a submersible duplex station with pumps set to operate in a

lead-lag operational mode. Each lift station has backup power electrical cables that can be attached to portable generators in the case of a power outage. The Main Lift Station provides the required head to convey wastewater through the RM I treatment process. No additional pumping is provided at the headworks of the RM II facility. Figure 3-1 shows the locations of the two treatment plants, and three lift stations.

3.2.2 Ridgemark Area Wastewater Treatment and Disposal

3.2.2.1 Ridgemark I Wastewater Treatment Plant

Figure 3-4 shows a process schematic for the RM I facility. The RM I influent is measured by a magnetic flow meter located on the pumped discharge from the Main Lift Station. Pond 1 uses floating aerators for mechanical oxygenation and Pond 2 is a facultative, non-aerated pond that relies on algae for oxygen production. Conveyance between Ponds 1 through 5 is accomplished by gravity. The combined area of the treatment ponds is 2.3 acres and the combined area of the four disposal ponds is 5.1 acres.

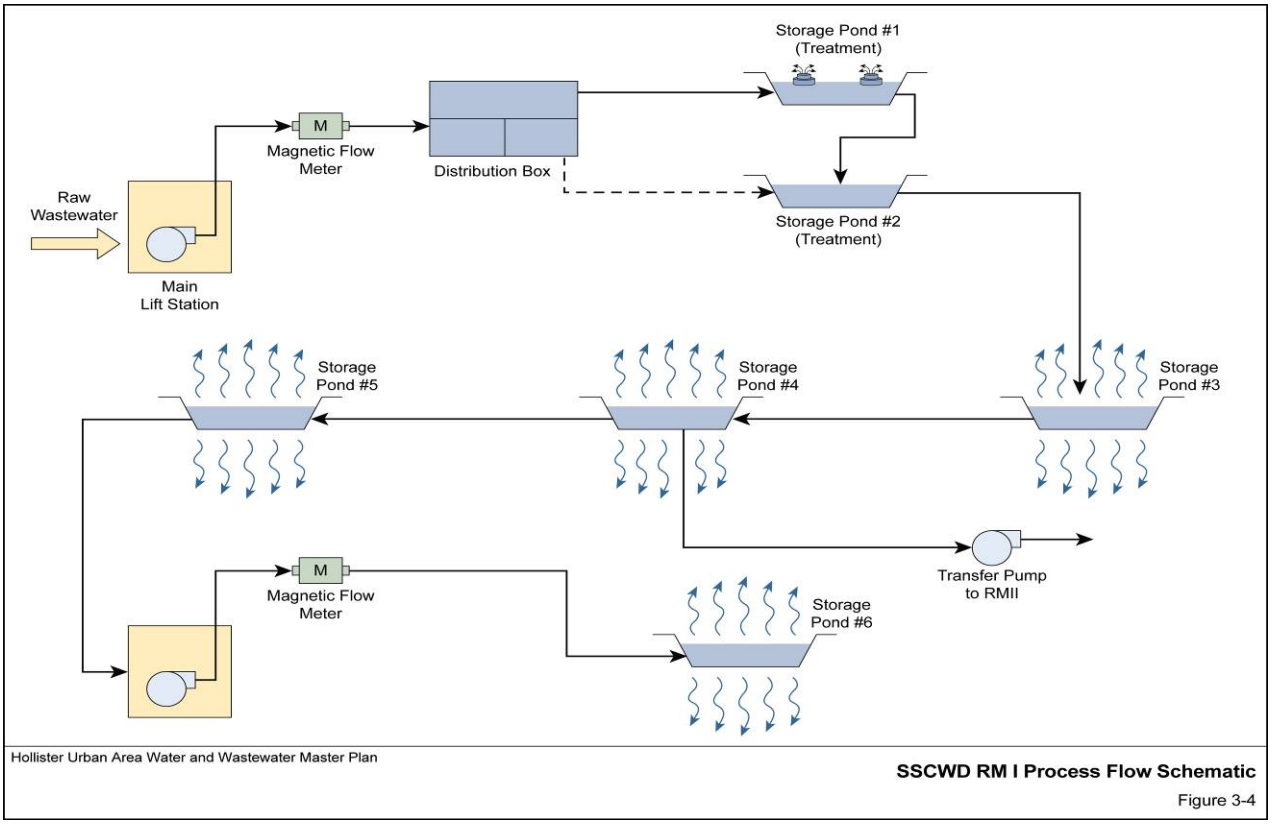


Figure 3-4: SSCWD RM I Process Flow Schematic

Effluent disposal from RM I is achieved through evaporation and percolation in Ponds 3 through 6. However, the percolation capacity of these ponds was greatly reduced due to the accumulation of biosolids at the pond bottom. Ponds 3 through 5 are plumbed to operate in series and are therefore not easily taken out of service without significantly impacting disposal capacity. Treated effluent from Pond 5 is pumped to Pond 6, designed as a rapid infiltration pond (Photograph 3-2), which is considered to be the primary disposal pond for RM I. Typically, Pond 6 is taken out of service, disked, and ripped annually to ensure continued high disposal capacity. However, Pond 6 percolation capacity has declined in recent years causing a reduction in the overall disposal capacity at RM I (Figure 3-4).

Photograph 3-2: Disposal Pond 6 at RM I Facility

Recent maintenance and solids removal from Ponds 3 through 5 have substantially increased their disposal capacity. Following the 2004-2005 wet weather season, SSCWD had an immediate need to increase disposal capacity, as Pond 6 percolation had significantly decreased. Work commenced in August 2005 to drain, dry, and remove solids from Pond 4. Following this work, the pond was placed back into service and percolation rates have increased. Similar work on Pond 3 and Pond 5 was completed in October 2005 and Fall 2006, respectively.

3.2.2.2 Ridgemark II Wastewater Treatment Plant

Figure 3-5 shows the process schematic for the RM II facility. Influent wastewater to RM II is a combination of pumped flow from the Paullus Lift Station and gravity flow from nearby areas that is measured using a three-inch Parshall flume. Similar to RM I, the first two ponds are

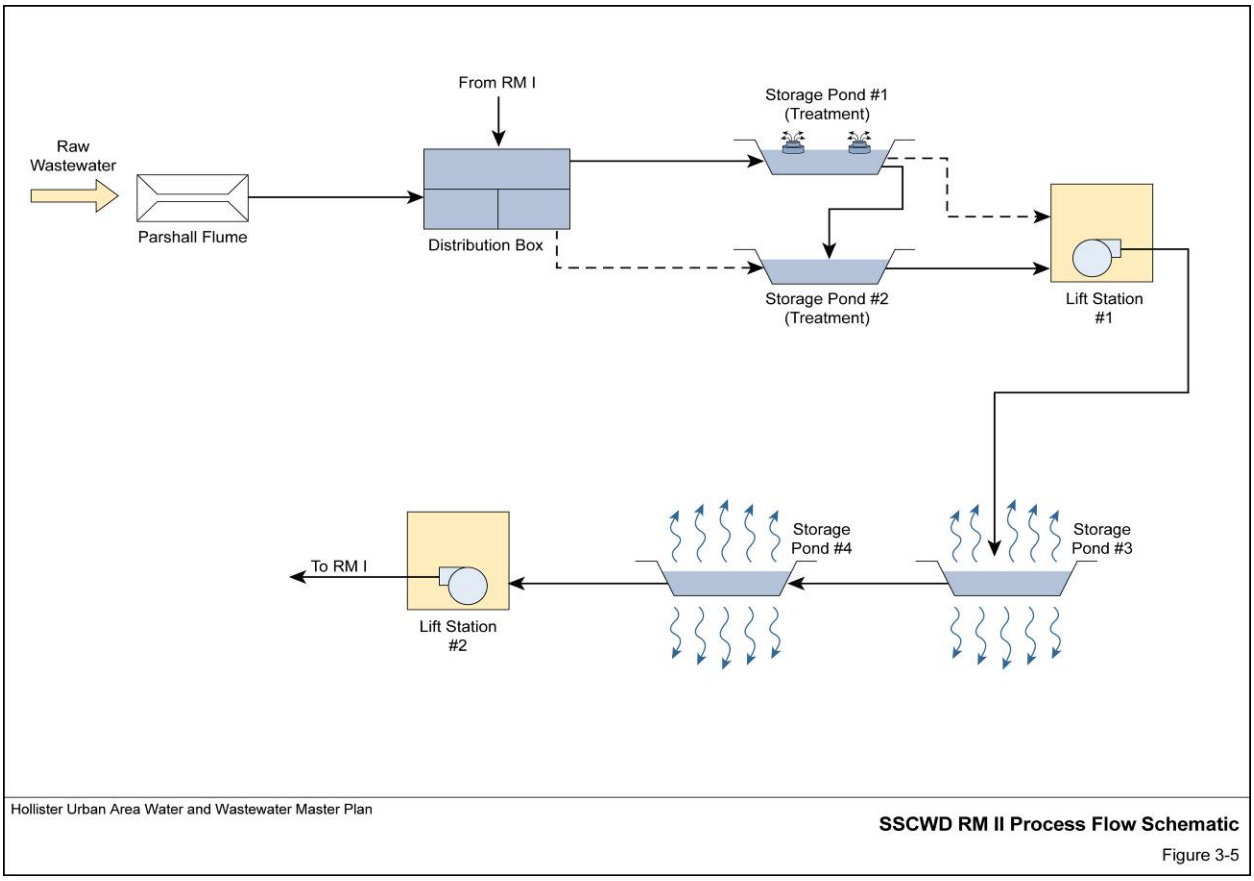


Figure 3-5: SSCWD RM II Process Flow Schematic

used for treatment with mechanical aeration in Pond 1 and algal aeration in Pond 2. Photograph 3-3 shows Ponds 1 and 2 at the RM II treatment facility with the Ridgemark Golf Course in the background.

Photograph 3-3: RM II WWTP Treatment Ponds

Ponds 3 and 4 are used for percolation and evaporation. The combined area of the treatment ponds is 2.8 acres and the combined area of the disposal ponds is 2.2 acres. Conveyance between Pond 1 and 2 and between Ponds 3 and 4 is by gravity. Lift Station No. 1 is used to transfer flow from Pond 2 to Pond 3.

Effluent disposal from RM II is primarily through evaporation in Ponds 3 and 4. Percolation is thought to be minimal since subsurface investigations have identified a clay layer underneath the disposal ponds. RM II currently operates well below its design flow, and due to the relatively long retention time, a large portion of the treated effluent is evaporated.

3.3 Cielo Vista Estates Wastewater Treatment Plant

Cielo Vista Estates was established as San Benito County Service Area No. 22 on April 1, 1987 and was granted a WDR permit by the RWQCB on July 10, 1987. Cielo Vista Estates is located northwest of the intersection of Fairview Road and Airline Highway, and consists of approximately 70 acres of residential development with approximately 76 residences. Approximately 1.2 miles of sewer collection pipe provide service to this area.

The wastewater treatment facility consists of an enclosed package sequencing batch reactor (SBR) with capacity to treat up to 30,000 gallons per day of domestic wastewater. Average influent wastewater flow is estimated at 20,000 gallons per day which is consistent with this level of development. Treated effluent is disposed of via leachfields adjacent to the treatment facility. Between October 2004 and September 2005, 22 acre-feet of treated wastewater was disposed of through the leachfield system. The leachfields are located on gently sloped land consisting of sandy and gravely soils located approximately 180 feet above the groundwater level. Bracewell Engineering of Oakland, California operates this facility under contract to San Benito County.

3.4 Regulatory History

On May 6, 2002, the Hollister City Council (City Council) adopted an urgency ordinance suspending issuance of building permits for new construction resulting in additional connections to the sewer system. This ordinance was adopted in response to concerns regarding flow metering, an unpermitted discharge of approximately 15 million gallons of treated effluent to the San Benito River, and delays in meeting milestones for developing an LTWMP by May

2005. This ordinance was adopted by the City Council for immediate protection of the public health, safety, and welfare.

On May 13, 2002, the City Council directed City staff to prepare a more formal ordinance than the urgency ordinance previously adopted. On May 20, 2002, the City Council adopted Ordinance 974 suspending issuance of building permits for new construction in the City. This includes (1) construction of new commercial, residential, or industrial building, which require connection to the City sewer system; (2) construction of new dwelling units; and (3) building additions that include installation of a new plumbing fixture unit.

City staff's May 16, 2002 report indicated there are currently 148 residential units, including 40 apartment units and 6 commercial/industrial projects that have been issued building permits but had not yet connected to the sewer system. The City estimated these permits represent an additional 40,000 gallons per day of wastewater flow, which City staff believes could be adequately treated and disposed with the existing facilities. Therefore, City Ordinance 974 allowed those structures to connect to the sewer system, but prohibits issuance of any new building permits.

On May 31, 2002, the RWQCB Board Executive Officer issued Cleanup and Abatement Order R3-2002-0082 to the City, requiring abatement of potential effects of additional domestic wastewater flow to the domestic or industrial wastewater treatment plants. Order R3-2002-0082 requires the City to keep in effect its self-imposed building permit moratorium. The RWQCB issued Cease and Desist Order R3-2002-0105 to replace the Cleanup and Abatement Order R3-2002-0082. Cease and Desist Order R3-2002-0105 was subsequently amended by Order R3-2005-0142. Together these orders restrict additional domestic wastewater flow to the City's collection system by ordering a formal connection permit moratorium. This prevents the City from lifting its self-imposed building moratorium adopted by the City Council on May 13, 2002. The orders also sets an influent flow limitation of 2.69 mgd at the domestic wastewater treatment plant and flow limitations of 0.18 and 1.52 mgd at the industrial wastewater treatment plant during the canning and non-canning seasons, respectively.

3.5 Required Wastewater System Improvements

Improvements to the existing wastewater facilities in the Hollister area are required to address regulatory requirements, projected population growth, and objectives set forth in the MOU for this Master Plan. The requirements were used to guide the development of alternatives and select recommended projects and upgrades.

3.5.1 City of Hollister Domestic Wastewater Treatment Plant Regulatory Requirements

Waste Discharge Requirements Order (00-020) and Cease and Desist Order R3-2002-0105) specified certain improvements to the DWTP. As a result of this order and subsequent communications with the RWQCB, the following major infrastructure improvements were identified:

- Increased treatment and disposal capacity
- Reduced effluent nitrate and ammonia concentrations
- Reduced effluent suspended and dissolved solids concentrations

After the proposed improvements to the DWTP are implemented, the Cease and Desist Order can be lifted and the City will be allowed to retract their building moratorium. Once this occurs, it is anticipated that substantial development will follow, resulting in an increase in wastewater flow to the DWTP.

Based on the RWQCB Basin Plan and other WDR permits issued for nearby wastewater treatment facilities, the DWTP is anticipated to have specific effluent quality requirements that need to be met prior to wastewater discharge. The existing and anticipated regulatory requirements are compared to the current effluent concentrations in Table 3-2.

Table 3-2: Anticipated DWTP Wastewater Regulatory Limits and Existing Concentrations

Constituent	Existing Wastewater Regulatory Limits (mg/L)	Anticipated Wastewater Regulatory Limits (mg/L)	Current Concentrations (mg/L)
Total Dissolved Solids	NR	1,200	960 - 1,300
Sodium/Chloride	NR	200 / 200	209-460 / 256-342
Nitrate/Ammonia	NR	5 / 5	0.05-0.14 / 27-33
Total Suspended Solids	60	30	< 60
Biological Oxygen Demand	NR	30	< 60

NR – No Requirement

3.5.2 City of Hollister Industrial Wastewater Treatment Plant Regulatory Requirements

The WDR permit for the industrial wastewater treatment plant (IWTP) includes effluent concentration limits for suspended and dissolved solids. TSS limits are 2.5 mg/L for a 30-day average with a maximum of 10 mg/L. Effluent quality requirements and current concentrations are summarized in Table 3-3. To date, the City's primary response to address periodic TDS, sodium and chloride concentration exceedances has been on source control to mitigate high concentrations of these constituents in the influent wastewater.

Table 3-3: IWTP Permit Requirements and Current Concentrations

Constituent	WDR Permit Requirements (mg/L)	Canning Season Concentrations (mg/L)	Non-Canning Season Concentrations (mg/L)
Settable Solids	2.5 (30-day average)	NA	350
TDS	1,415	1,200	1,400
Sodium	250	300	300
Chloride	240	170	360

NA – Not Available

3.5.3 SSCWD (Ridgemark WWTPs) Regulatory Requirements

The SSCWD LTWMP was developed in response to an updated WDR Order (R3-2004-0065) issued to SSCWD by the RWQCB. This permit imposes more stringent effluent quality requirements on the SSCWD treatment facilities and an upgrade to the existing treatment process would be required to meet these regulations. Table 3-4 summarizes the 30-day average regulatory requirements and the current concentrations in the effluent for the RM I and RM II treatment facilities.

Table 3-4: SSCWD Permit Requirements and Current Concentrations

Constituent	2010 Wastewater Effluent Limits (mg/L)	Current (2005) Concentrations (mg/L)	
		RM I	RM II
Total Dissolved Solids	1,200	1,774	1,973
Sodium/Chloride	200 / 200	416 / 694	508 / 738
Nitrate/Ammonia	5 / 5	0.12 / 22	0.34 / 7.7
Total Suspended Solids	30	88	21
Biological Oxygen Demand	30	57	8

The revised WDR also requires SSCWD to evaluate the feasibility of connecting to the City of Hollister wastewater system for treatment and disposal of their wastewater at the City's new domestic wastewater treatment plant that is currently under construction. The findings of the LTWMP are summarized in Chapter 8.

3.5.4 San Benito County Cielo Vista Estates WWTP Regulatory Requirement

The Cielo Vista Estates WWTP is currently operating within the requirements of their WDR permit. This permit was originally issued in 1987 and since that time, the Central Coast Groundwater Basin Plan has been revised. Given that this Basin Plan has been revised, the RWQCB may elect to review this permit and modify it to be more consistent with the recommendations of the current Basin Plan. When this review occurs, San Benito County and Cielo Vista Estates will reevaluate their processes to address any new requirements. At that time, San Benito County and the Cielo Vista Estates may elect to decommission the Cielo Vista Estate WWTP and convey the raw wastewater to the DWTP. This strategy was not included in the wastewater flow projections shown in Table 3-1. However, given the volume of flow routed to the Cielo Vista Estates WWTP relatively to the capacity of new DWTP, conveyance of raw wastewater from Cielo Vista Estates to the DWTP are not expected to impact the facility requirements currently under construction at the DWTP.

3.5.5 Collection System Regulatory Requirements

In May 2006 the State Water Resources Control Board (SWRCB) adopted new WDR for sanitary sewer systems to provide a consistent statewide approach for reducing sanitary sewer overflows (SSOs). These requirements are documented in SWRCB Order 2006-0003 and apply to any city or public agency that owns or operates more than one mile of sewer lines.

The SWRCB WDR order does not specify requirements for collection system improvements, however, through the development of the sewer system management plan (SSMP) required by the WDR, improvements are often identified and would need to be implemented to control the occurrence of SSOs.

Table 3-5 is a summary of the deadlines that apply from the date of WDR adoption, May 2, 2006, to the City, SSCWD, and Cielo Vista Estates collection systems:

Table 3-5: Waste Discharge Requirement Deadlines for the City, SSCWD, and Cielo Vista Estates

	City of Hollister	SSCWD	Cielo Vista Estates Collection System
Applicable Population Range	10,000-100,000	2,500-10,000	< 2,500
Submit WDR Permit Application	November 2, 2006	November 2, 2006	November 2, 2006
Report all SSOs via SWRCB electronic Reporting System	May 2, 2007	May 2, 2007	May 2, 2007
Create SSMP Development Plan and Schedule	November 2, 2007	February 2, 2008	May 2, 2008
Identify SSMP Goals; Define Organizational Structure for SSOs; Implement SSMP Recommendations	November 2, 2007	May 2, 2008	May 2, 2008
Develop Overflow Emergency Response Plan; Identify legal authorities to minimize SSOs; develop O&M Program; and Develop a Fats, Oils, and Grease Control Program	May 2, 2009	November 2, 2009	February 2, 2010
Develop Design and Performance Provisions; Evaluate System for Deficiencies; Evaluate Capacity Limitations; Approve The Final SSMP Including all State Water Resources Control Board Requirements	August 2, 2009	May 2, 2010	August 2, 2010

O&M – operations and maintenance

4.0 Basis of Planning

This chapter provides the basic information used in the development of concepts and alternatives for an integrated water resources management plan. The basis of planning includes assumptions with respect to the Study Area, planning period, land use, population, projected water demands, projected wastewater flows, and cost estimates. Through the application of a uniform set of planning assumptions, concepts and alternatives were developed in a manner to allow an objective comparison and evaluation of results.

4.1 Study Area

The Master Plan Study Area developed by the MOU Parties includes lands that are planned for future development that may require municipal and industrial water supply and wastewater collection and treatment services. The Hollister Urban Area lies within the Hollister Valley formed by the San Benito River and its tributaries, the Santa Ana, Tres Pinos, and Pescadero Creeks. The Study Area (Figure 4-1) includes the Hollister Planning Area boundary which includes the Sphere of Influence adopted by the Local Agency Formation Commission and some adjacent lands. The Study Area also includes lands that are designated in the San Benito County General Plan as industrial, commercial, or residential having a minimum density of one dwelling unit per acre. As described in the City's General Plan, the City Planning Area includes the current City limits and the unincorporated lands which ultimately may be developed and annexed to the City.

There are ten special study areas located within and outside the Master Plan Study Area boundary. As described in

Table 4-1, these special study areas are served by groundwater, City water supplies, and individual septic systems. In some of the special study areas, mutual water systems have been established. There is the potential that one of the MOU Parties may have to provide water and/or sewer service in the future if the need arises to one or several of these special study areas. For example, the City has extended water service to Special Study Area Number 7 in response to perchlorate issues in local groundwater supplies. As part of this master planning project, the MOU Parties desire to develop an institutional strategy for monitoring these

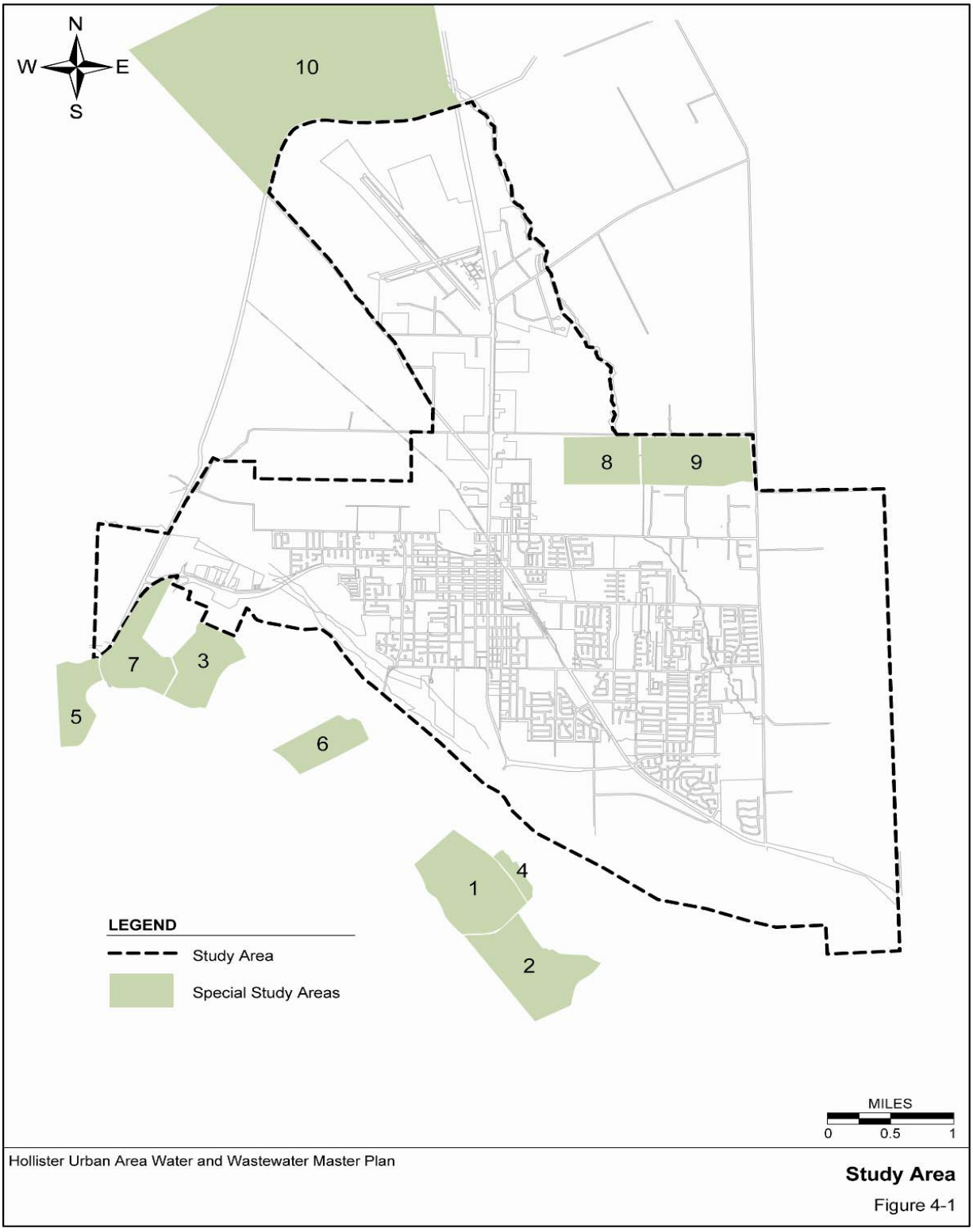


Figure 4-1: Study Area

areas for potential service needs in the future. However, specific water supply, water and wastewater treatment, and recycled water improvements and infrastructure needs for these areas will not be identified in the Master Plan.

Table 4-1: Special Study Areas

Identification Number	Special Study Area	Number of Residences Served	Water Service	Wastewater Service	Notes
1	Ashford Highlands	51	Groundwater/Mutual Water System	Individual Septic Systems	Groundwater pumped from well near San Benito River
2	Hidden Valley	55	Groundwater/Mutual Water System	Individual Septic Systems	Groundwater pumped from well near San Benito River
3	Hollister Ranch Estates	33	Groundwater/Mutual Water System	Individual Septic Systems	--
4	Montebello Estates	19	Groundwater/Mutual Water System	Individual Septic Systems	--
5	San Juan Oaks	183 residences 100 hotel rooms	Groundwater/Mutual Water System	Individual Septic Systems	Residences and hotel have not been developed at this time
6	Union Heights	22	Groundwater/Mutual Water System	Individual Septic Systems	Groundwater has high nitrates/nitrites
7	Area Adjacent to Hollister Ranch Estates	22	City of Hollister	Individual Septic Systems	Perchlorate issues with local groundwater
8	McCloskey Road Mobile Home Park	11	Groundwater	Individual Septic Systems	Groundwater has high nitrates
9	Area Near McCloskey Road and Fairview Road	272	Groundwater	Individual Septic Systems	Groundwater has high concentration of arsenic
10	Area North of Airport	None	N/A	N/A	Rising groundwater level has compromised septic system suitability in some areas

4.2 Planning Period

The planning period for this study extends 18 years, from 2005 to 2023. The initial year of the planning period was selected to provide a common baseline date for existing data related to land use, water supply and demand, and wastewater flows. The final year of the planning period coincides with the planning horizon of the adopted General Plan for the City of Hollister.

4.3 Land Use

As described in previous subsections, this Master Plan will provide recommendations for the water and wastewater infrastructure needs to serve the growth defined by the City of Hollister and San Benito County General Plans. The fundamental planning basis for the General Plans is proposed land use. The projected land use also provides the basis for projecting water demands and wastewater flows. Land use planning jurisdictions in the Study Area are shown on Figure 4-2. The General Plan land uses utilized in the completion of this Master Plan are illustrated on Exhibit I at the end of this report.

There are a number of specific land use policies that are relevant to the planning of water and wastewater facilities. Some of the pertinent land use policies are summarized in the following subsections.

4.3.1 City of Hollister General Plan

The City General Plan adopted in 2005 includes the following policy in Chapter 5 - Community Services and Facilities Element:

- *CSF1.1 Adequate Capabilities and Capacity of Local Facilities. Ensure that future growth does not exceed the capabilities and capacity of local public services such as wastewater collection and treatment, local water supply systems, fire and police protection, maintenance of streets and roads, local school systems, parks and recreational facilities, and landfill capacity, and ensure that public services meet Federal and State standards and are available in a timely fashion.*

4.3.2 San Benito County Zoning Ordinance No. 784

County Zoning Ordinance No. 784 amended County Zoning Ordinance No. 479 in March 2005 to include the following provisions:

- *Single Family Residential R-1 District. Section 10.4 Site Development Standard. The minimum area of a building site shall be one (1) acre in those portions of the unincorporated area of San Benito County in which septic tanks may be used for sewage disposal and there is a public water supply available. In those areas of the County in which a septic tank may be used for sewage disposal, but where there is no*

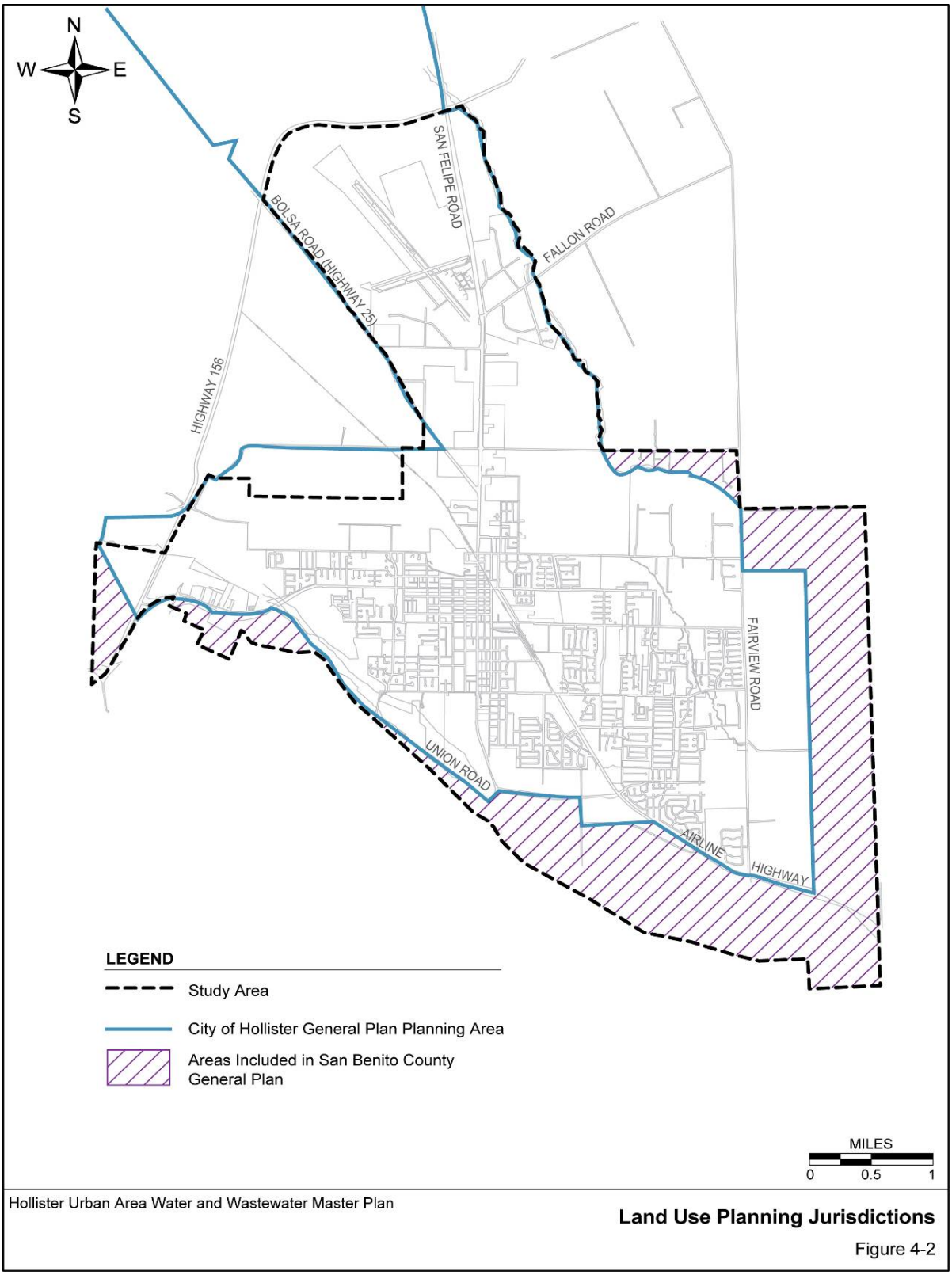


Figure 4-2: Land Use Jurisdictions

public water source, the minimum building site areas shall be 2.5 acres. Where a public sewer and public water supply are available, the minimum building site area shall be five thousand (5,000) square feet. Where public sewer and public water supply are available and the project involves the construction of 5 dwelling units or more, mixed residential development types shall be provided.

- *Residential Multiple (RM) District. Section 11.3 Site Development Standards in the Residential Multiple (RM) District. If the RM District is not served by a public sewer and public water supply, the minimum building area for a single-family dwelling shall be 2.5 acres. In those areas served by public water supply but no sewer, the minimum parcel size shall not be less than one acre. When the RM District is served by both a public sewer and water supply, the intensity of development will be directly proportional to the level and availability of public and private services. A minimum of eight (8) dwelling units per acre and a maximum of twenty (20) dwelling units per acre shall be provided.*

- *Planned Unit Development (PUD) District. Section 25.3 Standards for Planned Unit Development (PUD). Where public sewer and public water supplies are available, mixed residential development types shall be provided with an average parcel size of at least eight (8) dwelling units per acre, and up to 20 dwelling units per acre with a density bonus.*

4.3.3 San Benito County Zoning Change 04-141

The Mitigated Negative Declaration discussed the following water-related issues under the hydrology section:

- *34 Requires evidence of water quality and quantity provided for new development.*

- *30, 31, 32 Require development projects to design drainage and wastewater facilities to ensure water quality, require groundwater studies, and protect and preserve water resources.*

4.4 Population

Based on data from the California Department of Finance, the population of San Benito County was 57,440 in 2005. The Department of Finance projects that the County population will

increase to approximately 76,901 by 2023 (end of the planning period) and nearly double to 105,032 by the year 2050.

Approximately 64 percent of the current County population is located within the City of Hollister. The City has a current population estimated at 37,083. Based upon current planning data, future population growth will continue to be concentrated within the Hollister Urban Area. Population, housing, and employment data from the current City of Hollister General Plan are presented in Table 4-2.

Table 4-2: City of Hollister Population, Housing, and Employment

	2000	2010	2020	2023	% Change 2000 to 2023
Population	34,413	44,790	53,330	55,192	60.4
Housing Units	9,924	12,797	15,237	15,769	58.9
Employment	13,234	16,355	21,034	22,204	67.8

Source: Association of Monterey Bay Area Governments (January 2004) modified to address City of Hollister regional housing needs.

As described in Chapters 2 and 3, SSCWD is an independent public agency that provides water to a portion of the City and to unincorporated areas of San Benito County, generally east and southeast of the City. SSCWD's service is predominately residential and features the planned community of Ridgemark, whereas the City serves a mix of residential, commercial, and industrial customers. SSCWD currently serves water to approximately 5,200 connections and operates wastewater facilities for 1,200 connections.

As described in the following sections, projected water demands were based on land use. However, population projections provide a secondary check on these estimates and on the rate of projected development.

4.5 Projected Water Demands

Demand projections are required to identify Study Area water supply and infrastructure needs for the planning period. Water demand projections were based on 2005 water demand data and patterns, planned land uses, estimated water losses, land use unit demands, and anticipated levels of water conservation. Use of General Plan land uses within the Study Area is a critical aspect for projecting future water demand because the land uses reflect the City and County's plans and policies and the two General Plans have been through public review and the environmental compliance processes.

The water demand planning and projection process relies on the identification of future land uses that require treated water supply. A water use factor or land use unit demand is then applied to these lands. Future demands are added to the existing (2005) demand to determine interim and 2023 demands.

Future land use designations were identified for vacant parcels of one acre or more within the Study Area based on the City and County General Plans. The timing of development of these vacant lands was grouped into the following development horizons by the planning staff of the City and County:

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

Adjustments were made to account for the existing building moratorium and residential growth limitations described below.

- **Building Moratorium:** Phase 1 is expected to begin in 2008 for lands located within the City, which is delayed until the completion of the new domestic wastewater treatment plant by the building moratorium resulting from the Cease and Desist Order (R3-2002-0105). When additional capacity is available in the City's wastewater treatment and disposal facilities beginning at the end of 2008, the moratorium can be lifted. Growth constraints would then be determined by the City's residential growth management restrictions described below.
- **City Growth Ordinance:** The City of Hollister Growth Ordinance 959 restricts residential growth to 244 dwelling units per year until 2012 (or within 5 years after the moratorium is lifted, whichever is sooner). The proposed phasing of development was reviewed against the growth limitations specified in Ordinance 959. The City tracks the number of units that can be developed when the moratorium is lifted.
- **County Growth Ordinance:** The County Growth Management Ordinance 751 restricts subdivisions to a one percent increase in lots per year for the County as a whole, outside of the Cities of Hollister and San Juan Bautista. 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 building moratorium. An analysis was conducted on the phased land use plan for conformance with the County growth limitation. The number of new housing units allowable under each County general plan land use category was extrapolated from the inventory of future areas planned for development. One housing unit per lot was assumed.

Demands based on general plan land uses, unaccounted for water losses, growth restrictions, and the conservation assumptions described below were developed for 2023 conditions and interim periods and are presented in Table 4-3. Due to the over-availability of developable land within the Study Area relative to 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 timeframe. A detailed description of the methodology used to project water demands is included in Appendix D.

The projected water demands in Table 4-3 indicate that water supply needs will increase by 3,875 af/yr, or 48.6 percent, over the planning period. At buildout conditions, water demands will increase to 20,148 af/yr or by approximately 2.5 times the current levels. These estimates are generally consistent with the projected increases in population for the City and County described in the previous section.

Table 4-3: Existing and Projected Water Demand

	Projected Water Demands (ac-ft)				
	2005	2013	2018	2023	Buildout
Hollister Urban Area Water and Wastewater Master Plan	7,965	8,383	10,294	11,840	20,148

ac-ft – acre-feet

The Water Resources Association of San Benito County is a non-profit corporation governed by representatives from the City of Hollister, the City of San Juan Bautista, the Sunnyslope County Water District and the San Benito County Water District. The Water Resources Association of San Benito County is responsible for developing and implementing water conservation programs within the Study Area. The future average annual water demands in the Study Area will be affected by the conservation program established and implemented by the Water Resources Association of San Benito County, of which the water purveyors are

members. A range of conservation savings was established for this demand analysis as described below. The range was applied to the existing and projected water demands and is based on the following assumptions:

- **Leak Detection and Repair and Water Audits:** According to the Hollister Urban Water Management Plan 2000 (July 1999), hereinafter referred to as the 2000 UWMP, four percent of the existing and projected system losses are anticipated to be saved through leak detection and repair and system-wide water audits. Note that the 2000 UWMP is currently being updated through completion of the 2005 UWMP. The 2005 UWMP is currently in draft form as of August 2006. The four percent system loss estimate was applied to unaccounted-for water estimates. Ten percent of the existing large landscaping, commercial, and industrial demands are anticipated to be saved through conservation and repair efforts.
- **Conservation Goals:** According to the 2000 UWMP conservation goals, existing residential demands will be reduced by approximately 400 ac-ft by 2013 and reduced again by 2018. For projected residential demands, a six percent reduction is anticipated in accordance with the 2000 UWMP.
- **New Housing Units:** The existing residential demands will be reduced by one percent per year until 2023 in accordance with the 2003 Groundwater Management Plan Update to account for water use efficiency. The Groundwater Management Plan Update, discussed in the following section, assumed that new housing units would require 312 gallons per day per dwelling unit (gpd/du), a 25 percent reduction from the current 420 gpd/du. Therefore, a 25 percent reduction in projected residential demands was assumed.

These conservation savings were applied to the respective land use-based demands. The low end range resulted in a savings of approximately 7 percent of the total existing and projected demands, before conservation, in the year 2023. The high end conservation range resulted in a savings of approximately 16 percent of the total existing and projected demands before conservation in the year 2023.

The MOU Parties desire to maximize and support water conservation efforts within the Hollister Urban Area. However, for planning purposes, water demands based on a low level of

conservation (7 percent) were used in this Master Plan to be conservative and provide the flexibility to adjust to future unforeseen demands if needed.

4.6 Projected Wastewater Flows

Future wastewater flows were estimated as part of the Long-term Wastewater Management Plan (Draft, December 2005) for the City and Ridgemark service areas. Assumptions used in the projecting wastewater flows were consistent with the City's General Plan. Table 4-4 presents a summary of average dry weather flow (ADWF) projections through the year 2023.

Table 4-4: Summary of Projected Wastewater Flows

Year	Projected ADWF Contribution (mgd)				Total
	City	Ridgemark	Cielo Vista Estates	Septic Systems[a]	
2008	2.72	0.25	0.02	0.08	3.07
2013	3.10	0.31	0.02	0.08	3.51
2018	3.54	0.38	0.02	0.08	4.02
2023	4.04	0.46	0.02	0.08	4.60

ADWF – average dry weather flow
mgd – million gallons per day
(a) Septic flows are estimated at 3 percent of the City's current ADWF.

4.7 Groundwater Management Plan

The Groundwater Management Plan Update for the San Benito County portion of the Gilroy-Hollister Groundwater Basin (July 2003), hereinafter referred to as the Groundwater Management Plan (GMP) Update, was prepared to update the 1998 GMP. The purpose of the GMP Update was to build on the previous work to further identify and evaluate alternatives that will define coordinated basin-wide approaches to groundwater management. The area covered by the BMP Update is shown on Figure 4-3.

4.7.1 Problem Statements

The following problem statements regarding the quantity and quality of water in San Benito County are addressed in the GMP Update:

- Existing imbalance of areas of high and low groundwater elevation
- Anticipated imbalance of supply and demand due to planned growth
- Existing and anticipated inability to adequately dispose of wastewater

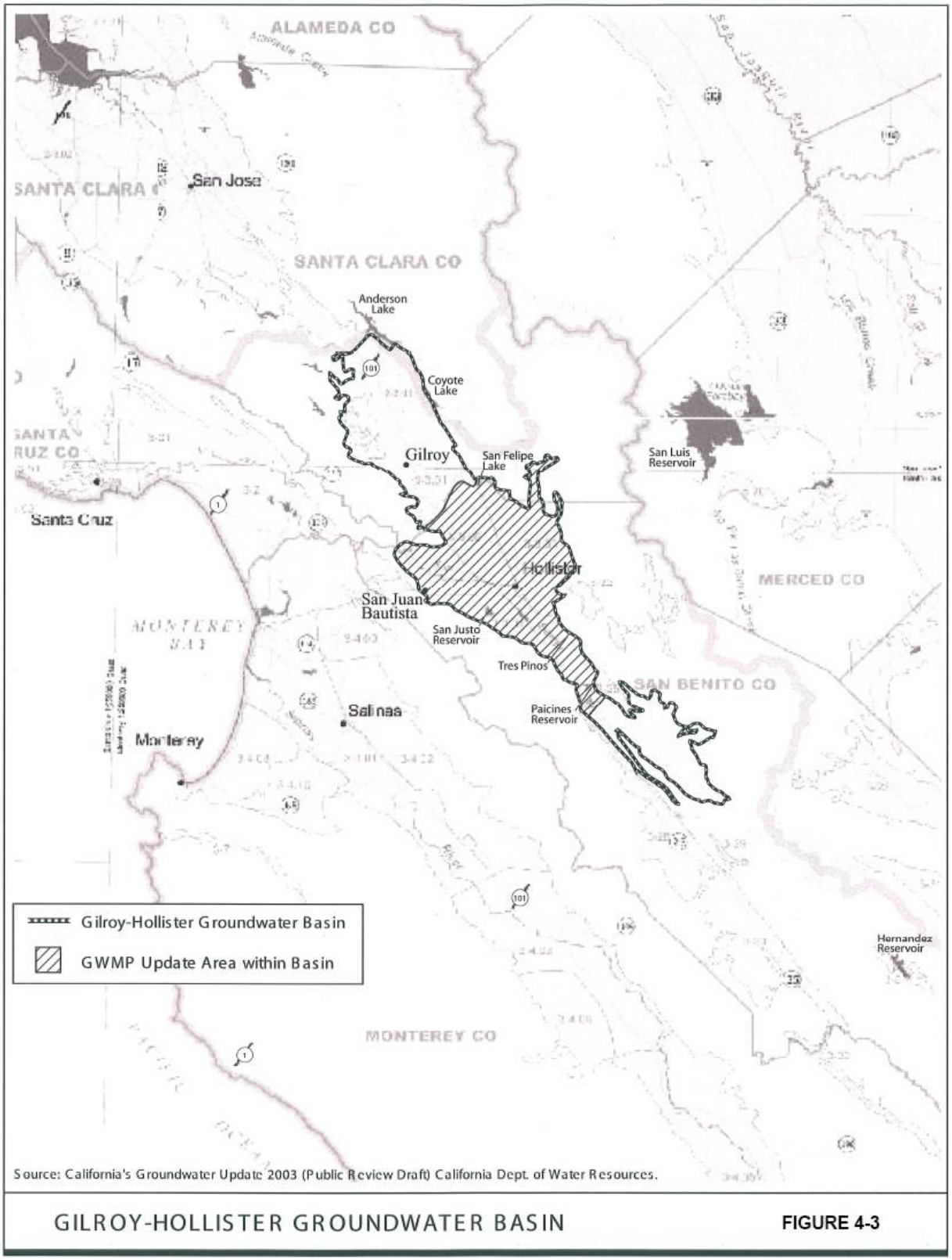


Figure 4-3: Gilroy-Hollister Groundwater Basin

- Frequent reduction of long-term imported water supplies and low quality local supplies
- Beneficial use constraints caused by increasing TDS accumulation in the basin
- Urban supplies affected by hardness, leading to use of self-regenerating water softeners that further add salts to the basin
- Beneficial use affected by nitrate accumulation in some groundwater subbasins
- Effective water quality protection is lacking

4.7.2 New Projects and Activities

The overall objective of the GMP Update is to maintain and enhance the agricultural and economic productivity of the County in an environmentally responsible manner. The GMP Update outlines the following new projects and activities that may be used to manage agricultural, municipal, and industrial supplies; groundwater levels; water quality; and/or wastewater effluent disposal. This list of new projects and activities was used as the baseline for preliminary screening and alternatives development described in Chapter 5 of this Master Plan.

- Regional and local conveyance facilities for water supply distribution
- In-basin water banking
- Development or redevelopment of high quality local groundwater and surface water supplies
- Out-of-basin water banking
- Groundwater/surface water blending facilities
- Groundwater treatment
- Use of recycled municipal and industrial wastewater
- Tile drains for groundwater level management
- Tree belt evapotranspiration for groundwater level management or wastewater disposal
- Groundwater pumping for water level/water quality management
- Out-of-basin export of wastewater, concentrate, pumped groundwater, or agricultural drainage water

- Constructed wetlands treatment of tile drainage and agricultural return flows

4.7.3 Water Quality Objectives and Criteria

The GMP Update also established water quality criteria for M&I use. The criteria were to meet primary and secondary drinking water quality objectives with emphasis on achieving the DHS Recommended Limit for Consumer Acceptance of not more than 500 mg/L of TDS and hardness of no greater than 120 mg/L. These are the same objectives contained in the MOU.

4.8 Urban Water Management Plan Update

The City and SSCWD jointly developed the 2008 UWMP Update, which includes water demand projections and estimates of supply reliability. The 2008 UWMP Update is currently in draft form (June 2008) and is expected to be finalized in 2008. These demand projections will be based on population projections and will not be directly associated with planned land uses identified in the City's General Plan that was adopted in December 2005 or the San Benito County General Plan (Land Use Element, adopted by the Board of Supervisors on July 14, 1992).

The draft UWMP water demand projections provided a projection of 2005 water demands for the City and SSCWD which was used as the existing demands for this analysis. The projected future demands, based on population projections, were not utilized because this Master Plan needs to rely on land use based demand projections. It was important for this Master Plan to reflect the land use planning efforts, programs, and policies of both General Plans, as well as reflect public input to the General Plan process and the environmental documentation associated with the development of these lands.

4.9 Long-Term Wastewater Management Plans

The City has developed a draft Long-term Wastewater Management Plan (LTWMP) (Draft, March 2007) for reliably treating and disposing of the City's domestic and industrial wastewaters. The purpose of the LTWMP is to determine the wastewater treatment components and storage and land required to achieve the LTWMP goal for projected growth described in the City's General Plan through 2023. Table 4-4 provides a summary of the projected ADWFs conveyed to the new domestic wastewater treatment plant (DWTP). The total projected ADWF of 4.50 mgd in year 2023 will be treated at the Ridgemark Wastewater

Treatment Facilities and the new DWTP. A more detailed description of the LTWMP is provided in Chapter 8.

The following LTWMP assumptions and recommendations were incorporated into the Master Plan:

- No future flow increase to the IWTP, as no additional industrial dischargers are expected.
- Wastewater from the Ridgemark development will be treated by the SSCWD at the Ridgemark Wastewater Treatment Facilities.
- The new DWTP will consist of an immersed membrane bioreactor with an ADWF design capacity of 5.0 mgd. The new DWTP will be capable of producing disinfected tertiary recycled water as defined by Title 22 and treated effluent nitrate concentrations no greater than 5.0 mg/L measured as nitrogen.
- The new DWTP will be located at the existing DWTP site and will replace the existing plant.

The SSCWD LTWMP was completed in January 2006. This plan identifies several potential alternatives for improvements to the Ridgemark Wastewater Treatment Facilities. The two main alternatives identified were:

- Upgrade the existing wastewater treatment facilities in response to more stringent discharge requirements issued by the Central Coast RWQCB
- Convey raw wastewater to the City's new DWTP for treatment and disposal
- Since the completion of the SSCWD LTWMP, SSCWD has determined that their best course of action is to upgrade the existing Ridgemark Wastewater Treatment Facilities and remain independent of the City's new DWTP. SSCWD will also produce recycled water for beneficial use.

4.10 Recycled Water Feasibility Study

The Water Resources Association of San Benito County (WRA), in partnership with the SBCWD, has adopted the GMP Update. As previously described, this plan identifies water recycling as one of the tools to achieve the goals established in that regional planning effort.

The San Benito County Regional Recycled Water Project was initiated to investigate the feasibility of developing a regional recycled water supply in the northern area of San Benito County. The San Benito County Regional Recycled Water Project Feasibility Study Report (RMC, May 2005) was conducted with interaction with partner agencies, including the Cities of Hollister and San Juan Bautista, the SSCWD, San Benito County, and grower and development interests.

The goals of a regional recycled water project are as follows:

- Enhance water supply and reliability
- Improve water supply quality
- Support wastewater management
- Protect groundwater quality
- Reduce basin salt loading
- Provide a tool to manage groundwater levels

Some of the key issues discussed in the Feasibility Report were:

- CVP water supply and reliability
- Equitable provisions of CVP supply and associated benefits to both agriculture and urban interests
- Wastewater treatment and disposal at the City, SSCWD, and San Juan Bautista wastewater treatment plants - in particular, issues associated with disposal capacity limitations and emerging regulatory challenges

Urban and agricultural water markets were examined and groundwater recharge and environmental enhancement efforts were reviewed to identify recycled water opportunities. Agricultural and urban markets were identified as primary opportunities for recycled water use in the northern part of San Benito County. The following is a summary of key results presented in the feasibility study report:

- Agricultural reuse is the most cost effective because distribution systems are simpler and less extensive than an urban application would be with similar demand. The San

Juan Valley and the Wright and Buena Vista service areas were identified as the most attractive agricultural reuse sites.

- Urban customers located near recycled water supplies may be a cost effective option for distribution of recycled water. Potential urban customers include parks, golf courses, school yards, and several industries.
- Widespread urban recycling appears impractical in Hollister and San Juan Bautista due to the high cost for retrofitting the existing infrastructure with a dual system for water and recycled water service.
- Groundwater recharge requires reverse osmosis and brine disposal, making it less cost effective and heavily scrutinized by regulators.
- Environmental enhancement projects may be feasible in the future. To date, no specific plans have been identified for environmental enhancement recycling opportunities, such as stream flow augmentation, lake recharge, wildlife habit restoration, and wetland enhancement.

Since the original Feasibility Report was completed in 2005, the study has been revisited and a draft Recycled Water Feasibility Study Update was completed in March 2008. The Study Update reflects several significant changes that occurred in the interim, including:

- In 2006 an Escherichia coli (E. coli) outbreak was linked to uncooked spinach originating in San Benito County. Although the spinach was not irrigated with recycled water, the outbreak drew attention to recycled water as an irrigation supply for high value crops. As a result, irrigators in the San Juan Valley, which was the recommended location for recycled water use in the original Feasibility Report, expressed concern with regard to using recycled water originating from the DWTP. Therefore, the ability to use recycled water in the San Juan Valley was in question.
- In 2007, a federal court ruled to protect the Delta smelt, which is facing extinction, by limiting the quantities of water pumped out of the Sacramento-San Joaquin River Delta. Consequently, the reliability of future Central Valley Project (CVP) water supplies is in question.
- The original Feasibility Report focused on areas to the west of the DWTP. Since that time, several new areas had been identified as potential locations for recycled water use.

The recommended alternative and implementation strategy described in the Feasibility Study Update is described below:

- Phase 1 – Construct a regional wastewater treatment facility (new DWTP) and distribute recycled water using a new distribution system serving the Hollister airport area.
  - A recycled water conveyance pipeline would extend from the DWTP to the airport, with a 'tee' located at the intersection of Wright Road and Briggs Road.
  - Phase 1 will provide up to 772 acre-feet per year of recycled water to the airport through 2015.
- Phase 2A – Extend the Phase 1 recycled water conveyance pipeline from the 'tee' to the intersection of McCloskey Road and Fairview Road and distribute recycled water to the Wright Road / McCloskey Road corridor.
  - Phase 2A will provide up to 4,200 acre-feet per year through 2023.
- Phase 2B – Beyond 2023 additional areas for recycled water use will be required. The Phase 2A facilities would provide opportunities for use in the Lone Tree area, Santa Ana Valley, East of Fairview Road or other areas.

The draft Recycled Water Feasibility Study Update is included in Appendix I.

4.11 Pajaro River Watershed Integrated Water Management Plan

The Pajaro River Watershed Integrated Regional Water Management Plan (IRWMP) is an ongoing cooperative effort by the Pajaro Valley Water Management Agency (PVWMA), SBCWD, and Santa Clara Valley Water District (SCVWD) to identify regional and multi-beneficial projects for the Pajaro River Watershed.

Figure 4-4 shows the watershed setting and service areas of these three agencies. On an individual basis, PVWMA, SBCWD, and SCVWD have each investigated and evaluated various resource, environmental, and management options for the overall wealth and well being of the watershed within their jurisdictions. The IRWMP integrates these various efforts and investigates the greater Pajaro River Watershed area to identify and prioritize integrated regional projects for the watershed to maximize benefits to the broadest group of stakeholders in the region.

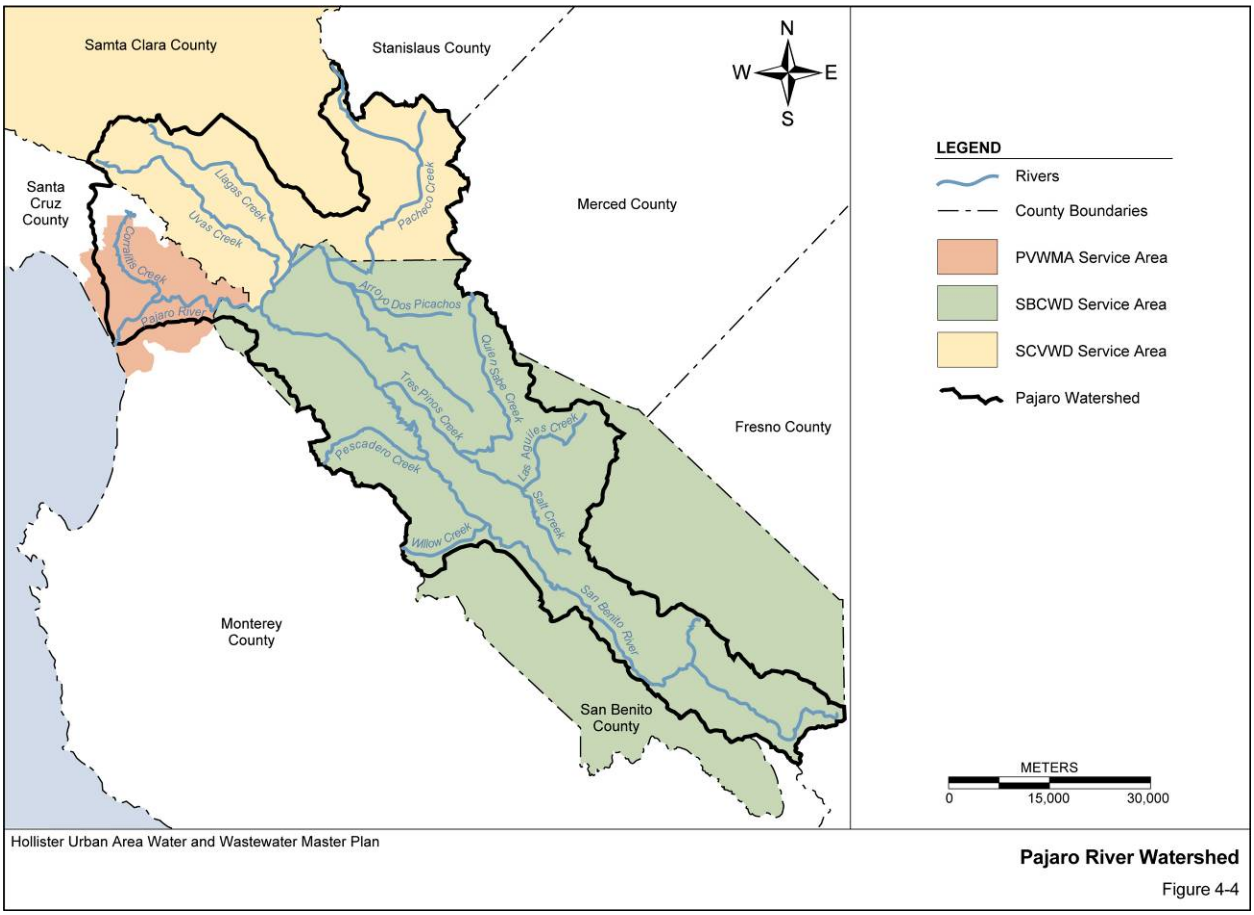


Figure 4-4: Pajaro River Watershed

The mission of the Pajaro River Watershed IRWMP is to preserve the economic and environmental wealth and well-being for the Pajaro River watershed through watershed stewardship and comprehensive management of water resources in a practical, cost effective and responsible manner. This Master Plan for the Hollister Urban Area will be a major component of the IRWMP. Due to the critical needs of improved water quality and water supply reliability for the Study Area, potential regional solutions through the IRWMP will be developed and evaluated.

4.12 Memorandum of Understanding

The following are descriptions of the principles and objectives described in the MOU that was developed by the MOU Parties. The principles and objectives have been grouped according to individual project components. As previously described, these principles and objectives will

form the basis for, and directly impact the development of, the Master Plan. A copy of the MOU is included in Appendix B.

4.12.1 Principles

As described in Section 2.1 of the MOU, the Master Plan shall be based on the following principles:

- 2.1.1 The Hollister Domestic Wastewater Treatment Plant is the primary wastewater treatment plant for the Hollister Urban Area including areas within the County that are designated to be served by that facility.
- 2.1.2 The standards for the quality of wastewater to be discharged (percolated, reused or discharged to surface water) shall be developed and agreed to by the City of Hollister, San Benito County, the San Benito County Water District and the Sunnyslope County Water District and shall include appropriate consideration of regional issues. These standards shall be the most stringent of local standards, state and federal regulations and shall include careful consideration of anticipated future regulation.
- 2.1.3 The selection of wastewater treatment processes and disposal methods shall include careful consideration of future wastewater disposal requirements and provisions for maximum reuse of wastewater. The selection of wastewater disposal options and sites shall be agreed to by the City of Hollister, San Benito County, San Benito County Waster District and Sunnyslope County Water District provided that disposal shall not:
  - Impact drinking water supplies or negatively impact adjacent land uses or property values unless fully mitigated to the satisfaction of the City of Hollister, San Benito County, San Benito County Water District and Sunnyslope County Water District.
  - Be inconsistent with applicable General Plans or Policies including preservation of agricultural land.
  - Be or result in conditions inconsistent with the quantity, quality, or groundwater level objectives of groundwater management plans for the area of disposal.
- 2.1.4 Urban water supply including as appropriate blending of treated surface water and groundwater, removal of hardness and other minerals from groundwater to provide urban water users with uniform water quality, shall minimize the need for water softeners, assure reliability of the urban water supply and support direct use of urban

wastewater. The urban water supply shall include provision(s) for drinking water service to areas in and adjacent to the Hollister Urban Area where Health and Safety issues exist.

- 2.1.5 Surface water and groundwater supplies shall be managed to sustain the area water supply and manage groundwater levels to avoid negative impacts on overlying land uses.
- 2.1.6 The standards for the quality of potable (drinking) water delivered to urban users shall be developed and agreed to by the City of Hollister, San Benito County, the San Benito County Water District and Sunnyslope County Water District and shall include appropriate consideration of regional issues while focusing on economic and health impacts. These standards shall be to the most stringent of local standards, state or federal regulations and shall include careful consideration of anticipated future regulation.
- 2.1.7 The impacts of water supply and treatment and wastewater treatment and disposal including reclamation on the culture, economy and environment of the City of Hollister and San Benito County shall be carefully evaluated and negative impacts minimized. The impacts considered shall include, but not be limited to, impacts on air quality, surface water and groundwater quality and quantity, rates and charges including connection/impact fees, property values, industry and business, preservation of agriculture and agricultural land, and aesthetics.
- 2.1.8 Water and wastewater management to protect and sustain the local surface and groundwater supplies of San Benito County.

4.12.2 Objectives and Assumptions

As described in Section 2.2 of the MOU, the Master Plan shall be based on the following objectives and assumptions:

- 2.2.1 The urban water supply (surface and groundwater) and water system for the Hollister Urban Area shall be capable of meeting 100 percent of the demands during wet, above normal, normal and dry years and in the first year of a critically dry period. That supply shall be consistent with meeting 100 percent of the San Benito County Water District Zone 3 and Zone 6 demands under the same conditions. During the

second and subsequent years of multi-year droughts/water shortages the water supplies (surface and groundwater) shall be capable of meeting 85 percent of the Municipal and Industrial demands and 75 percent of the agricultural demands.

- 2.2.2 Drinking water shall have a TDS concentration of not greater than 500 mg/L and a hardness of not greater than 120 mg/L (Calcium Carbonate).
- 2.2.3 Recycled wastewater shall have a target TDS of 500 mg/L and shall not exceed 700 mg/L TDS. To meet this objective, the wastewater treatment plant(s) shall include provision(s) for demineralization. This objective shall be met first by rigorous source control including, but not limited to, the elimination of on-site regenerating water softeners and second by demineralization. Blending recycled water with San Felipe water is only an interim measure for achieving recycled wastewater quality objectives. The recycled wastewater objective shall be met by the two measures identified above and the objectives of Section 2.2.2 as soon as practical and not later than by 2015.
- 2.2.4 Within the Hollister Urban Area all wastewater shall be treated at a central wastewater treatment plant and implementing Ordinances/Regulations shall be consistent with that requirement. This provision shall not preclude satellite wastewater separation plants for recovery of water for local recycling or the upgrading of the SSCWD Ridgemark Estates Wastewater Treatment Plants for local recycling, including but not limited to the Ridgemark Golf Course.
- 2.2.5 Within the Hollister Urban Area reliable and sustainable water supply shall be provided and maintained. The water conservation goals of the Groundwater Management Plan Update for the San Benito County Portion of the Gilroy-Hollister Groundwater Basin shall be used as the basis for all water and wastewater demand/flow projects. Water supply, treatment, transmission, storage (fire suppression, emergency and operational), and distribution facilities shall meet water industry and regulatory standards for service and reliability. The Master Plan shall include an evaluation of the current systems service and reliability levels. The Master Plan shall include an evaluation of the Hollister Urban Area water supply meeting California Urban Water Management Plan requirements including Chapter 642 and 643 Statues of 2001 (Senate Bill 221 and 610 respectively). It is the intent of the parties that these evaluations be used to determine and define the ability of the Hollister Area water systems to service

additional customers and that these evaluations will be the basis for General Plans and supporting policies and plans including input to LAFCO determinations and that the Master Plan be updated at seven (7) to ten (10) year intervals.

- 2.2.6 Urban Water supply including the treatment of surface and groundwater for wholesale delivery shall be the responsibility of the San Benito County Water District. Continued, managed use of groundwater is necessary to protect portions of the Hollister Urban Area including the City of Hollister Industrial and Domestic Wastewater Treatment Plants and areas susceptible to liquefaction from the adverse impacts of high groundwater. To achieve this continued and managed use of groundwater, groundwater supplies from the existing City of Hollister wells will be made available to SBCWD for water supply purposes only if the City of Hollister consents and agrees to specific terms and conditions for that use. To achieve this continued and managed use of groundwater, groundwater supplies from the existing SSCWD wells will be made available to SBCWD for water supply purposes only if SSCWD consents and agrees to specific terms and conditions for that use.

- 2.2.7 Centralized wastewater treatment including specialized treatment as required to produce reclaimed water for agricultural purposes and disposal by means other than reclamation shall be the responsibility of the City of Hollister.

- 2.2.8 Marketing and distribution of recycled water outside the city limits of Hollister and outside the Sphere of Influence of SSCWD shall be the responsibility of SBCWD. Marketing and distribution of recycled water for M&I use inside the Sphere of Influence of SSCWD shall be the responsibility of SSCWD. The marketing and distribution of recycled water for agricultural use inside the Sphere of Influence of SSCWD shall be the responsibility of SBCWD.

- 2.2.9 Within the Hollister Urban Area dual water supplies and dual distribution systems shall be required for all new development and for new parks, school grounds, cemeteries, and other large landscaped areas. Every reasonable effort shall be made to provide existing park, school grounds, cemeteries and other large landscape areas with supplies separate from the domestic water system. Nothing shall prevent the San Benito County Water District from developing groundwater supplies for parks, school grounds, cemeteries and other large landscaped areas.

4.13 Basis of Cost Estimates

Preliminary cost estimates have been developed for the projects and alternatives identified during the completion of this Master Plan. These preliminary cost estimates include both capital costs and O&M costs.

Capital cost estimates were prepared by applying unit costs and cost curve data to the estimated quantities or capacities for proposed improvement projects. Allowances were added for contingency (30 percent) and engineering, administration, and permitting (25 percent). For projects already in progress, actual bid data or established budgets developed by others were utilized. Construction costs will include water conveyance system pipelines, wastewater interceptors and supporting infrastructure (e.g., pump stations); however, distribution and collection networks within new developments will not be included.

O&M costs include only those costs associated with new facilities. Existing O&M costs were considered a sunk cost and are not relevant to the comparison of alternatives. Estimated annual O&M costs for new facilities were based on historical data from local facilities or a percentage of construction cost based on industry standards.

All preliminary cost estimates have been adjusted to current dollars. The basis for the estimates is the ENR Construction Cost Index for the San Francisco Bay Area for March 2008 which is 9133.

5.0 Development of Alternatives

This chapter provides a summary of the development of alternatives. The alternatives analysis process is described along with the initial screening of alternative concepts. Several feasibility studies are discussed that were completed to narrow the choices of key decisions. The resulting alternatives and the alternatives evaluation are described in Chapter 6.

5.1 Integrated Water Resources Approach

An integrated water resources strategy is required to address the high mineral content of the water supply and future recycled water, the reliability and reduced delivery of imported CVP water during dry years, and the regional wastewater treatment and disposal needs of the Study Area. The principle resource issues that can be addressed with an integrated approach to developing each alternative include the following:

- Quality of drinking water and recycled water
- Reliability of water supply
- Coordination of water and wastewater system improvements
- Regional balance of water resources including high groundwater areas

5.2 Initial Feasibility Studies

Several initial feasibility studies were conducted as a part of this Master Plan to identify the most feasible, long-term solutions to address major project components. These solutions were carried forward into the formulation of alternatives. These components include demineralization of water supply versus wastewater and groundwater demineralization versus softening.

5.2.1 Demineralization Alternatives Analysis

A demineralization alternatives analysis was conducted to determine whether demineralization should be provided for the water supply, recycled water, or both. Selection of the recommended demineralization strategy was based on the lowest overall life cycle cost developed from a net present worth cost analysis and a comparison of relative advantages and disadvantages. A

detailed description of this analysis is provided in Appendix E: Demineralization Alternative Analysis Technical Memorandum.

The net present worth cost analysis included construction, and operations and maintenance (O&M), and avoided consumer costs through 2023. The existing blended groundwater TDS concentration of 875 mg/L was used as the baseline for estimating avoided consumer costs. Avoided consumer cost estimates based on reduced potable water TDS levels included reduced bottled/filtered water use; increased faucet, garbage disposal, clothes and dish washer, water heater, and residential water distribution pipeline service life expectancies; reduced operating expenses for residential water softening systems; and reduced purchase of residential water softening systems. Annual avoided consumer cost estimates ranged between $0.4 and $0.5 per mg TDS/L removed per resident or between $185 to $250 per resident. A summary of the development of estimated consumer costs is included in Appendix E.

To meet the MOU drinking water and recycled water goals, groundwater demineralization and groundwater and recycled water demineralization are essentially equal in cost for the Hollister Urban Area. Groundwater demineralization is the recommended alternative since it limits demineralization and brine disposal operations to a single stream and provides the greatest consumer benefits. This demineralization strategy will be used as the basis for development of the comprehensive alternatives described later in this chapter.

5.2.2 Comparison of Demineralization and Centralized Lime Softening

The MOU Parties have sets goals of reducing TDS and hardness in the drinking water to 500 mg/L and 120 mg/L, respectively. The MOU Parties have set treated wastewater effluent goals of 500 – 700 mg/L TDS. An analysis of the drinking water quality for the City and the SSCWD water systems, as well as the City's wastewater influent indicates that these goals may be achieved with a centralized raw water lime softening. A detailed description of the assumptions, findings, and results of the analysis is provided in a technical memorandum in Appendix F: Technical Memorandum on Softening.

Softening of the raw water will likely result in a drinking water TDS concentration in the range of 485 to 555 mg/L, depending on the blending of the raw water sources and sources to be softened. Hardness is likely to vary between 55 and 70 mg/L as $CaCO_3$ in the softened treated water compared to the maximum goal of 120 mg/L prescribed by the MOU. Additionally,

softening of the raw water may result in wastewater influent concentrations ranging from 735 to 760 mg/L. Therefore, demineralization of the wastewater effluent is needed to meet the MOU water quality goals.

An analysis of costs indicates that both softening and demineralization of the groundwater supply are essentially equal with regard to life cycle cost. However, demineralization offers the following benefits: (1) it will produce higher drinking water quality, (2) it does not require recycled water demineralization, and, (3) it does not require that water supply sources be centralized. Given these advantages and the ability to be implemented facilities incrementally, demineralization is the recommended alternative for TDS and hardness removal and will serve as a preferred treatment technology for the alternatives described in Chapter 6**.**

5.3 Other Programs

There are numerous ongoing programs in the Study Area which provide solutions for the identified water resources issues. These program solutions would be common to any concept or alternative.

5.3.1 Groundwater Management Plan Update

The Groundwater Management Plan Update (GMP Update) (July 2003) included water resource management program and project elements for agricultural and M&I water supplies, groundwater level management, water quality management, and wastewater disposal within the San Benito County portion of the Gilroy-Hollister Groundwater Basin. The GMP Update management measures were divided into three general categories: Institutional Programs, Continuation of Existing Projects and Activities, and New Projects and Activities. The institutional programs relevant to the Master Plan are as follows:

- M&I water conservation
- Salinity education program
- Water softener ordinance
- Industrial salt control in municipal wastewater program
- Nitrate education program
- Well construction and abatement ordinance

- Maintain and enhance strategic data collection and management program
- Continue and expand economic/regulatory water level management tools

These institutional programs will be assumed to start up or continue, for purposes of the Master Plan recommendations. The following current projects and activities are also assumed to continue:

- Groundwater extraction
- Surface water importation and treatment
- Water transfers
- In-basin banking with natural percolation or artificial percolation of imported and/or local surface water
- In-basin water banking, in-lieu banking of imported and/or local surface water

New projects and activities were carried forward into the development of alternatives if they (1) provide benefit to the urban area, (2) meet or contribute to M&I needs, and (3) are technically feasible. New projects and activities that were not carried forward from the GMP Update are listed below:

- Tile drains for localized groundwater level management
- Tree belt evapotranspiration
- Out-of-basin export of wastewater effluent, brine concentrate, and/or agricultural drainage by river discharge or export pipeline
- Wetlands construction for treatment/polishing of wastewater effluent, storm water, and agricultural runoff

The remaining items from the extensive list of projects have been adapted into alternatives for the Hollister Urban Area.

5.3.2 Long-term Wastewater Management Plan

The LTWMP was prepared for the City in March 2007 (Draft). The goals of the LTWMP were to provide high quality wastewater effluent suitable for direct reuse on high value, quality sensitive crops, and dispose of all treated effluent through some form of recycled water

irrigation such as crop and spray field irrigation. The key elements of the recycled water plan are as follows:

- Effluent applied to percolation beds is to be limited to not more than current levels by spray fields with the remainder disposed of via irrigated pasture.
- Effluent salinity levels to be reduced by 2015 through a combination of source control, water treatment, and water softener ordinance.
- The Phase 2 Recycled Water project is to be implemented in 2015, designed to provide adequate reuse capacity through 2023.

The LTWMP provides for specific wastewater treatment, storage, and land requirements to achieve these goals. It was assumed that wastewater from the SSCWD will be treated at the new DWTP starting in 2008. The new DWTP will be designed to produce Disinfected Tertiary Recycled Water, as defined by Title 22 of the California Code of Regulations. Specific components of the LTWMP are being incorporated into each of the Master Plan alternatives.

The LTWMP for SSCWD was completed in January 2006. Goals for the plan include meeting the RWQCB requirements through the construction of an enhanced wastewater treatment plan, demineralization of drinking water and reuse of reclaimed water.

5.3.3 Recycled Water Feasibility Study Update

The purpose of the Recycled Water Feasibility Study Update (Draft March 2008) was to investigate the feasibility of a regional recycled water supply in northern San Benito County. Urban and agricultural water markets, groundwater recharge, and environmental enhancements were considered when identifying opportunities. Agricultural and urban markets were determined to be the primary opportunities for recycled water. The recommended project is a phased approach that will serve recycled water to the Wright Road / McCloskey Road corridor in the first phase (Phase 2A) and then be extended to additional areas to the west of the City as demand increases (e.g., Lone Tree Road area, Santa Ana Valley, areas east of Fairview Road). Various alternatives for interim effluent disposal were evaluated. The preferred alternative was spray field application at the Hollister Municipal Airport. A portion of the infrastructure required to convey recycled water to the Hollister airport will be utilized for the recycled water project along the Wright Road / McCloskey Road corridor.

5.3.4 Water Conservation

The Water Resources Association of San Benito County is responsible for developing and implementing water conservation programs within the Study Area. As described in Chapter 4, a range of water conservation savings was established for the water demand projections. The range of water conservation savings is from a low of 7 percent to a high of 16 percent. Specific water conservation methods to achieve this range of water savings are described in detail in the Hollister Area 2008 Urban Water Management Plan (Final Draft, June 2008).

The MOU Parties desire to maximize and support water conservation within the Study Area. However, for planning purposes, water demands based on a low level of conservation were used in this Master Plan. The impact of a higher level of conservation would be to extend the time required for the construction of new facilities.

5.3.5 Water Softener Ordinance

The Water Resources Association of San Benito County is completing a technological and economic feasibility study of alternatives to an ordinance, that would limit the availability, or prohibit the installation, of residential water softening or conditioning appliances that discharge to the sewer system of the City of Hollister, Ridgemark Estates/Sunnyslope County Water District, and Cielo Vista Estates in accordance with section 116786 of the Health and Safety Code (H&SC).

The purpose of the feasibility study is to:

1. Provide the assessment by the local agency of the technological and economic feasibility of alternatives to the ordinance, H&SC 116786(a)(1)(A) and H&SC 116786(b)(1)(A).
2. Provide the assessment by the local agency of the potential saline discharge reduction of the ordinance, H&SC 116786(a)(1)(B) and H&SC 116786(b)(1)(B).
3. Substantiate the findings of the local agency so that they may issue an Ordinance prohibiting the installation of brine discharging water softeners, H&SC 116786(c).

The local agency is the agency responsible for the sewer system. Therefore, there are three responsible local agencies: Hollister for those connected to the sewers in Hollister, SSCWD for

Ridgemark Estates, and San Benito County for Cielo Vista Estates. The impact of the ordinance would be to reduce the discharges of salinity to the sewer system and improve effluent water quality for recycled water.

5.3.6 Salinity Education

Source control for municipal and industrial users will primarily occur through implementation of a Water Softener Ordinance. Additional source control measures are also being implemented in the Hollister Urban Area, including a salinity education program for agricultural, municipal, and industrial users.

The salinity education program includes assisting agricultural water users in managing salt infiltration to the local groundwater basin. An additional program will involve working cooperatively with food processors and other industrial dischargers. Salts could be reduced through operational changes that reduce the use of salts or pretreatment processes that remove salts prior to discharging wastewater to the collection system. The impact of these source control measures would be to further reduce salt in the effluent of the City and SSCWD wastewater treatment plants.

5.3.7 Dual Distribution Systems

Section 2.2.9 of the MOU states that "within the Hollister Urban Area dual water supplies and dual distribution systems shall be required for all new development and for new parks, cemeteries, and other large landscaped areas." Additional institutional work will be required to connect these new dual distribution systems to the wastewater treatment plant recycled water supply, and extend the duel system to include existing uses. The impact of the use of dual distribution systems and separate water supplies would be to reduce the capacity requirements of new water treatment facilities.

5.3.8 Special Study Areas

As shown in Figure 4-1, there were ten special study areas identified for this Master Plan. Specific information for each of these special study areas is summarized in Table 4-1.

These special study areas are generally outside the primary Study Area but may require water and/or wastewater service from the MOU Parties in the future. These special study areas range from approximately 20 residences up to 250 residences.

Due to the potential need for future water and/or wastewater service, these areas need to be monitored by the MOU Parties and SSCWD. The proposed water and wastewater facilities in the Hollister Urban Area need to provide sufficient flexibility to serve these areas if required in the future. The impact of providing water and/or wastewater service to these areas would be to increase water demands and wastewater flows to the Hollister Urban Area. However, these increased wastewater flow contributions and water demands would only result in a reduction in the reserve capacity of existing and new facilities; the increases would not require the recommended improvements described later in this report to be altered.

The intent of the MOU Parties is to consider individual groundwater or mutual water systems or septic systems (satellite systems) with regard to their consistency with the MOU goals and objectives. As part of this master planning project, the MOU Parties desire to develop an institutional strategy for monitoring these areas for potential service needs in the future. Specific water supply, water and wastewater treatment, and recycled water improvements and infrastructure needs for these special study areas have not been identified in the Master Plan. The MOU also provides for the use of satellite wastewater systems for local water recycling (Article 2.2.4 of MOU).

5.3.8.1 Satellite System Management Categories

The following are three potential categories of satellite system management services that pertain to the Hollister Urban Area:

- **Ownership:** Satellite management ownership exists when water or wastewater services are physically separated from one another, but owned by a single entity. Ownership assumes responsibility for all aspects of water and wastewater system functioning and development. Ownership of an existing water or wastewater system may be transferred to the MOU Parties through the system sale, trade, gift, etc. A satellite management agency may own more than one water or wastewater system and many also provide management and operations and/or contract services to other systems.

- **Management and Operations:** Satellite management and operations exist when water or wastewater systems are physically separated from one another, but are comprehensively managed and operated by a single entity which does not own the water or wastewater systems' physical components. In conducting satellite management and operations, an entity is responsible for all day-to-day responsibilities. Management responsibilities include planning and policy decision making. Operational responsibilities include normal day-to-day operations, preventative maintenance, water quality and regulatory monitoring, troubleshooting, emergency response, response to complaints, and public relations including contact and record keeping. Satellite management and operations does not include addressing legal issues, financing or rate setting.

- **Contract Services:** Contract services are services provided by an entity to water and wastewater systems through a written agreement (contract) for specific tasks. Types of contract services vary with the specific needs of the systems and the capabilities of the service provider. Types of contract services may include water quality monitoring, billing, emergency response, record keeping, meter reading, operations, maintenance, etc. Each of these services may be provided by separate entities under separate contracts. An example of this type of contract operations is the current operation of the Cielo Vista Estates wastewater facilities by a private contractor.

5.3.8.2 Considerations for Category Determination

Each of the satellite management types has benefits and limitations for both the system being served and the service provider. Levels of responsibility, liability, the ability to affect change or maintain system stability, cost, and political considerations, are a few of the issues to be raised and discussed when determining how services will be provided. The decision making process should include factors such as long term goals of the MOU Parties, its responsibility and liabilities, and its capacity to provide the service. Table 5-1 is a summary of the characteristics typically achieved with each satellite management type.

5.3.8.3 Recommended Monitoring Elements

The following elements are essential for the successful operation of water and wastewater systems. It is recommended that the MOU Parties begin monitoring these elements for each special study area.

Table 5-1: Typical Satellite Management Characteristics

Issues	Management Type		
	Ownership	Operations	Contract Services
Complete control of the system	●		
Limited control of the system		●	●
Does not require SMA approval			●
Must prepare system master or facility plans	●		
Possible access to public funding	●		
Distribution of costs (economics of scale)	●	●	●
SMA may limit the services it chooses to provide			●
Contracts may be developed on a case by case basis			●

SMA = Satellite Management Agency or in this case the MOU Parties or one of the MOU Parties

- **Management Capability.** The managers of successful water and wastewater systems are dedicated to providing the best possible service for their customers. This dedication may take many forms, such as an entrepreneurial spirit or aggressive pursuit of information and funding. These managers are active participants in local and regional activities and understand the importance of maintaining communication with their customers, and with state, regional, and local agencies.

- **Ability to Respond Quickly.** Effective water and wastewater systems are quick to respond to problems, adapt to external influences and take risks with new ideas. They are continually applying improvements without need of a formal program prior to implementation.

- **Financial Viability.** A key factor for a water and wastewater system to achieve or retain viability is to adopt and use business principles to guide their financial practices. Some of these financial practices include: (1) developing and using a system operating budget, (2) guarding against cash flow fluctuations (shortfalls) by funding a reserve account, and (3) guaranteeing their ability to finance and make emergency and routine repairs or replacement of system components by completing capital improvement planning.

5.4 Alternatives Analysis Process

Alternative concepts were identified through a series of workshops with the Management Committee and the Governance Committee. Initial screening criteria were developed and

applied to the alternative concepts for the purpose of identifying fatal flaws and screening out infeasible options. The screening criteria were applied in a pass/fail analysis. The intent was to carry forward to the evaluation process a focused list of reasonable alternatives reflecting a wide range of viable solutions.

5.4.1 Evaluation Process

As shown in Figure 5-1, a two-step evaluation process was utilized focusing on developing and screening initial alternative concepts followed by the refinement and evaluation of more specific alternatives.

The alternative concepts were developed in parallel with the preliminary screening criteria. After screening the concepts during a Management Committee workshop, initial concepts were reformulated to reflect new information and more feasible components. These concepts and supporting components were screened again. The process and results are described in this chapter. The alternative concepts which appeared to be most feasible were then developed in more detail with specific facilities and costs identified, while evaluation criteria were finalized. Chapter 6 presents the alternatives analysis and the resulting preferred alternative.

5.4.2 Project Objectives

As presented previously in this report, the problem definition was determined based on issues and concerns with the Hollister Urban Area water and wastewater resources (e.g., water quality, reliability, system improvements, and regional water resources balance). The MOU provides principles, objectives, and assumptions. These guidelines form the basis of the Master Plan screening and evaluation criteria and were used in the development of alternatives to ensure that they contributed to resolving the identified problems. These project objectives were focused on achieving the following goals:

- Improve municipal, industrial, and recycled water quality
- Increase the reliability of the water supply
- Coordinate infrastructure improvements for water and wastewater systems
- Implement the goals of the Groundwater Management Plan

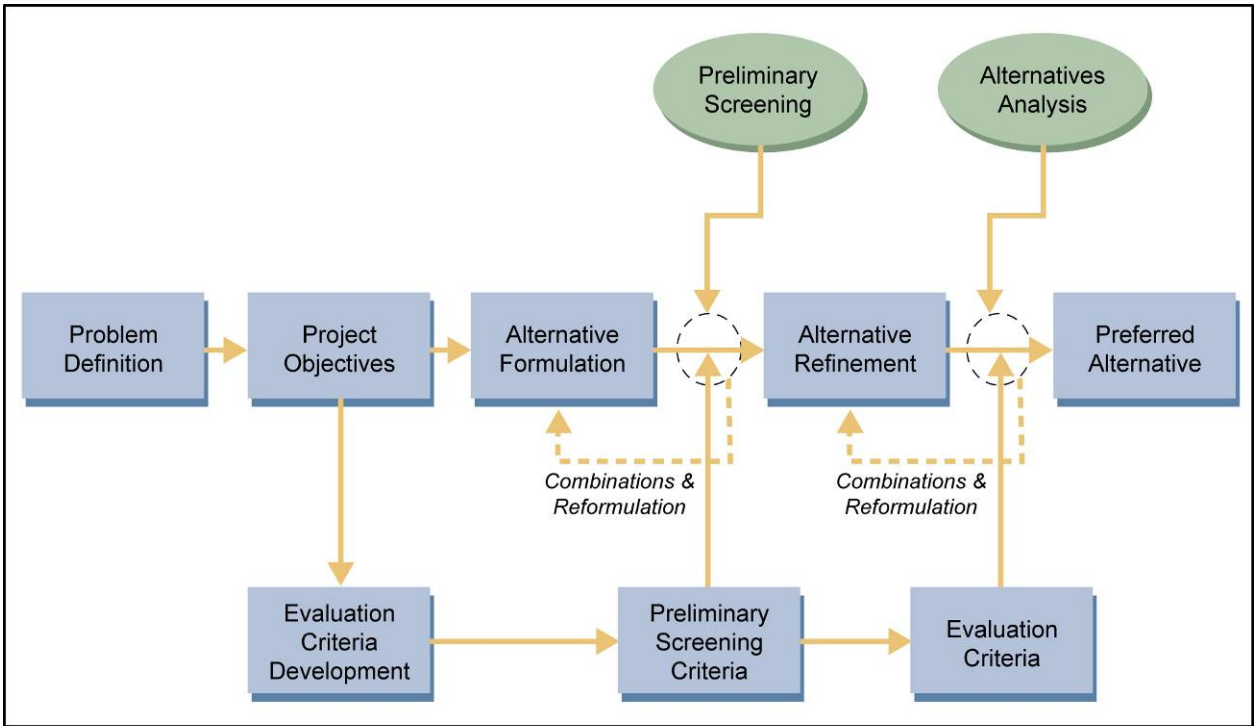


Figure 5-1. **Alternative Development and Evaluation Process**

Figure 5-1: Alternative Development and Evaluation Process

- Implement the recommendations of the LTWMP and integrate the recommended strategies into the Master Plan
- Support economic growth and development consistent with the City and County General Plans and Policies
- Consider regional issues and solutions that provide benefits to multiple agencies and their constituents

Specific MOU objectives and assumptions that reflect these goals are incorporated into the initial screening criteria described below and in the evaluation criteria presented in Chapter 6.

5.4.3 Preliminary Screening Criteria

Preliminary screening criteria were developed to reflect the project goals. These criteria were used to evaluate the alternative concepts based on the following minimum criteria:

- Measurable benefit to TDS and hardness levels
- Measurable increase in dry year reliability

- Minimum implementation risks associated with technical feasibility, institutional constraints, high costs, and environmental permitting
- The ability to be combined with other concepts

5.5 Description and Screening of Alternative Concepts

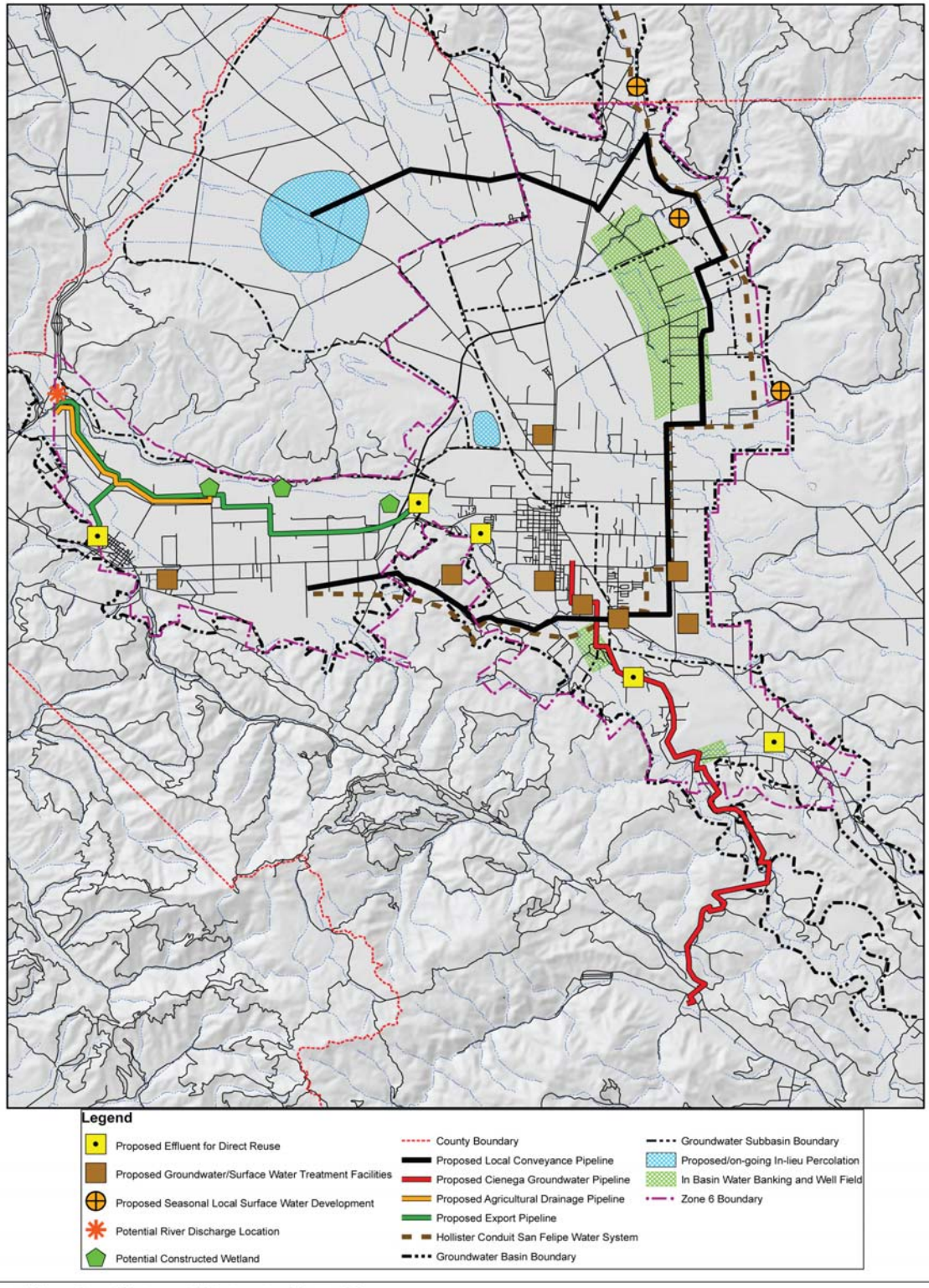
Five overall concepts were developed to meet the goals of this Master Plan. The alternative concepts were developed through the evaluation of previous and ongoing projects, initial feasibility evaluations of major components described in Section 5.2, and workshops conducted with the Management Committee, the Governance Committee, and the public. The concepts were centered on the water supply and water quality aspects of the problem definition. Solving the water supply and water quality issues allows for implementation of wastewater management and water recycling. Figure 5-2 illustrates many of the facilities and locations included in the concept descriptions.

For each concept, a range of alternative configurations was assumed and is generally described in the following subsections. The results of the preliminary screening process are described at the end of each alternative concept or alternative component within a concept, and are summarized in Table 5-2 at the end of this chapter. In addition to the development and preliminary screening of the concepts, a baseline case has also been developed representing current and expected programs. A description of the baseline case is provided together with the results of the preliminary screening process.

The alternatives selected to carry forward to the alternatives evaluation are identified, numbered, and described in more detail in Chapter 6.

5.5.1 Base Case – Continuation of Current Programs

Alternative Description. This alternative represents the baseline case in which the MOU Parties would continue forward with only their existing facilities, projects currently in progress, and projects which are reasonably expected to occur in the foreseeable future. This alternative has been included to provide a common baseline by which all other alternatives can be compared and measured.



Hollister Urban Area Water and Wastewater Master Plan

Groundwater Management Plan Update Project Elements

Figure 5-2

The existing facilities in the baseline case include all existing water and wastewater facilities. The existing water facilities, as described in greater detail in Section 2 of this Master Plan, include existing groundwater wells, the Lessalt WTP, the City's four storage reservoirs and SSCWD's three reservoirs, two pressure reducing pressure sustaining stations in the City and seven in SSCWD, and the existing water transmission and distribution systems. The existing wastewater facilities, as described in Section 3 of this Master Plan, include the collection systems, the five wastewater treatment plants and their respective disposal facilities.

The following projects or studies, which are included in the baseline case, are currently in progress:

- Construction of DWTP. The DWTP is currently under construction and is expected to be operational in late 2008 or early 2009. The DWTP will have a capacity of 5 mgd, which will be sufficient through 2023. The DWTP will provide tertiary treated, Title 22 unrestricted use, recycled water.
- Seasonal Storage Reservoir. A seasonal storage reservoir with a capacity of 800 ac-ft is currently under construction at the DWTP. This facility will provide seasonal storage for recycled water during the winter months.
- Phase 1 Recycled Water. Construction of the Phase 1 recycled water facilities is expected to begin in mid-2008 and be operational in late 2008 or early 2009. The Phase 1 facilities will convey recycled water from the DWTP to the Hollister airport where it will be used for turf irrigation.
- Upgrade of Lessalt WTP. The Lessalt WTP was originally designed to treat 3 mgd of imported CVP water using microfiltration and chlorine disinfection. The plant has been unable to achieve its design capacity due to hydraulic constraints and treated water capacity issues related to the Stage 2 Disinfectant/Disinfection Byproducts Rule (Stage 2 D/DBP). Hydraulic and process improvements will be completed allowing the Lessalt WTP to operate at its rated capacity of 3.0 mgd.
- SSCWD WWTP Upgrades. As previously described, SSCWD will upgrade their existing wastewater treatment plant in order to be compliant with the WDR Order R3-2004-0065 issued by the RWQCB and provide reclaimed water.

- SSCWD Demineralization Project. SSCWD has initiated a demineralization study to determine the most economic means of reducing the TDS concentration in the potable water supply. It is expected that SSCWD will implement some combination of demineralization and/or softening of its wells as a result of the study.

In addition to the existing facilities and the projects which are currently in progress, there are additional projects which can reasonably be expected to occur between now and 2023, including the following:

- Development of new wells. As the City of Hollister and County of San Benito grows as in conformance with their respective General Plans, water demands will continue to exacerbate the overdrafted groundwater basin conditions. It is expected that wells will continue to be drilled to provide additional water supply to support new development.
- Water distribution and wastewater collection systems pipelines. Similar to water supply, as development occurs in the Study Area, new water distribution and wastewater collection systems pipelines will be installed.
- Phase 2A recycled water infrastructure. The draft Recycled Water Feasibility Study Update included an implementation plan to have the Phase 2A recycled water program in operation in 2015. Even if the TDS goal of 500 – 700 mg/l for recycled water is not reached by 2015, there would be opportunities for blending that could sustain the feasibility of the Phase 2A infrastructure.

Preliminary Screening. The continuation of existing programs will exacerbate existing problems with respect to TDS loadings in the groundwater basin. The study area will become evermore dependant on groundwater, which has high TDS concentrations in most areas. Since no demineralization is included in the baseline case, it can be expected that residents would continue to use softeners to combat high TDS concentrations leading to high TDS in the wastewater effluent. Although the new DWTP will produce Title 22 unrestricted use recycled water, the TDS in the recycled water will be high (e.g., 1200 – 1500 mg/l). Without implementation of demineralization, the recycled water program would be limited by the ability to blend with higher quality water. Any application of recycled water or other supply with similar or worse water quality will continue to degrade the groundwater basin by increasing salt loadings, particularly TDS levels.

Continuation of existing programs would not result in a measurable increase in reliability of water supply during drought years. Again, this baseline concept is provided in this analysis as a point of comparison and measurement for alternative solutions to the Hollister Urban Area water and wastewater challenges.

5.5.2 Concept 1 – Increase Use of Imported Surface Water

5.5.2.1 Purchase, Exchange, or Transfer Imported Supplies

Alternative Description. Currently, imported CVP M&I supplies are often reduced to 86 percent of contract amounts and can be as low as 50 percent during critically dry years as was illustrated in Figure 2-3. The reliability of the existing CVP supply is expected to decrease further over time, therefore requiring supplemental supplies to maintain the current level of reliability.

This concept includes a long-term transfer and/or purchase of additional imported CVP and/or a new State Water Project (SWP) supply. A significant quantity of new supply would be needed to augment the existing supplies on an average annual basis to meet the TDS and hardness goals uniformly throughout the M&I system.

This concept is a supply option; storage is needed to make it into a feasible alternative. The water could be stored (banked) outside the County and made available during times of reduced CVP deliveries. The water could be banked in the Kern Water Bank, Semitropic Water Bank, or an equivalent basin managed for this purpose. Banking of this water outside of the basin allows for the purchase of wet year or above average year water that is more readily available, which is then stored for extraction or in-lieu delivery during dry years when it is needed by the Hollister Urban Area. Even though the quality of the new imported water (and current CVP supply) is good, demineralization of wastewater would be needed to meet the recycled water quality goals due to residential and wastewater treatment contributions.

Institutional arrangements are needed with the SCVWD and USBR (and the Department of Water Resources (DWR) if a state contractor is transferring its supply), along with the contractor (or a contracting wholesale agency). Wheeling charges would be imposed by the USBR, south of Delta transfer fees are administered by the State, and the contractors would need to be compensated.

This alternative could also incorporate water management strategies being developed for the Pajaro River Watershed IRWMP as described in Chapter 4. The IRWMP is considering the export of San Benito County groundwater in exchange for PVWMA CVP supply. Different arrangements are also being considered with SCVWD. This regional option is discussed in more detail as part of Concept 4.

Preliminary Screening. This option would provide a measurable benefit to TDS levels and some level of increase in dry year reliability. A transfer alternative would be institutionally complex, but is being carried forward to the alternatives evaluation as Alternative 1A. A purchase arrangement with a non-CVP/SWP contractor with the water wheeled through the federal facilities may be feasible, but is more complex than a transfer arrangement. Banking out of the area is the most feasible storage option for the newly obtained supplies. It is not recommended that this water be stored in–basin because of the risk of water quality degradation. Transfers, purchases, and out-of-area banking would involve significant institutional arrangements and costs to purchase, store, extract, treat, and deliver the water when needed. More detailed information is also required on the capacity constraints of the Hollister Conduit shown on Figure 5-2. A study is currently in progress by the SBCWD to evaluate the conduit capacity.

5.5.2.2 Exchange Imported Agricultural Water for Municipal Use

Alternative Description. Buy-in from current agricultural CVP users would be required to fallow land, take delivery of recycled water from the City wastewater treatment plant, or take delivery of groundwater. All options would rely on a similar quantity of CVP agricultural contract water being offered in exchange as an M&I supply.

The reliability of the allocations for CVP agricultural contractors differ from M&I allocations and have typically been 65 to 70 percent of the contract amount with zero percent of the entitlement available during critically dry years as shown on Figure 2-3. This supply is not currently available at the required quantities as an agricultural supply due to the higher level of curtailment required during shortages. If possible the supply would be converted to an M&I supply with its more favorable curtailment schedule. However, the existing shortage schedule is being reviewed by USBR.

Current agricultural CVP users could take recycled water in exchange for CVP agricultural contract water, or the two source waters could be blended. Likewise, groundwater could be blended with CVP water, which would result in a lower TDS than just groundwater. As yet another option, CVP water could be blended with both recycled water and groundwater and used for agricultural purposes. In all cases, the quantity of CVP water being replaced with recycled water and/or groundwater could be reallocated for M&I use. Long-term blending of recycled water would require that the MOU Parties relax the MOU blending objectives as blending is currently only permitted as a short-term solution.

This concept involves reallocation of existing CVP entitlements from agricultural water. Any such reallocation would be subject to approval of the SBCWD Board of Directors. This concept would also require the addition of new surface water treatment capacity.

Preliminary Screening. This option would provide a measurable benefit to TDS and hardness levels and some level of increase in dry year reliability. The negotiations to complete an in-County transfer, particularly with a fallowing alternative, are anticipated to be complex and protracted. The concept of fallowing agricultural lands to free up CVP water for M&I needs is not considered further.

Reallocating CVP water for M&I use in exchange for the agricultural use of recycled water, alone or blended, reflects the LTWMP recommendations and the Master Plan water quality goals. This option will be carried forward as Alternative 1B. Up to 4,200 af/yr of recycled water may be available for exchange with CVP supplies in 2023.Reallocating CVP water for M&I use in exchange for blended groundwater and CVP water would result in a measurable benefit to TDS and hardness levels. This concept provides some level of increase in dry year reliability for agricultural users due to the increased reliability of groundwater, but not for M&I which would become more dependent on the less reliable CVP supply.

5.5.2.3 Reallocate Municipal Supply

Alternative Description. As described in Chapter 2, current entitlements for domestic and municipal accounts total 9,763 af/yr which is greater than the 8,250 af/yr USBR contract amount. However, user requests, allocations, and usage are less than the CVP contract amount. One of the biggest differences is for the Domestic Small User Accounts. These accounts are for parcels less than 10 acres and have an entitlement of 1.2 af/acre/yr. However, this amount

is not fully utilized. Therefore, there is the potential to free up some CVP M&I supply if approved by the SBCWD Board of Directors. The estimated quantity of water could be up to 1,253 af/yr based on the current entitlement of 1,579 af/yr and a current usage of 126 af/yr. With the continuing development of five acre parcels within the San Felipe Distribution System, this over-commitment of CVP water will increase in the future. Moreover, recycled water from the future SSCWD wastewater treatment plant could be supplied to the Ridgemark and San Juan Golf Courses, thereby reducing their dependence on CVP water. The residual CVP supply could then be reallocated for other municipal uses. This would need to be further evaluated to determine the timeframe and quantities of CVP water that could be reallocated.

This concept involves reallocation of existing CVP entitlements from domestic and municipal water. Any such reallocation would be subject to approval of the SBCWD Board of Directors. This concept would also require the addition of new surface water treatment capacity.

Preliminary Screening. Reallocation of CVP entitlements for domestic and municipal accounts would provide a measurable benefit to TDS and hardness levels but does not increase dry year reliability.

5.5.3 Concept 2 – Utilize Local Surface Supplies

Capturing intermittent creek flows within the County could contribute additional supplies to the Hollister Urban Area. Utilizing existing reservoirs, reclaiming quarries for storage, managing in-basin aquifer storage and recovery (ASR) or recharge facilities, and constructing a new reservoir were all considered for providing storage for new and existing water supplies. The concept of utilizing local surface supplies requires the combining of various supply, storage, and treatment options to create a viable alternative. The location of the supplies and facilities included in this concept are shown on Figure 5-2.

5.5.3.1 Capture Intermittent Creek Flows

Alternative Description. Local surface waters are only available in the winter and late spring. These local supplies include SBCWD's Arroyo Dos Picachos surface water right, and a new surface water right needed on Arroyo Los Viboras and Pacheco Creek. The supplies may be developed using seasonal diversion dams (e.g., inflatable dams, rehabilitation of an existing structure) along with earthwork to create a small impoundment upstream of the diversion structure or traditional wells adjacent to the streams. In-stream collectors (e.g., Ranney

collector wells or infiltration galleries) are not likely to be feasible due to unfavorable creek bed conditions of the local streams for this purpose. Potential environmental impacts to in-stream and riparian areas may be associated with the construction of facilities.

These supplies would be directed to a recharge area (in-stream recharge or ASR), conveyed to the Hollister Conduit or new conduit due to capacity limitations for delivery to a new WTP for treatment before delivery to M&I users, or conveyed in the Hollister Conduit to San Justo Reservoir. A pump station is needed to lift the supply into a new conveyance facility.

The Arroyo Dos Picachos and Arroyo Los Viboras are located northeast of the study area as shown on Figure 5-2; they are tributaries of Tequisquita Slough which drains to the Pajaro River. According to 1954 data, TDS levels in Arroyo Dos Picachos may be 500 mg/L. SBCWD holds an existing water right to divert up to 4.75 cfs from December 1 to May 1 from Arroyo Dos Picachos. If the 4.75 cfs were available for the full period, a total of up to 1,422 af/yr may be available. According to the GMP Update, the SBCWD's 1,422 af/yr water right may be available during most wet and above normal years.

Based on 1954 data, TDS levels of Arroyo Los Viboras may be 360 mg/L. According to the GMP Update, there may be up to 1,377 af/yr of unadjudicated seasonal water rights available during an average year from Arroyo Los Viboras. Use of the unadjudicated wet season water would require coordination with Pacheco Pass Water District (PPWD) and development of any institutional arrangements for the use of an existing diversion structure. A water right filing for any remaining quantity would be required.

According to the GMP Update, Pacheco Creek, shown on Figure 5-2, may have an average of 25,551 af/yr supply available. According to 1954 data, TDS levels may be 235 mg/L. Use of the unadjudicated wet season water would require coordination with PPWD and development of any institutional arrangements for the use of an existing diversion structure (located just north of the Santa Clara County line). A Hollister Irrigation District water right would need to be reviewed and evaluated for transferability to the SBCWD, and/or a water right filing for any available quantity would be required. The Pacheco Subbasin currently has a high water table with additional natural recharge currently being rejected; the supply could not be percolated in place. Steelhead could also be present in Pacheco Creek. If channel diversions occur, steelhead could become stranded and activities in channels could result in direct take of fish. Additional

environmental analyses are needed to determine the implementation risks associated with this concept.

Preliminary Screening. This option would provide a measurable benefit to TDS and hardness levels. The Arroyo Dos Picachos and Arroyo Los Viboras options do not provide an adequate supply under normal years, dry years, nor multiple dry years, therefore they must be combined with each other and/or Pacheco Creek supplies as well as a storage component. There appears to be an adequate unadjudicated seasonal supply from Pacheco Creek. The local supplies are not likely feasible to be percolated in-place due to its distance to beneficial urban area wells and aquifer storage capacity restrictions. For Alternative 2A, it will be assumed that a diversion facility is developed on all three of the streams, the supply conveyed to a new WTP during the winter with the excess treated supply stored in an aquifer proximate to the urban demands using ASR. This stored water would be demineralized when pumped from the groundwater basin. This option has implementation risks associated with water rights, high costs, and environmental permitting, and must be further studied.

5.5.3.2 Utilize Existing Reservoirs

Alternative Description. The SBCWD operates Hernandez and Paicines Reservoirs in the San Benito River watershed to store runoff and release it during the dry season to augment groundwater recharge. Hernandez Reservoir is located on the San Benito River, 43 miles south of the City. Paicines Reservoir is located near Tres Pinos and stores water diverted from the San Benito River for percolation releases to Tres Pinos Creek as shown on Figure 5-2. The diversions consist of natural flow in the river and augmented flows released from storage in Hernandez Reservoir. According to the GMP Update, the bottom of the Paicines Reservoir is permeable and seepage losses are significant (approximately 80 percent of the total reservoir outflow is to evaporation and seepage).

More local or CVP supply may be captured by better utilizing the existing reservoirs. These concepts include reoperating Hernandez Reservoir and rebuilding Paicines Reservoir to capture and/or retain more local supply and use this supply to recharge the groundwater basin. SBCWD has modified its operation of Hernandez and Paicines Reservoirs in recent years to avoid excessive percolation along the San Benito River below Hospital Road when groundwater levels are high. It is effective to store water until dry periods when water levels are

somewhat lower and additional percolation is beneficial. The local supplies contributing to these reservoirs have TDS levels of approximately 700 to 800 mg/L.

The 10,300 ac-ft San Justo Reservoir, shown in Figure 5-2, is used exclusively to store and regulate imported CVP water. San Justo Reservoir has seepage losses estimated to be approximately 3,000 af/yr. Modifying and reoperating this reservoir to capture more high quality CVP water when it is available would provide better water quality than that provided by the Hernandez and Paicines Reservoirs. Additional studies are needed to assess the potential increase in reliability by modifying reservoir operations.

Preliminary Screening. Because of the amounts of water needed to meet the reliability and water quality goals, the storage options relying on runoff do not provide an adequate supply under normal years, dry years, nor multiple dry years. In addition, Hernandez and Paicines Reservoirs are not located close to an imported supply or other higher water quality source. Therefore, these options are not considered further. San Justo Reservoir, if rehabilitated and reoperated, could store additional imported supplies from the Hollister Conduit if conduit capacity constraints do not exist when the water is available. The San Justo Reservoir storage option could provide a measurable benefit to TDS levels if combined with a high quality supply option, but will not be carried forward as a stand-alone alternative.

5.5.3.3 Reclaim Quarries for Storage

Alternative Description. Reclaiming sand and gravel extraction quarries for use as storage facilities is a storage option. More information is needed on the storage capacity potential, impacts to groundwater quality, and the timing of availability (end of extraction period).

Preliminary Screening. According to the Groundwater Management Plan Update, the quarries may not be available for approximately 100 years. There are no anticipated TDS benefits associated with this concept if local supplies were to be stored. This option is not considered further.

5.5.3.4 In-Basin Aquifer Storage and Recovery

Alternative Description. This is a storage and treatment option without a supply. ASR facilities are specially designed wells that operate as both injection and extraction wells. ASR could be located in or near the Hollister Urban Area in areas of potential overdraft, but would

require additional studies to determine appropriate locations with aquifer conditions which allow for injection and extraction.

Using ASR would require treatment of the source waters, injection into a groundwater basin, and extraction. Demineralization or softening of the extracted water is required prior to distribution if the injected waters blend with a lower quality water during storage. A 1999 SBCWD study indicated that the San Juan Creek vicinity may be an appropriate location for ASR with benefits to the Hollister Urban Area. Because treatment of the supply prior to injection is required, proximity to a WTP is important. Land acquisition may be required to accommodate new facilities at existing wells.

Preliminary Screening. Although this option requires a supply, it provides a measurable increase in dry year reliability. It may be a feasible component in combination with other options if the water quality of the provided supply is not significantly degraded during storage. It has some implementation risks due to the lack of information on a suitable site. ASR will therefore be included with Alternative 2A, utilization of local surface supplies. It is recommended that an ASR pilot study be conducted if this alternative/component is recommended for implementation.

5.5.3.5 In-Basin Artificial Recharge

Alternative Description. This is a storage and treatment option without a supply. A new unidentified water supply would be obtained and percolated in artificial recharge basins and stored in an ASR facility located in or near the Hollister Urban Area. This option requires extraction wells and the demineralization or softening of the pumped water prior to distribution to its overall water quality. A significant amount of land would be required for construction of the artificial recharge basins. Siting facilities to recharge groundwater aquifers that supply the urban area provides the greatest benefit to M&I pumping.

Preliminary Screening. This option has a high risk associated with implementation due to the technical feasibility requirements of siting, as described above, and the minimal benefit to water quality, and is therefore not considered further. However, it may be combined with other options in the future.

5.5.3.6 New Off-Stream Reservoir

Alternative Description. This is a storage option without a supply. The GMP Update recommended a new seasonal storage reservoir on Pacheco Creek, as shown on Figure 5-2; however, this perennial stream may have a variety of environmental concerns. A new pumped storage reservoir on Arroyo Dos Picachos near Lone Tree Way may also be considered. Stored surface water would be treated at a new WTP prior to integration into the potable distribution system. Storing a local supply with higher TDS levels than Pacheco Creek would not improve TDS levels without adding demineralization or softening to the surface water treatment process.

Preliminary Screening. The institutional constraints (implementation risk) with developing a new dam and reservoir eliminate this option from further consideration. These constraints may include high costs which cannot be phased, environmental and other permitting requirements, and risk of delays associated with public concerns over building new dams on perennial streams.

5.5.4 Concept 3 – Demineralization of Urban Wells

Alternative Description. With this concept, groundwater would be demineralized or softened to reduce TDS and hardness levels. Individual wellhead treatment is a viable concept for the demineralization option. Softening of the groundwater could also be utilized as a treatment process instead of demineralization. Softening, however, requires centralized treatment similar to a surface water treatment plant which would increase costs. Softening the water supply also requires demineralizing the wastewater effluent to meet recycled water quality objectives, thus also increasing costs. Moreover, preliminary analyses indicate that softening, alone, does not achieve the hardness goals. However, it should be noted that a combination of softening and demineralization could potentially be used to achieve hardness and TDS goals.

The treated supply would be blended with the existing CVP and remaining groundwater supplies in a the distribution system. Demineralization could be implemented at many wells sites to deliver uniform water quality by the 2015 target date.

As an alternative to meeting the water quality goals in 2015, and to reduce infrastructure requirements, one or more wells could be selected for an initial demineralization program. This approach would require that the MOU Parties relax the MOU objective to provide uniform water quality.

Brine concentrate is a byproduct of the demineralization process which must be disposed of. Approximately 10 to 20 percent of the demineralized supply becomes brine. Brine would be collected from the wells with demineralization treatment and conveyed to evaporative drying beds or deep injection wells. The finished product would be removed from the beds for land disposal.

Preliminary Screening. Conveying groundwater from existing wells located throughout the City and SSCWD distribution systems would require extensive piping to implement the softening option. The demineralization option provides a measurable benefit to TDS and hardness levels and a measurable increase in dry year reliability. Given the City's and SSCWD's existing water supply infrastructure, demineralization appears to be a more appropriate treatment process than softening and will be carried forward as Alternative 3A. Because of the higher costs associated with softening, the uncertainty of implementation of softening as a regional solution increases; therefore a regional softening solution was not considered further. If, during implementation of a demineralization solution, softening becomes more cost effective, it should be reconsidered.

Initial demineralization at a limited number of wells would provide a similar benefit to TDS and a measurable increase in dry year reliability and would require less extensive conveyance piping to meet the uniform water quality goal and will be carried forward as Alternative 3B. Brine disposal is an implementation risk that must be studied further.

5.5.5 Concept 4 – Utilization of Water from High Groundwater Basins

The Bolsa Subbasin shown on Figure 5-2 has groundwater levels that vary throughout the area. High water levels are found in the northeast and low levels to the south. This area is predominately agricultural and does not receive imported surface water. TDS levels are approximately 600 to 800 mg/L.

The Pacheco Subbasin also shown on Figure 5-2 also has high water levels and TDS levels of approximately 600 mg/L or lower. Flowing wells have been present along Lovers Lane and Shore Road (Pacheco Subbasin and part of the Bolsa Subbasin east of the Calaveras Fault) since the late 1990's and poor drainage conditions have posed problems for septic systems. This area receives imported surface water.

As imported CVP water was introduced and used in the San Juan Subbasin, there was continued percolation from wastewater treatment plant effluent and applied water and insufficient pumping of the groundwater to keep groundwater levels below the surface. The soil structure, clay layers existing at 3 to 12 feet below the ground surface, results in poor soil drainage. The San Juan Subbasin has very high water levels and TDS levels of approximately 1,200 mg/L with some wells with concentrations of 1,500 mg/L.

Alternative Description. One option for the utilization of water from high groundwater basins would require groundwater conveyance from existing or planned wells in the Bolsa, Pacheco, or San Juan Subbasins to a centralized location for treatment, then export to the Hollister Urban Area. Construction of new well(s) or purchase of existing agricultural wells is required to meet capacity needs. Centralized treatment could be located prior to or during conveyance to the urban area. Since the number of wells would be minimized and the source imported to the urban area through one transmission facility, centralized softening treatment would be feasible for this option; however, demineralization could also be considered for treatment.

Another option for the utilization of water from high groundwater basins is to use the groundwater in these basins as exchange water with other CVP contractors or users. CVP water users such as individuals in the Pacheco area or CVP contractors such as SCVWD, and future water contractors such as the Pajaro Valley Water Management Agency (PVWMA), could receive this high groundwater supply in exchange for providing a portion of their CVP supply to San Benito County. This option includes negotiating an exchange agreement with PVWMA, pumping from wells to be located near Lovers Lane, and conveying the water through Pacheco Creek to Miller Canal then to the Pajaro River. PVWMA would then provide its CVP allocation for a similar quantity for M&I use in the Hollister Urban Area.

As an alternative to demineralization of water from the high groundwater basins, the groundwater could be blended with recycled water. Groundwater would be conveyed from existing or planned wells in the Bolsa Subbasin south along Business Highway 156 to Flynn Road. A blending and storage facility would be located in this vicinity. The Phase 1 recycled water transmission system is planned to terminate along Wright Road; this line would be extended north along Business Highway 156 to the blending facility. Blended Bolsa groundwater and recycled water would be distributed through a dual water system in new

commercial and industrial developments in the airport business park, along Business Highway 156, and in the vicinity of the merging of Business Highway 156 and State Route 25.

Preliminary Screening. The concept of utilizing groundwater from high water basins provides a measurable increase in dry year reliability and the treated groundwater provides a measurable increase in water quality. However, the substantial costs associated with constructing a transmission pipeline to convey groundwater from the high water basins to Hollister make this alternative less desirable and more difficult to implement than pumping groundwater from urban wells (as described in Concept 3). Therefore, this option is not carried forward. However, this option should be considered as part of a long term water supply program. The exchange option provides a measurable benefit to TDS levels and a measurable increase in dry year reliability, but has significant risks associated with implementation due to the complexity of working with other agencies.

The alternative of blending groundwater with recycled water for municipal non-potable use supports the City's plan to use recycled water as a non-potable supply. However, it is not cost effective within the planning horizon of this master plan compared with Concept 1, using recycled water to offset CVP supplies. Nonetheless, in conjunction with Concept 1, as some of the agricultural lands utilizing recycled water convert to urban uses per the General Plan, the recycled water would continue to be used, but for outdoor urban irrigation and indoor industrial applications. The concept provides a highly reliable dry year water supply which also benefits the Bolsa groundwater basin and reduces the increase in pumping requirements within the overdrafted Hollister West basin. There are no costs associated with additional treatment of these supplies, although facilities are needed for blending, storing, and conveyance. This concept may be best utilized beyond the planning horizon of the master plan as the non-potable demands increase in these areas and agricultural lands are converted to urban uses.

5.6 Preliminary Screening Results

The application of the preliminary screening criteria was described above for each alternative concept. A summary of the preliminary screening results is shown in Table 5-2. The alternatives to be carried forward to the alternatives analysis described in Chapter 6 are based on the reformulation or combining of alternative concepts or components analyzed and described above. The alternatives carried forward include the following:

- Alternative 1A – Exchange agricultural CVP supply with recycled water
- Alternative 1B – Reallocate Unused CVP M&I Entitlements
- Alternative 2A – Capture intermittent creek flows
- Alternative 3A – Demineralization to meet MOU goals
- Alternative 3B – Phased demineralization of urban wells

Table 5-2: Preliminary Screening of Alternative Concepts

Initial Screening of Alternatives					
Concepts/Alternatives	Measurable TDS Benefit	Measurable Increase in Dry Year Reliability	Minimize Implementation Risk	Viable as a Component with other Options	Notes
Baseline Concept. MAINTAIN CURRENT PROGRAMS					
Continue Current Programs	✗	✗	✓	Y	Does not meet preliminary screening criteria for TDS improvement or increase in dry year reliability. Carried forward only to serve as point of comparison for other alternatives.
Concept 1. INCREASE IMPORTED SURFACE WATER					
Purchase or Transfer Imported Supplies					
Purchase Imported Supplies	✓	✓	✗	N	Needs significant quantity of dry year supply to meet reliability goals
Exchange Imported Agricultural Supply for Municipal Use					
Retire Agricultural Land	✓	✗	✗	N	Requires significant fallowing to meet dry year reliability goals; negotiations complex
Use Recycled Water for Agricultural Supply	✓	✓	✓	Y	Supports LTWMP plan to reuse wastewater
Blend Recycled Water with CVP Water	✓	✓	—	Y	Supports LTWMP plan to reuse wastewater; more information needed on institutional risks associated with blending
Blend Groundwater with CVP Water	✓	✓	—	Y	More information needed on institutional risks associated with blending
Blend CVP Water with Groundwater and Recycled Water	✓	✓	—	Y	Supports LTWMP plan to reuse wastewater; more information needed on institutional risks associated with blending
Reallocate CVP M&I Supply					
Reallocate Unused CVP M&I Entitlements	✓	✓	—	Y	More information needed on risks associated with reallocation

Initial Screening of Alternatives					
Concepts/Alternatives	Measurable TDS Benefit	Measurable Increase in Dry Year Reliability	Minimize Implementation Risk	Viable as a Component with other Options	Notes
Concept 2. UTILIZE LOCAL SURFACE SUPPLIES					
Capture Intermittent Creek Flows					
Arroyo Dos Picachos and Los Viboras	✔	—	—	Y	Dry year supply inadequate to meet reliability goals; facilities, storage, and institutional information needed
Pacheco Creek	✔	—	—	Y	Quantity and institutional information needed
Utilize Existing Reservoirs					
Hernandez Reservoir	✕	✕	✔	N	Poor water quality; minimal reliability benefit; not carried forward
Paicines Reservoir	✕	✕	✕	N	Poor water quality; minimal reliability benefit; construction may have environmental and permitting constraints; not carried forward
San Justo Reservoir	—	✔	✔	Y	Could be combined with a storage option; more information needed on modifications and reoperation
Reclaim Quarries for Storage	✕	—	—	N	Timing of availability makes this storage option infeasible
In-Basin ASR	✔	✔	✔	Y	This is a storage option; carried forward combined with a supply option
In-Basin Artificial Recharge	✔	—	✕	N	Lack of available sites in the urban area makes this storage option technically infeasible; not carried forward
New Off-Stream Reservoir	✕	—	✕	N	This storage option has significant institutional constraints; not carried forward
Concept 3. DEMINERALIZATION OF URBAN WELLS					
Demineralize Existing and New City and SSCWD Wells	✔	✔	✔	Y	Demineralization at several well sites
Phased Demineralization of Existing and New City and/or SSCWD Wells	✔	✔	✔	Y	Initial demineralization at one or more sites requires relaxing of uniform water quality objective
Softening of Existing and New City and SSCWD Wells	✔	✔	✕	N	Softening at centralized facility is not as attractive as demineralization. Preliminary analyses indicate that softening will not meet hardness goal.
Concept 4. UTILIZATION OF WATER FROM HIGH GROUNDWATER BASINS					
Demineralize or Soften Groundwater and Import to Urban Area	✔	✔	✕	N	
Exchange Groundwater for CVP Supply	✔	✔	✕	N	More information needed on institutional risks
Blend Groundwater with Recycled Water for Agricultural and Municipal Turf Use	—	✔	✕	N	Supports LTWMP plan to reuse wastewater; but timing of availability makes this option infeasible during the planning horizon.

Legend: ✔ Meets Screening Criterion
— Needs More Information
✕ Does Not Meet Criterion and Option is Eliminated
Y Yes
N No

6.0 Evaluation of Alternatives

This chapter presents the results of the alternatives analysis including more detailed development of the alternatives that passed the initial screening, developing evaluation criteria for the alternatives analysis, and evaluating the alternatives against the criteria.

6.1 Formulation of Alternatives

6.1.1 Alternatives Resulting from Screening Process

The initial screening of alternative concepts, presented in Chapter 5, resulted in five alternatives for further consideration and analysis. Each of the alternatives builds upon the Base Case described in Chapter 5, which includes existing facilities, projects currently in progress such as the DWTP and Seasonal Storage Reservoir, and projects which are reasonably expected to occur in the foreseeable future such as new wells, the Lessalt WTP upgrades and the DWTP expansion and Phase 2A Recycled Water facilities. The Base Case projects which are reasonably expected to occur in the future are presented in Table 6-1, and have been included as a base line cost for each of the alternatives.

The five alternatives identified for further consideration and analysis are listed below and a more detailed description is provided in the following subsections.

- 1A. Exchange agricultural CVP supply with recycled water
- 1B. Reallocate unused CVP M&I entitlements
- 2A. Capture intermittent creek flows
- 3A. Demineralization to meet MOU goals
- 3B. Phased demineralization of urban wells

6.1.2 Alternative 1A. Exchange Agricultural CVP Supply with Recycled Water

Alternative 1A involves the reallocation of agricultural CVP water from current users in San Benito County to M&I use. In exchange, the agricultural contractors would take delivery of recycled water from the City's new DWTP. This alternative relies on a similar quantity of CVP agricultural contract water being offered in exchange for the recycled water supply.

Table 6-1: Alternative Facility Requirements for 2023

	Units	Base Case	Alternatives				
			1A	1B	2A	3A	3B
Raw Water Storage and ASR Facilities							
Aquifer Storage and Recovery (ASR)	ac-ft				6,580		
Water Supply Facilities							
10-in Supply Pipelines	lf				10,960		
14-in Supply Pipelines	Lf				45,000		
16-in Supply Pipelines	Lf				1,000		
CVP Water Transfer	ac-ft		4,200	1,200			
Pumping Station	hp				751		
New Wells	gpm	417	0	0	4,075	1,320	1,320
SSCWD New Well	gpm	2,000	2,000	2,000	2,000	2,000	2,000
Seasonal Dam - Arroyo Dos Picachos	ac-ft				1,420		
Seasonal Dam - Arroyo Los Viboras	ac-ft				1,380		
Seasonal Dam - Pacheco Creek	ac-ft				3,780		
Water Treatment Facilities							
Lessalt WTP Hydraulic Upgrades	mgd	3	3	3	3	3	3
Lessalt Expansion (3 to 4 mgd)	mgd			1.1			
Surface Water Treatment Plant	mgd		3.7				
Treatment For ASR System	mgd				5.9		
Demineralization	mgd		8.2	9.9	7.5	16.0	7.1
SSCWD Softening at Well #8	gpm	1,300	1,300	1,300	1,300	1,300	1,300
SSCWD Softening Plant	gpm	3,800	3,800	3,800	3,800	3,800	3,800
SSCWD Demineralization Project	gpm	2,000	2,000	2,000	2,000	2,000	2,000
SSCWD Deep Well Injection	na	X	X	X	X	X	X
Treated Water Reservoirs							
Storage to Meet Existing Demands	MG	5	5	5	5	5	5
Storage to Meet Future Demands	MG		6	6	6	6	6
Wastewater Treatment							
DWTP Expansion (4 to 5 mgd)	mgd	5	5	5	5	5	5
SSCWD Ridgemark WWTP	mgd	0.5	0.5	0.5	0.5	0.5	0.5
Recycled Water							
Phase 2A Recycled Water Project	na	X	X	X	X	X	X
SSCWD Recycled Water Project	na	X	X	X	X	X	X

The Base Case facilities are common to all alternatives.

It is assumed that the CVP agricultural supply allocated as an M&I supply would experience the same levels of curtailment as existing agricultural CVP supply. Table 6-1 presents the quantities of water required for the reallocation. A maximum of 4,200 acre-feet is available for exchange based on the recycled water effluent production anticipated for 2023. It is not expected that conveyance through the Pacheco and Hollister Conduits would pose a problem for this alternative, since CVP supply is used as a baseload supply as opposed to a peaking supply. However, the recently updated USBR hydraulic model would be used to confirm that no additional improvements would be required to eliminate capacity constraints. It is assumed that this alternative would be too costly if capacity in the Pacheco or Hollister Conduit or substantial upgrades of these conduits is required.

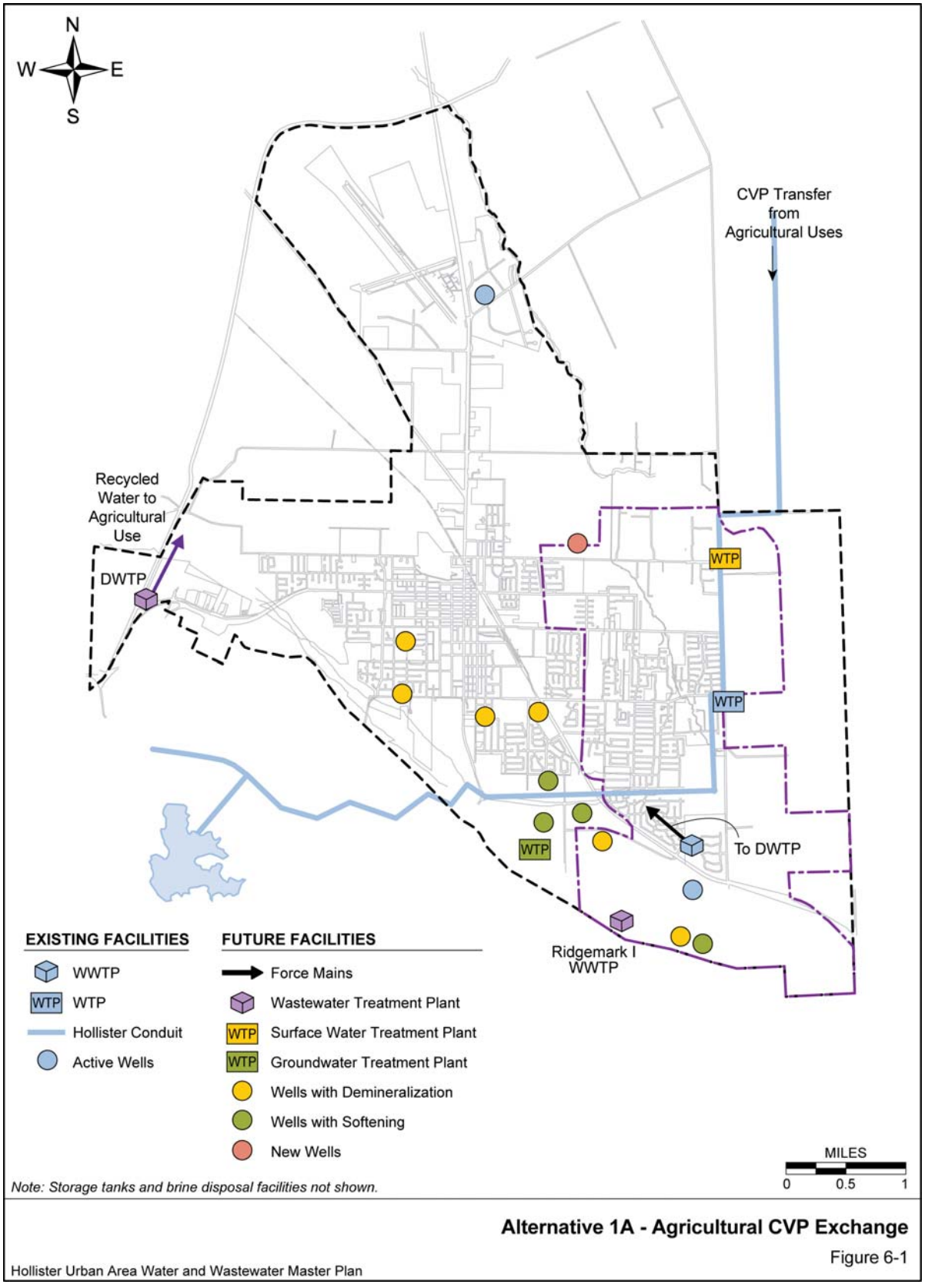
The imported water would be conveyed to the Lessalt WTP with a new WTP required for the additional supply. The Lessalt WTP would treat a portion of the new supply to use its full capacity, with the balance of the supply being treated at a new WTP. This new treatment facility may be located adjacent to the Lessalt WTP or at another location along the Hollister Conduit. Figure 6-1 presents the preliminary location of new facilities needed for this alternative.

Demineralization of the surface water is not needed due to the expected adequacy of CVP TDS and hardness levels. However, demineralization of some urban wells within the Study Area will be needed to meet the drinking water quality goals, particularly during peak demand months. This alternative will likely require lining of the recycled water storage ponds to minimize pond losses and maximize recycled water availability.

Conveyance and treatment facilities associated with Alternative 1A are presented in Table 6-1. The water supplies proposed to meet the monthly demands are presented in Figure 6-2.

6.1.3 Alternative 1B. Reallocate Unused M&I CVP Entitlements

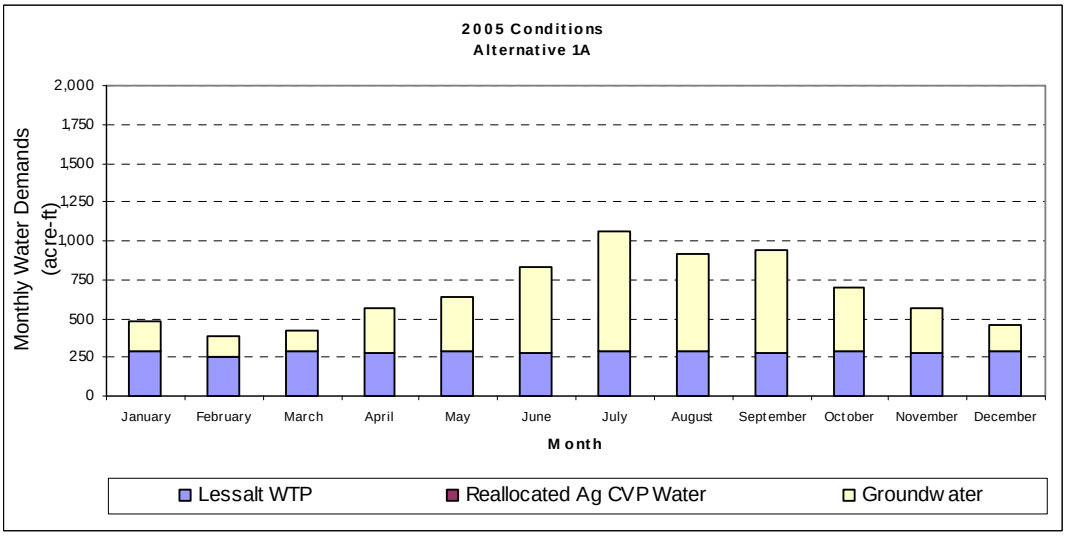
Alternative 1B involves the reallocation of existing unused M&I CVP entitlements from domestic and municipal users in San Benito County. As described in Chapter 5, an estimated 1,253 af/yr currently allocated to Domestic Small User Accounts may be available for reallocation. It is assumed that the reallocated CVP supply would experience the same levels of curtailment as existing M&I CVP supply. Conveyance capacity constraints in the Pacheco and Hollister Conduits are similar to those described for Alternative 1A above.

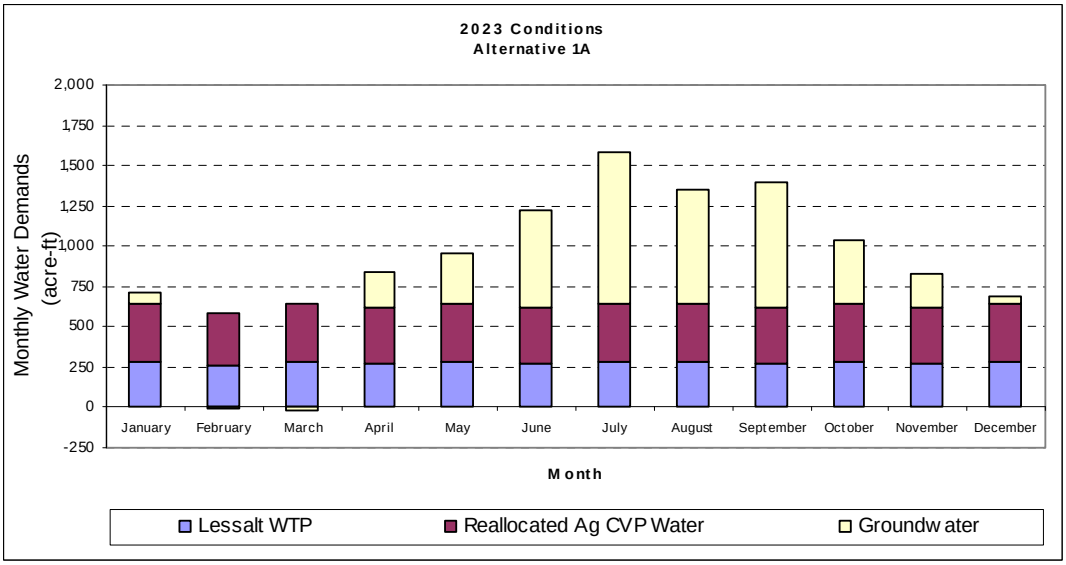


Alternative 1A - Agricultural CVP Exchange

Figure 6-1

Hollister Urban Area Water and Wastewater Master Plan





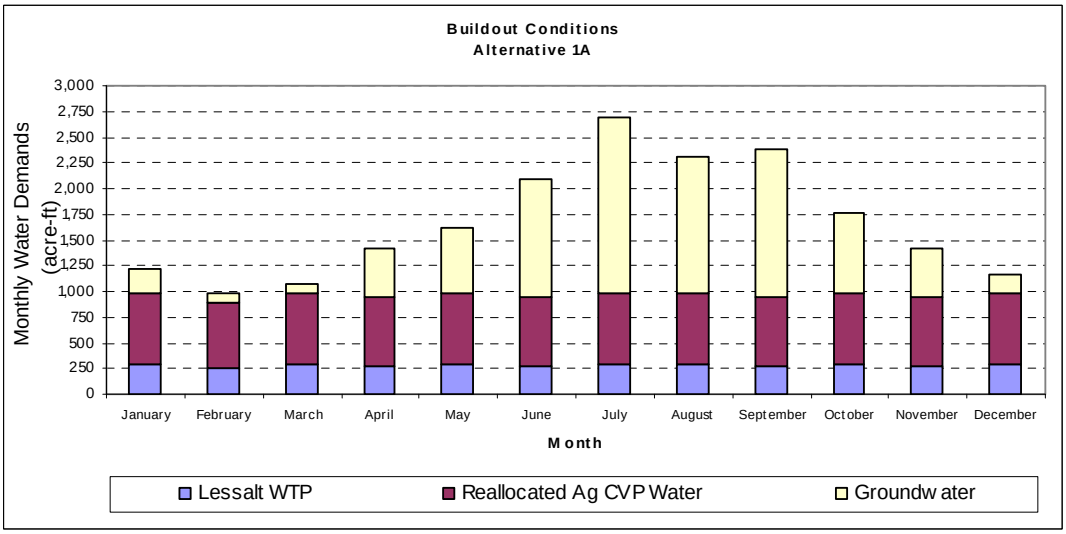


Figure 6-2: Alternative 1A. Water Supplies Proposed to Meet Monthly Demands

The reallocated water would be conveyed to and treated at the Lessalt WTP. The Lessalt WTP would require an expansion to treat the reallocated water. Alternatively, a new treatment facility could be located adjacent to the Lessalt WTP or at another location along the Hollister Conduit. Figure 6-3 presents the preliminary location of new facilities needed for this alternative.

Demineralization of the CVP water is not needed due to the expected adequacy of TDS and hardness levels. Similar to Alternative 1A, demineralization of some urban wells within the Study Area will be needed to meet the drinking water quality goals during peak demand months.

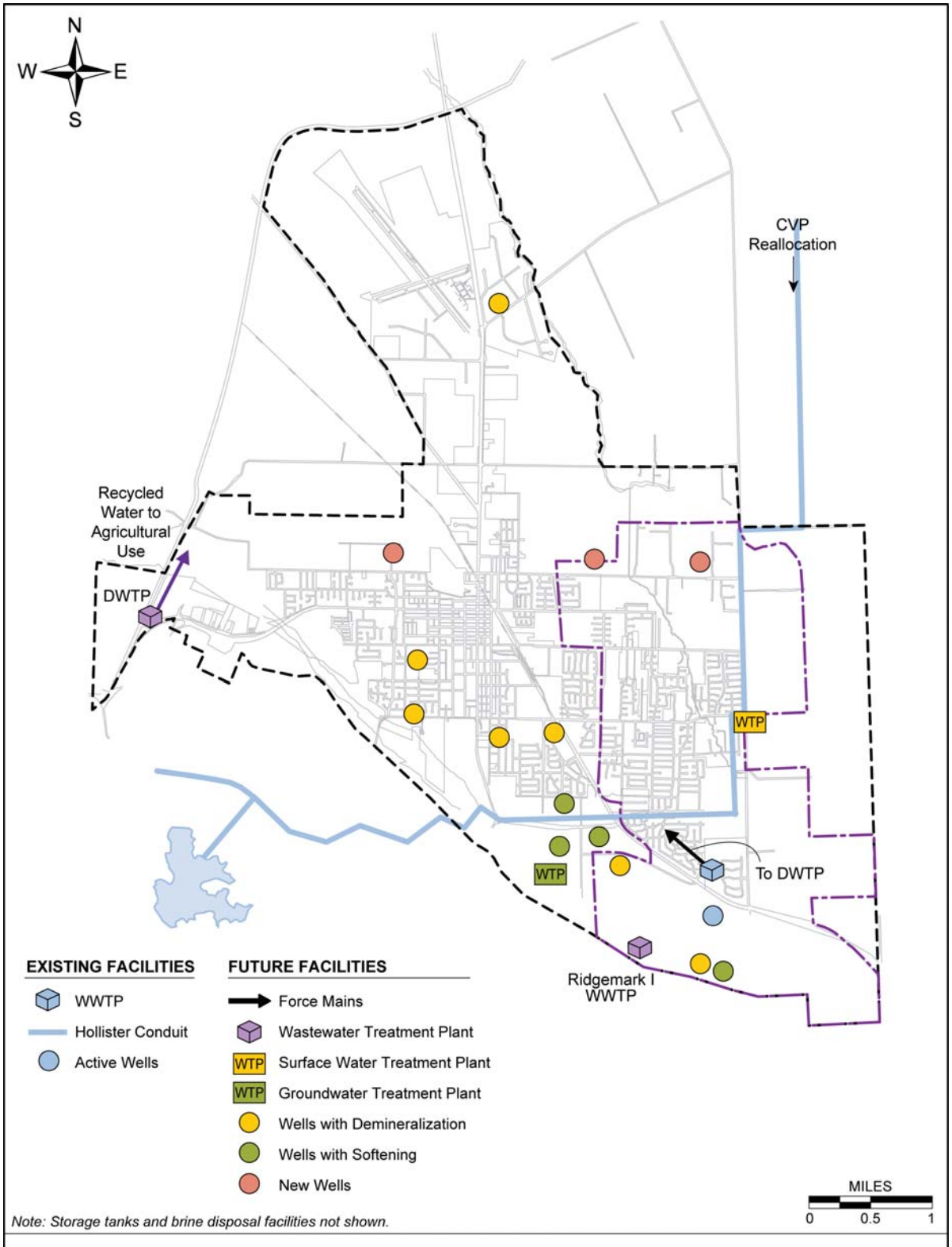
The treatment facilities associated with Alternative 1B are presented in Table 6-1 and the water supplies proposed to meet the monthly demands are presented in Figure 6-4.

6.1.4 Alternative 2A. Capture Intermittent Creek Flows

Alternative 2A relies on the development of the local streams: Arroyo Dos Picachos, Arroyo Los Viboras, and Pacheco Creek. Table 6-1 presents the quantities of water required from the local streams.

Utilizing an existing SBCWD water right to Arroyo Dos Picachos, obtaining new water rights to Arroyo Los Viboras, and transferring a water right on Pacheco Creek would be required. There are diversion dam-type facilities on Arroyo Dos Picachos and Arroyo Los Viboras which may be utilized if agreements are reached with the owners and rehabilitation or reconstruction conducted. The diversion facility on Arroyo Los Viboras may be able to store a limited quantity of water if reconstructed for this purpose. Storing local water would also require a water rights permit.

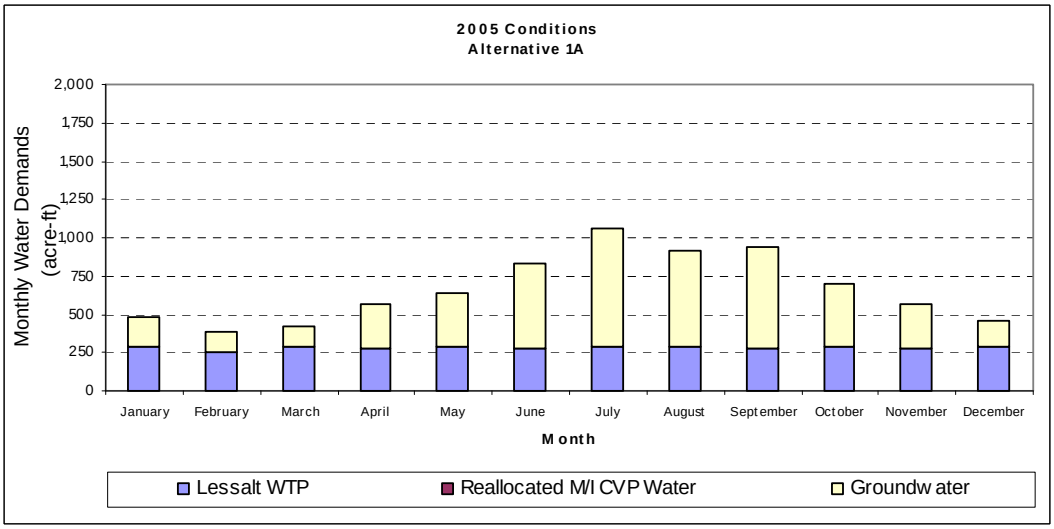
Intake, pumping, and conveyance facilities would be constructed on each stream to convey the supply for treatment. These intake and conveyance facilities would be oversized to capture supply when it is available (during the wet season, depending on the water rights obtained). The Lessalt WTP would treat a portion of the new local supply to its full capacity, with the balance being treated at a new WTP. The new WTP would likely be located between the local streams and an aquifer storage and recovery (ASR) facility located near Santa Ana Creek. Figure 6-5 presents the preliminary location of new facilities needed for this alternative.

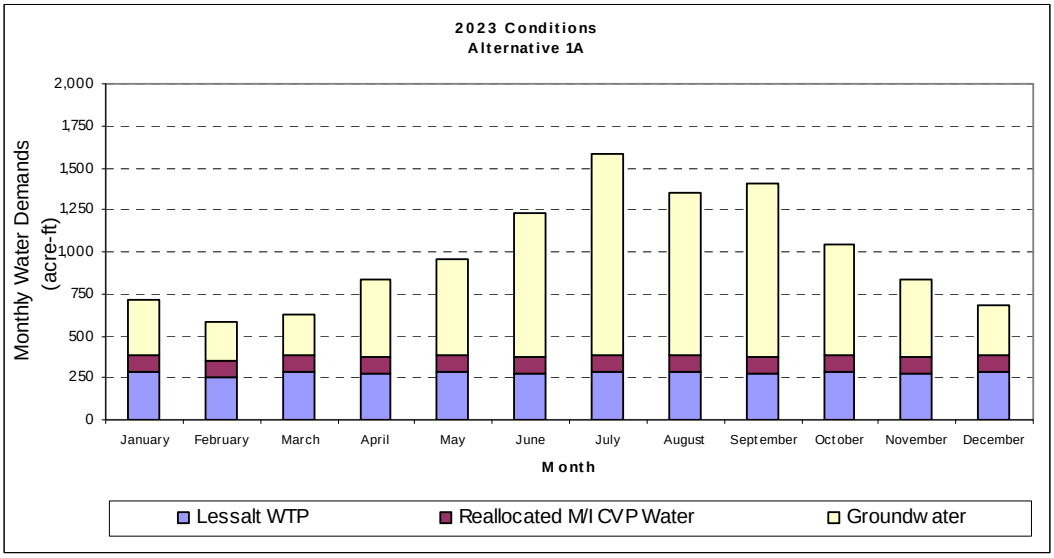


Alternative 1B - Reallocate Unused M/I CVP Entitlements

Figure 6-3

Hollister Urban Area Water and Wastewater Master Plan





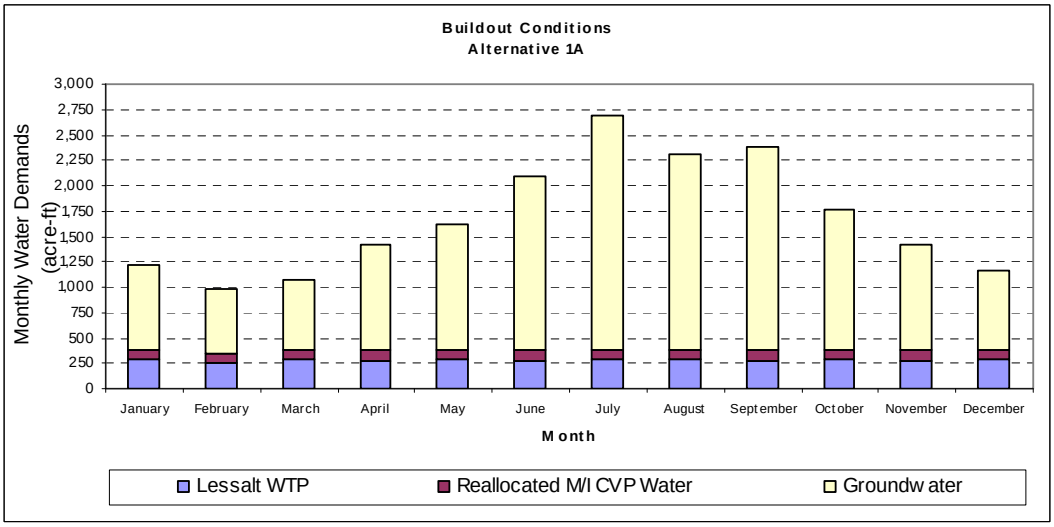
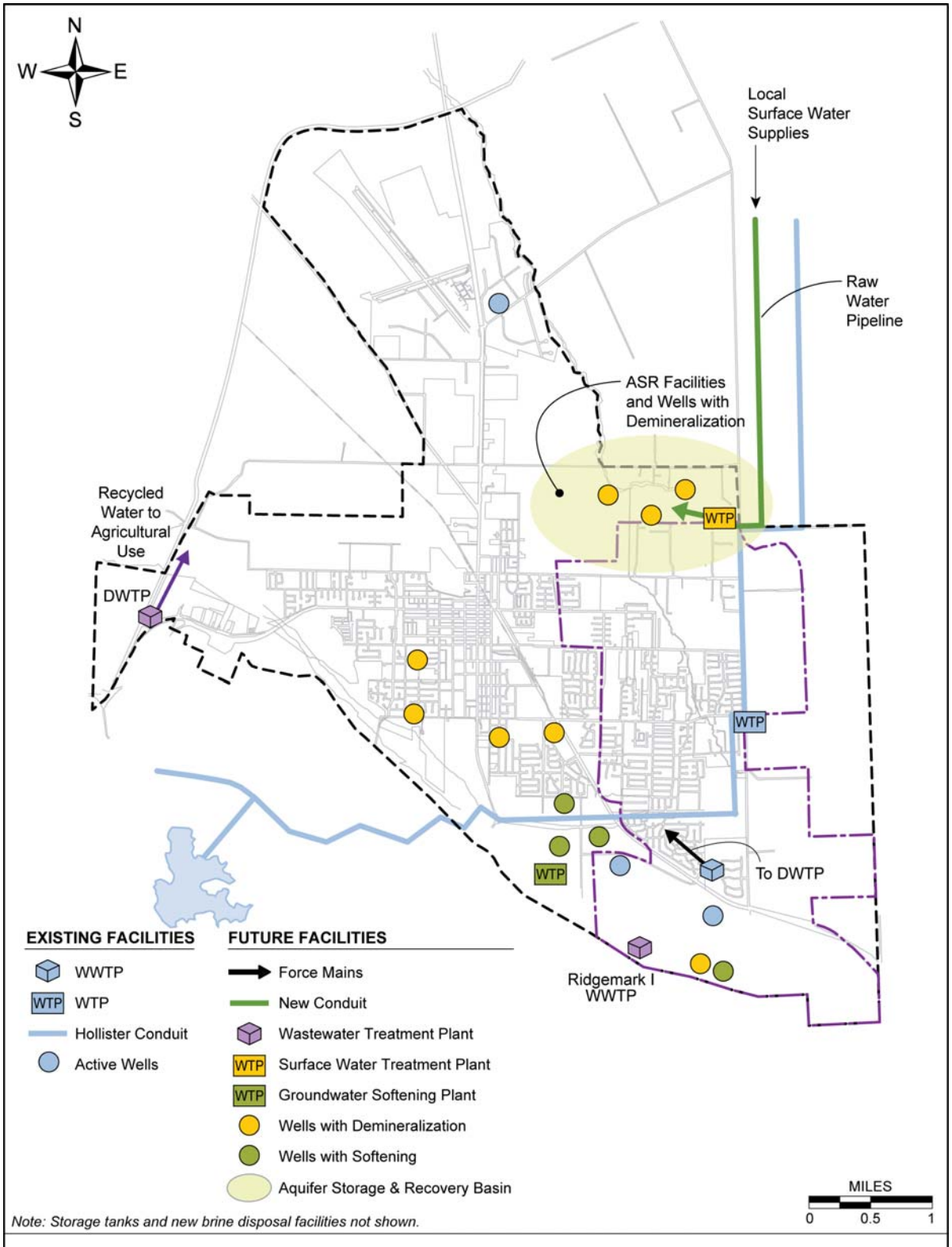


Figure 6-4: Alternative 1B. Water Supplies Proposed to Meet Monthly Demands



Alternative 2A - Local Surface Water Supplies

Figure 6-5

Hollister Urban Area Water and Wastewater Master Plan

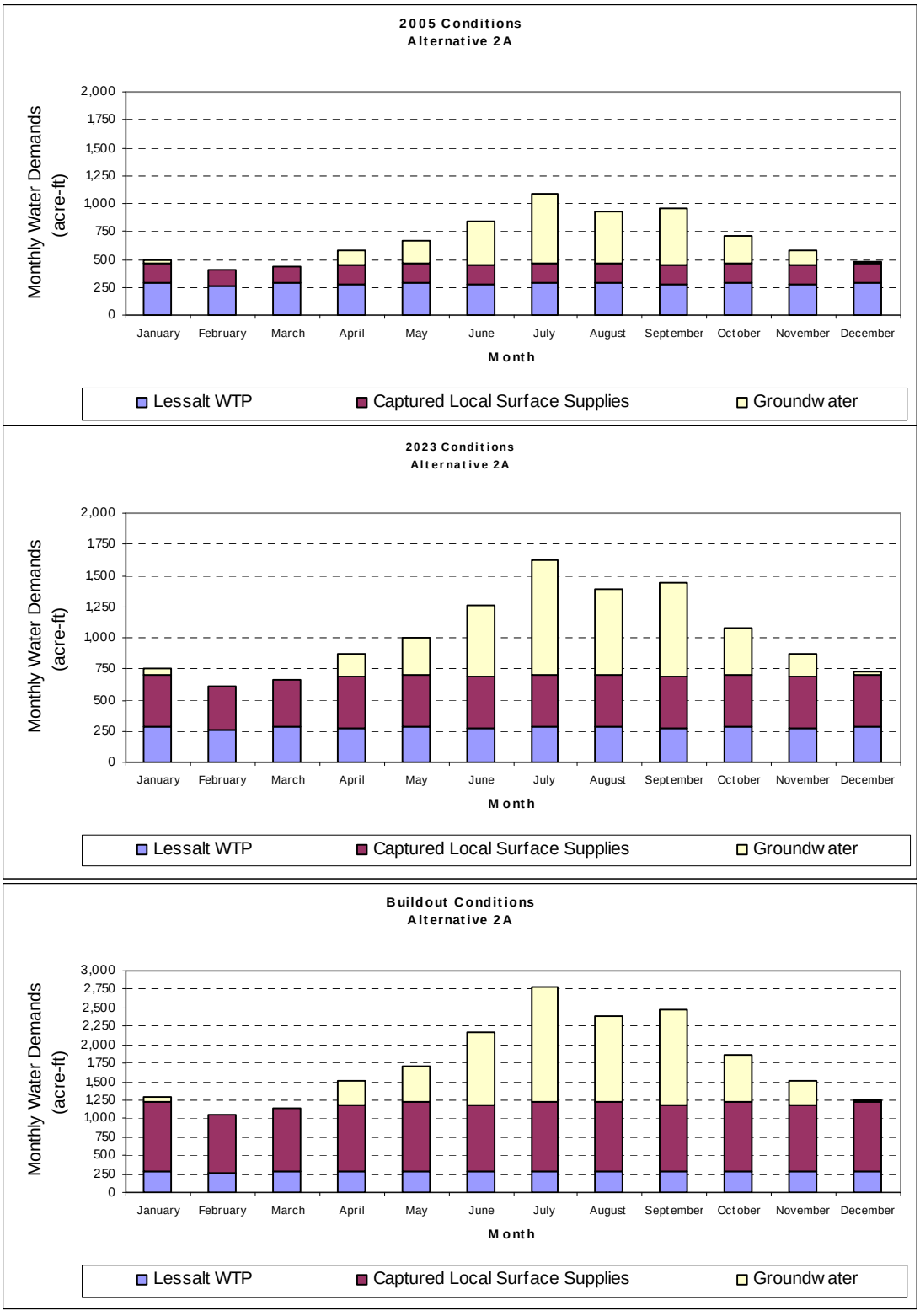


Figure 6-6: Alternative 2A. Water Supplies Proposed to Meet Monthly Demands

Treated water would be conveyed from the new supplies to the new ASR facility. Groundwater pumped from the ASR facility would be demineralized and conveyed to the City and SSCWD distribution systems. Similar to Alternative 1A, demineralization of urban wells within the Study Area will be needed to meet the drinking water quality goals during peak demand months.

Conveyance and treatment facilities associated with Alternative 2A are presented in Table 6-1. The water supplies proposed to meet the monthly demands are presented in Figure 6-6.

6.1.5 Alternative 3A. Demineralization to Meet MOU

Alternative 3A involves demineralizing the majority of the urban groundwater supply to reduce TDS and hardness levels throughout the City and SSCWD distribution systems to meet the MOU water quality goals. Table 6-1 presents the quantities of water and facilities required for demineralization. Individual wellhead treatment will be provided on existing wells and the new wells constructed for future demands. Figure 6-7 presents the preliminary location of new facilities needed for this alternative. A brine pipeline from the individual wells would be required to convey the brine to evaporation ponds.

Conveyance and treatment facilities associated with Alternative 3A are presented in Table 6-1. The water supplies proposed to meet the monthly demands are presented in Figure 6-8.

6.1.6 Alternative 3B. Phased Demineralization of Urban Wells

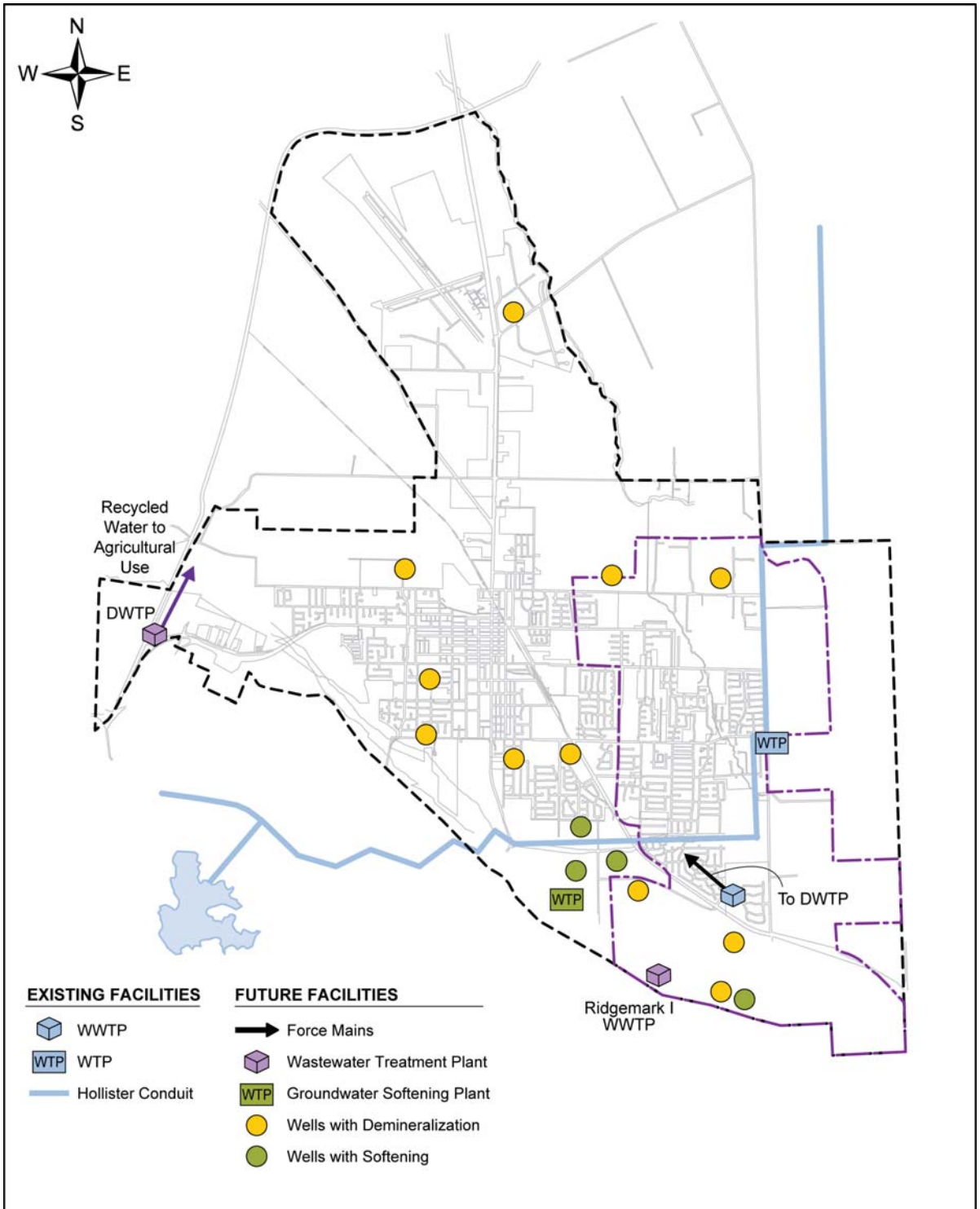
Similar to Alternative 3A, Alternative 3B involves demineralization of the urban groundwater supply to reduce TDS and hardness levels in the City and SSCWD distribution systems. Table 6-1 presents the quantities of water and facilities proposed for this alternative. In an initial phase, to be completed by 2015, three existing wells in the south-western area of the City would be equipped with wellhead demineralization. Figure 6-7 presents the preliminary location of new facilities needed for this alternative.

Alternative 3B does not meet the MOU drinking water quality goals by 2015. However, the three initial wells proposed for demineralization predominantly serve the western side of the City's distribution system while treated water from the Lessalt WTP predominantly serves the eastern side of the City and SSCWD's distribution system. Thus, while this alternative does not meet MOU goals by 2015, it does provide a more uniform water quality in the distribution

system. Moreover, while the drinking water quality goals are not met, drinking water quality is significantly improved. The estimated average annual hardness concentration in drinking water for 2005 is 304 mg/l (see Figure 6-11). The demineralization facilities proposed for Alternative 3B would reduce the average annual hardness for 2023 projected demands to approximately 126 mg/l, with a peak month hardness of approximately 177 mg/l. Similarly, the demineralization facilities would reduce the average annual recycled water TDS concentration from 944 mg/l to approximately 544 mg/l, as shown in Figure 6-12.

In addition to the demineralization facilities, brine disposal pipelines from the individual wells would be required to convey the brine to evaporation ponds.

The supply and treatment facilities associated with Alternative 3B are presented in Table 6-1. The water supplies proposed to meet the monthly demands are presented in Figure 6-8.



Alternative 3A - Demineralize Urban Wells to Meet MOU Goals

Figure 6-7

Hollister Urban Area Water and Wastewater Master Plan

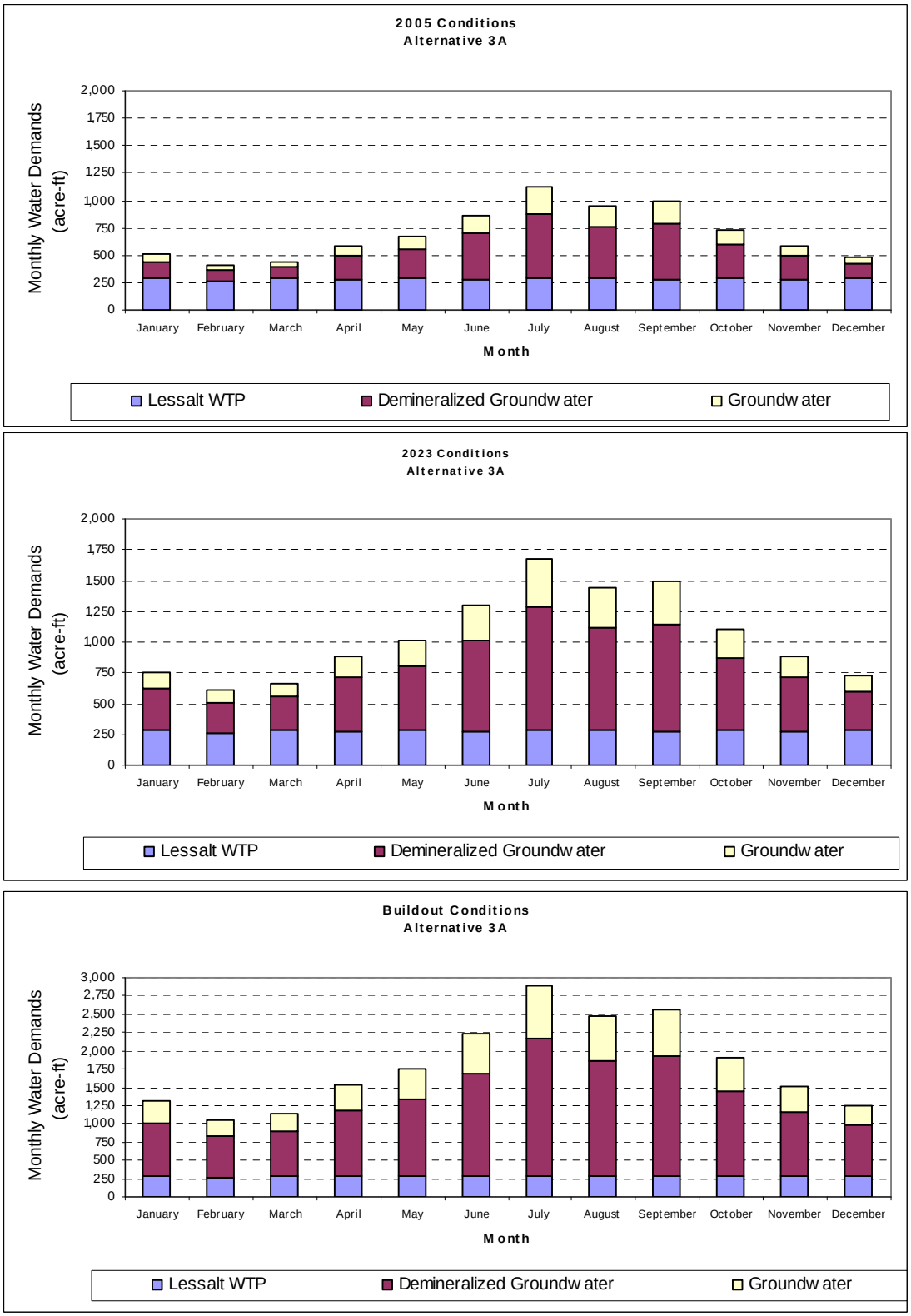
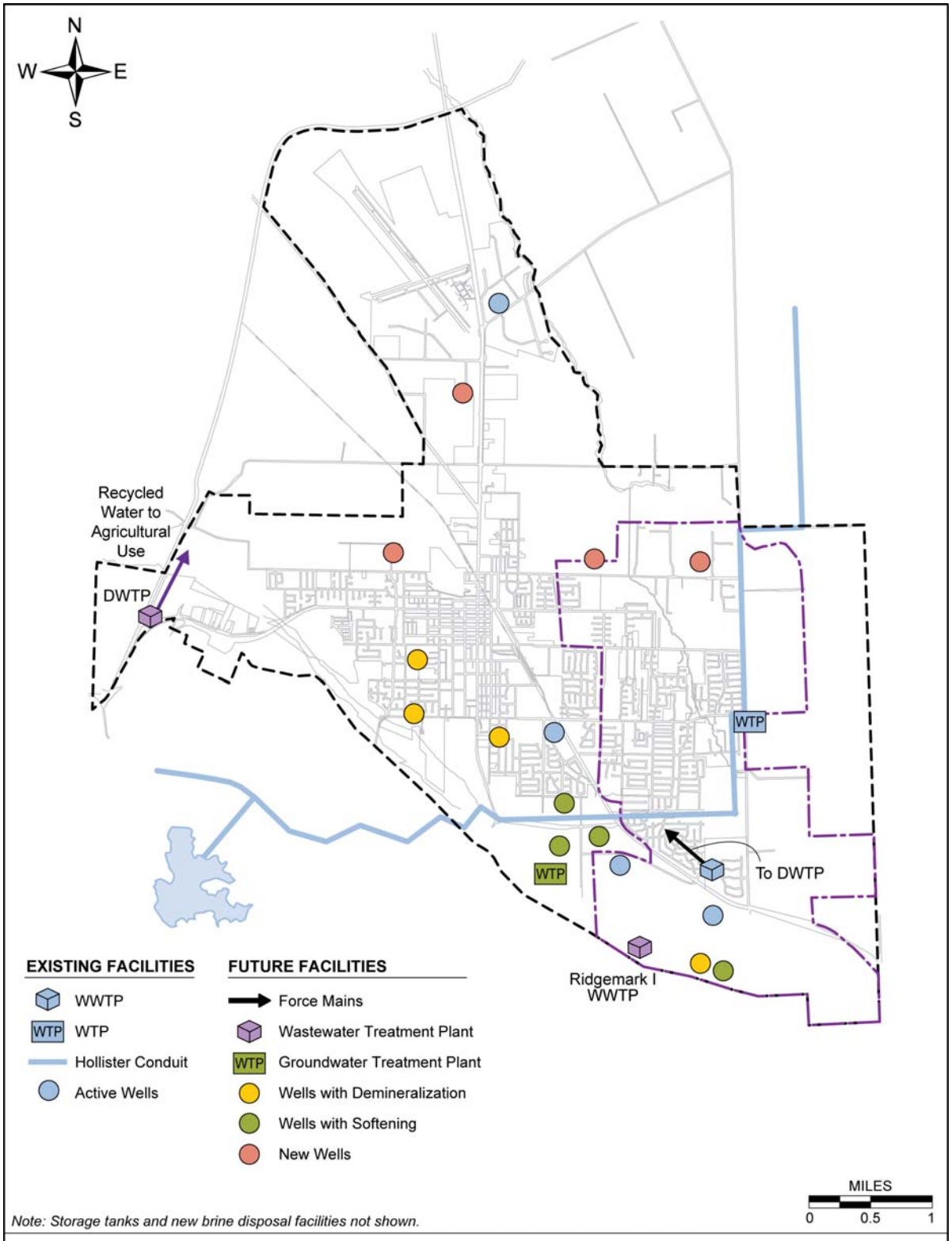


Figure 6-8: Alternative 3A. Water Supplies Proposed to Meet Monthly Demands



Alternative 3B - Phased Demineralization of Urban Wells

Figure 6-9

Hollister Urban Area Water and Wastewater Master Plan

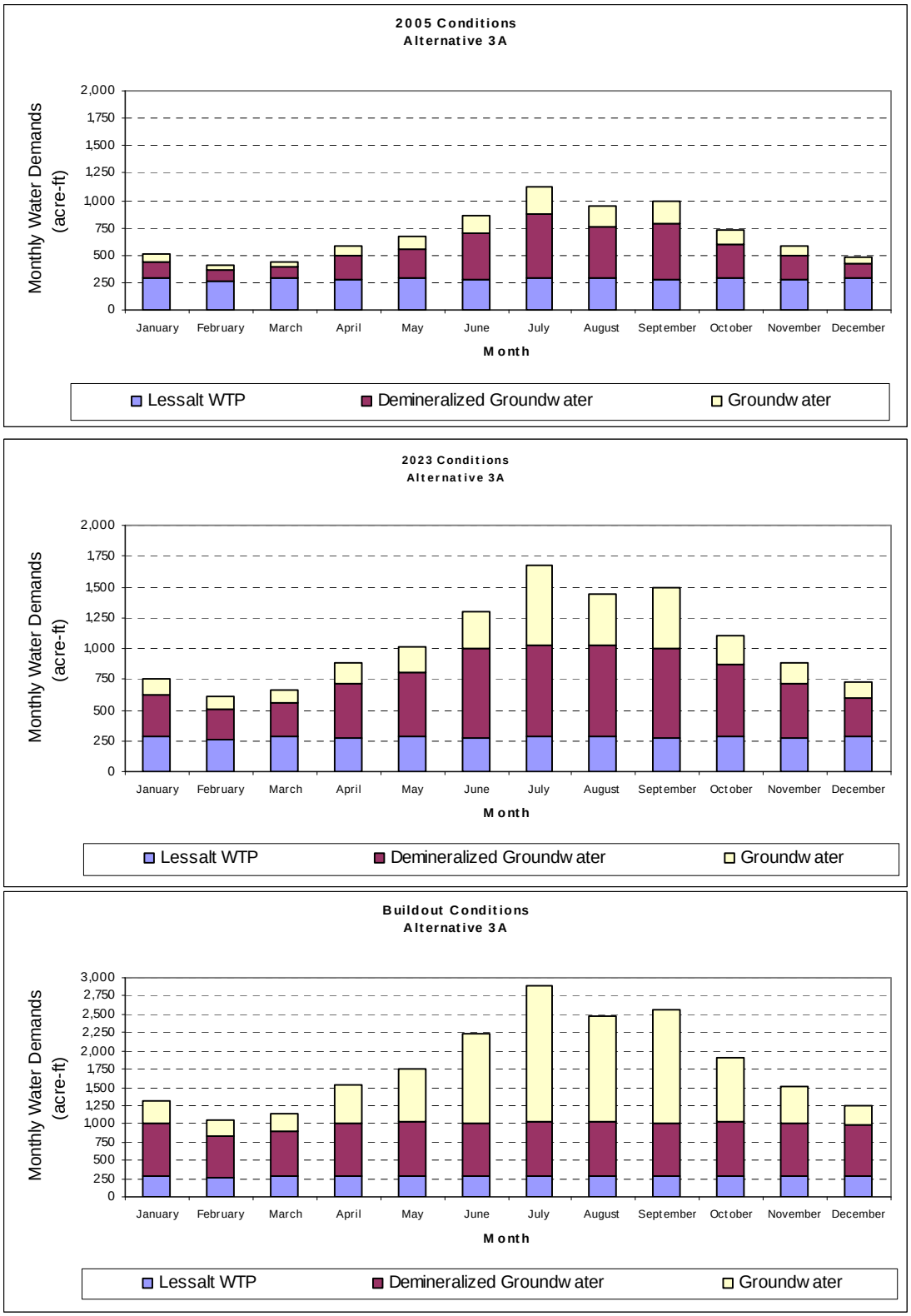


Figure 6-10: Alternative 3B. Water Supplies Proposed to Meet Monthly Demands

6.2 Evaluation Criteria

A preliminary set of evaluation criteria were developed based on the principles and objectives in the MOU described in Chapter 4. The final evaluation criteria were developed through workshops with the Governance Committee, the Management Committee, and the public. The criteria listed below were applied to the alternatives described in the previous sections.

Evaluation Criteria

- Criterion 1: Minimize Costs
- Criterion 2: Meet Drinking Water Quality Goals
- Criterion 3: Meet Recycled Water Quality Goals
- Criterion 4: Balance Water Supply for Enhanced Reliability
- Criterion 5: Maximize Availability of Supplies
- Criterion 6: Maximize Opportunities for Regional Solutions
- Criterion 7: Minimize Environmental Impacts
- Criterion 8: Provide Flexibility for Phased Implementation
- Criterion 9: Minimize Risk of Implementation

Alternatives were ranked for how they meet each criterion. A "moderate" ranking is used for those alternatives that do not fully meet the highest or lowest description of the criteria provided below.

6.2.1 Criterion 1: Minimize Costs

6.2.1.1 High

- The alternative has low capital costs (in 2008 dollars).
- The alternative has low O&M costs (labor, energy, chemicals, and maintenance).
- The alternative has a high level of consumer benefits or avoided consumer costs.

6.2.1.2 Low

- The alternative has high capital costs.
- The alternative has high O&M costs.
- The alternative has a high level of consumer costs.

6.2.2 Criterion 2: Meet Drinking Water Quality Goals

6.2.2.1 High

- The alternative is able meet the drinking water TDS and hardness goals of not greater than 500 mg/L and not greater than 120 mg/L, respectively.
- The alternative will provide uniform water quality throughout the drinking water system and minimize the need for water softeners.

6.2.2.2 Low

- The alternative is not able to meet the drinking water TDS and hardness (measured as calcium carbonate) goals of not greater than 500 mg/L and not greater than 120 mg/L, respectively.
- The alternative will not provide uniform water quality throughout the drinking water system and will not minimize the need for water softeners.

6.2.3 Criterion 3: Meet Recycled Water Quality Goals

6.2.3.1 High

- The alternative will meet the recycled wastewater TDS target of 500 mg/L and shall not exceed 700 mg/L.

6.2.3.2 Low

- The alternative will not meet the recycled wastewater TDS target of 500 mg/L and shall not exceed 700 mg/L.

6.2.4 Criterion 4: Balance Water Supply for Enhanced Reliability

6.2.4.1 High

- The alternative is able to support the groundwater management plan goals of increasing reliability for multiple dry years. The alternative will ensure that 100 percent of M&I demands will be met during wet, above normal, and dry years, and in the first year of critically dry year periods. The alternative will ensure that 85 percent of M&I demands will be met during the second and subsequent years of multi-year droughts.
- The alternative will contribute to the balancing of local supplies by reducing overdraft and high groundwater levels.

- The alternative will maximize the use of recycled water.

6.2.4.2 Low

- The alternative will not be able to support the groundwater management plan goals of increasing reliability for multiple dry years. The alternative will not ensure that 100 percent of M&I demands will be met during wet, above normal, and dry years, and in the first year of critically dry year periods. The alternative will not ensure that 85 percent of M&I demands will be met during the second and subsequent years of multi-year droughts.
- The alternative will not significantly reduce groundwater overdraft or high groundwater levels.
- The alternative does not maximize the use of recycled water.

6.2.5 Criterion 5: Maximize Availability of Supplies

6.2.5.1 High

- The alternative will provide salt management benefits by decreasing groundwater TDS and hardness levels.
- Water supply systems could be repaired relatively quickly after earthquake damage.

6.2.5.2 Low

- The alternative has detrimental impacts to salt management; groundwater TDS and hardness levels are expected to increase over time.
- Water supply system repairs would require a substantial amount of time and effort to repair if and earthquake were to damage the supply system.

6.2.6 Criterion 6: Maximize Opportunities for Regional Solutions

6.2.6.1 High

- The alternative provides sufficient capacity and flexibility to accommodate water and wastewater needs of the study area.
- The alternative has the potential to accommodate the needs of the ten “special study areas.”

- This alternative provides potential for regional partnering and benefits outside of the study area.

6.2.6.2 Low

- The alternative does not provide sufficient capacity and flexibility to accommodate water and wastewater needs of the study area.
- The alternative does not have the potential to accommodate the needs of any of the ten special study areas.
- This alternative does not provide the potential for regional partnering and benefits outside of the study area.

6.2.7 Criterion 7: Minimize Environmental Impacts

6.2.7.1 High

- The alternative avoids or minimizes potential environmental impacts, assuming feasible mitigations are incorporated into the project.

6.2.7.2 Low

- The alternative may have adverse impacts to biological, cultural, aesthetics, and air quality resources; or may impact the preservation of agriculture and agricultural land, or other resources which cannot be mitigated.

6.2.8 Criterion 8: Provide Flexibility for Implementation

6.2.8.1 High

- This alternative provides the ability to phase a project to ensure affordability.
- The alternative provides a high level of flexibility to manage the Hollister Urban Area water resources to meet changing conditions (e.g., increased demands, future reductions in supply, new regulations, new technology).

6.2.8.2 Low

- This alternative does not provide the ability to phase a project to ensure affordability.
- This alternative provides limited flexibility to manage the Hollister Urban Area water supplies to meet changing conditions.

6.2.9 Criterion 9: Minimize Risk of Implementation

6.2.9.1 High

- The alternative ensures minimal risk of implementation delays due to institutional barriers such as regulatory or permitting obstacles, legal challenge, potential partners' uncertainty, long construction timeframe, or other non-MOU Party (City, County, SBCWD, SSCWD) controls or influence.
- The alternative will be financially feasible.
- The schedule associated with this alternative meets the intent of the MOU.

6.2.9.2 Low

- High likelihood of delay associated with this alternative.
- The alternative is not financially feasible.
- Project schedule for the alternative does not meet the intent of the MOU.

6.3 Evaluation of Alternatives

Table 6-2 presents a summary of the alternatives evaluation. As shown in Table 6-2, and described below, alternatives were ranked for how they meet each criterion. A "moderate" ranking is used for those alternatives that do not fully meet the highest or lowest description of the criteria. In addition to the Highest/ Moderate/ Low rankings, a plus (+) and minus (-) sign were used to distinguish or compare between ranked groups of alternatives, as needed.

Information used in assigning the rankings included results of previous studies, technical and economic analyses completed for development of this Master Plan, water distribution system modeling of flows and water quality, and groundwater modeling. The following subsections describe the ranking rationale for the economic and non-economic factors.

Table 6-2: Summary of Alternatives Analysis

Alternatives	Evaluation Criteria								
	Minimize Costs	Meet Drinking Water Quality Goals	Meet Recycled Water Quality Goals	Balance Supply for Reliability	Maximize Availability of Supplies (i)	Maximize Opportun-ities for Regional Solutions	Minimize Environmen - tal Impacts	Provide Flexibility for Phased Implementa-tion	Minimize Risks of Implementa-tion
1A – Exchange Recycled Water for Ag CVP Supply	L	H	H	L (c)	M	L	M	L	L
1B – Reallocate Unused CVP M&I Entitlements	L	H	H	L- (d)	M	L	M	L	L
2A – Develop Local Surface Water	L- (a)	H	H	L+ (e, f)	M	L	M-	L	L
3A – Demineralization to Meet Water Quality Goals	L-	H	H	H	H	M	M	H	M
3B – Phased Demineralization of Urban Wells	M	M (b)	M (b)	H	H	M	M	H+	H

Note: H/M/L = High/Moderate/Low ranking of alternative to criterion.

(a) Diversion and storage costs obtained from the Groundwater Management Plan and updated to reflect current dollars

(b) Water quality goals are not met in peak summer months. Recycled water quality goals may be achieved through blending with water from the Seasonal Storage Reservoir

(c) Exchanged CVP supply would be subject to same level of curtailment as agricultural CVP supply

(d) CVP deliveries from USBR are based on historical use

(e) Out of basin storage or in-basin ASR storage must be expanded to meet dry year reliability goals

(f) Additional water needed to meet dry year supply needs which may result in significantly increased costs

(g) Long-term availability based on salt management benefits and seismic reliability

6.3.1 Economic Analysis

A present worth analysis was developed for each of the alternatives to compare relative lifecycle costs. Present worth costs are based on estimated capital, operation, maintenance, and avoided consumer cost estimates, and the following economic parameters:

- Costs based on 2008 dollars
- Discount rate of 3 percent
- 20 year analysis period

Table 6-3 presents a summary of the net present worth analysis for each of the alternatives as well as the base case. Project elements reflect the required improvements to serve the Hollister Urban Area through the year 2023. Annual costs are based on operating and maintaining proposed improvements and do not include O&M costs of any existing facilities.

Avoided consumer cost estimates were developed to reflect the monetary benefit associated with reduced drinking water TDS concentrations as compared to the current average TDS concentration of 875 mg/L. These avoided costs are based on a review of current relevant analyses (e.g., City of Davis, California; Central Arizona Salinity Study; Metropolitan Water District of Southern California and US Bureau of Reclamation; and CALFED Economics Workshop) which addressed reduced bottled/filtered water use; increased faucet, garbage disposal, clothes and dish washer, water heater, and residential water distribution pipeline service life expectancies; reduced operating expenses for residential water softening systems; and reduced purchase of residential water softening systems.

The net present worth of the projects included in the base case is $173 million. As these costs are common to all alternatives, the marginal increase in present worth costs was used to compare and evaluate the alternatives.

The marginal present worth costs shown in Table 6-3 range between $116 and $222 million; which is equal to a 91 percent differential. Typically the level of accuracy for planning level costs estimates is between +/- 15 and 30 percent. Thus, it is clear that Alternative 3B – Phased Demineralization of Urban Wells is the lowest cost alternative. Due to the magnitude of costs, the remaining alternatives were assigned a Low (L) ranking for the cost criterion in Table 6-2.

Table 6-3: Net Present Worth Cost Comparison for All Alternative Elements

		Alternatives					
	Units	Base Case	1A – Exchange Recycled Water with Ag CVP	1B- Reallocate Unused M/I CVP Entitlements	2A -- Local Surface Water Supplies	3A -- Demineralization to Meet MOU Goals	3B – Phased Demineralization of Urban Wells
Water Supply Facilities							
Capital Costs	$	1,660,000	800,000	800,000	36,680,000	2,530,000	2,530,000
O&M Costs	$	170,000	50,000	50,000	642,000	170,000	170,000
Water Treatment Facilities							
Capital Costs	$	36,300,000	123,740,000	117,550,000	77,460,000	151,100,000	93,700,000
O&M Costs	$/yr	2,530,000	10,330,000	10,110,000	5,776,050	11,870,000	8,540,000
Treated Water Reservoirs							
Capital Costs	$	6,950,000	11,730,000	11,730,000	11,730,000	11,730,000	11,730,000
O&M Costs	$/yr	110,000	182,000	182,000	182,000	182,000	182,000
Wastewater Treatment							
Capital Costs	$	10,720,000	10,720,000	10,720,000	10,720,000	10,720,000	10,720,000
O&M Costs	$/yr	110,000	182,000	182,000	182,000	182,000	182,000
Recycled Water							
Capital Costs	$	14,395,000	14,395,000	14,395,000	14,395,000	14,395,000	14,395,000
O&M Costs	$/yr	3,968,000	3,968,000	3,968,000	3,968,000	3,968,000	3,968,000
Totals							
Capital Costs	$	70,025,000	176,045,000	162,885,000	397,200,000	190,475,000	133,075,000
O&M Costs	$/yr	6,888,000	15,592,000	14,872,000	12,722,870	16,372,000	13,042,000
Avoided Consumer Costs	$/yr	0	-2,620,000	-2,650,000	-2,850,000	-2,670,000	-2,580,000
Net O&M Costs	$/yr	6,888,000	12,972,000	12,222,000	9,872,870	13,702,000	10,462,000
Present Value Net O&M (3%, 20 yr)	$	102,480,000	192,990,000	181,830,000	146,880,000	203,850,000	155,650,000
Present Worth Costs	$	172,505,000	346,835,000	340,835,000	544,080,000	394,325,000	288,725,000
Less Base Case	$	172,505,000	172,505,000	172,505,000	172,505,000	172,505,000	172,505,000
Marginal Present Worth of Alternative	$	0	173,550,000	168,330,000	208,870,000	221,820,000	116,220,000

Note: Capital costs do not include projects currently under construction, estimated at $100,000,000. These projects include the DWTP, Seasonal Storage Reservoir, Phase 1 Recycled Water facilities, and two SSCWD wells. O&M costs do not include costs to operate these facilities.

6.3.2 Non-Economic Analysis

The following are descriptions of the rational used to rank each alternative relative to the non-economic evaluation described in Section 6.2.

6.3.2.1 Meet Drinking Water Quality Goals (Criterion 2)

Alternatives 1A, 1B, 2A and 3A were configured to meet the drinking water quality TDS, hardness, and uniform water quality goals defined in the MOU and were therefore assigned a High (H) ranking. To achieve the goals, these alternatives required additional treatment of urban groundwater wells. Alternative 3B (Phased Demineralization of Urban Wells) does not meet drinking water quality TDS, hardness, and uniform water quality goals in all months. However, it is expected that water quality goals could be met in all but three months in 2023. Therefore, Alternative 3B was assigned a Medium (M) ranking.

6.3.2.2 Meet Recycled Water Quality Goals (Criterion 3)

Alternatives 1A, 1B, 2A and 3A meet the recycled water quality TDS target defined in the MOU and used for Criterion 3 and were therefore assigned a High (H) ranking. Alternative 3B does not meet the recycled water quality TDS target in summer months. Therefore, Alternative 3B was assigned a Medium (M) ranking. To attain adequate TDS levels for recycled water utilization, high TDS water produced in the summer could be blended with lower TDS water stored in the Seasonal Storage Reservoir. Further analysis would be required to confirm the feasibility of this blending strategy.

6.3.2.3 Balance Water Supply for Enhanced Reliability (Criterion 4)

The MOU goal regarding increasing the reliability of the supply for multiple dry years will be difficult to achieve. Alternatives 3A and 3B meet Criterion 4 better than the remaining alternatives because they rely on the utilization of groundwater located within the Hollister urban area without overdrafting the groundwater subbasins. Groundwater is a more reliable supply than surface water because it is not as sensitive to weather conditions and the operational and administrative constraints of the CVP supply; therefore, Alternatives 3A and 3B were assigned a High (H) ranking.

Alternatives that rely on the CVP supply (Alternatives 1A and 1B) are subject to the reliability of the imported surface water supply which is anticipated to continue to decline in the future.

As described in the 2001 USBR Draft M&I Water Shortage Policy, in years of average or below average precipitation or drought, full deliveries of imported surface water may not be possible. In either the case of a one-year shortfall, or in a period of multiple dry years, the 2001 USBR Draft M&I Water Shortage Policy indicates the following impacts to reliability of this supply.

- Any reduction of M&I water made available to the District shall be no greater than the percentage reduction applied to any other CVP M&I user.
- No reduction shall be made to M&I water made available to the District until agricultural users' allocations have been reduced to 75 percent; after this, both agricultural and M&I users' allocations are reduced equally to 50 and 75 percent, respectively; then agricultural users face cutbacks to 25 percent; at this point, agricultural allocations are cut back to 0 percent, while M&I allocations are reduced to 50 percent.
- In no year of shortage will the USBR reduce the quantity of M&I water made available to the District to less than the public health and safety water supply level.
- The quantity of water to be made available to the District shall be based on the District's historical use. The water requirements shall be the average quantity of water put to beneficial use within the service area during the last three years of water deliveries, unconstrained by the availability of CVP water.

The 2001 USBR Draft M&I Water Shortage Policy was finalized through the acceptance of a final Environmental Assessment and a Finding of No Significant Impact in December 2005. Since that time, two significant developments have occurred which significantly affect the reliability of both CVP and SWP deliveries in the State and which were addressed in the California Department of Water Resources' 2007 Final State Water Project Delivery Reliability Report. The first is climate change, which is altering hydrologic conditions in the State. The second is associated with a December 2007 federal court decision to protect the delta smelt by imposing interim rules that will significantly restrict the operations of the CVP. Based on this decision, the future reliability of CVP water is in question.

The SBCWD's full M&I entitlement is 8,250 af/yr. However, the average historical M&I use, including transfers, is about 6,976 af/yr. It is expected, as reported in the 2008 Final UWMP,

that this amount will be subject to the USBR M&I deficiency criteria, which will likely result in deliveries of 75 percent of historical use.

The alternatives relying on an imported surface water supply, Alternatives 1A and 1B, were therefore ranked low. Alternative 1A maximizes the use of recycled water and provides a higher level of reliability for the current CVP contractor who would receive recycled water in exchange for their allocation, but it does not improve the reliability of the urban area imported supply, without additional, more reliable supplies. Moreover, the exchanged CVP water would be subject to the same level of curtailment in dry years as agricultural CVP supply. Based on this assessment, Alternative 1A was assigned the Lowest (L) ranking. Since CVP deliveries are based on historic use, as opposed to entitlements, Alternative 1B would be subject to a significant lag period before it could be realized, particularly if the interim rules restricting CVP operations remain in place. Additionally, Alternative 1B would require additional, more reliable supplies. Based on this assessment, Alternative 1B was assigned a Low minus (L-) ranking.

Alternative 2A relies on the development of ASR storage facilities near the urban area; further analyses would be necessary to determine the feasibility and location of this type of storage. Due to the uncertainties associated with the implementation of in-basin ASR, this alternative was assigned a Low plus (L+) ranking.

6.3.2.4 Maximize Availability of Supplies (Criterion 5)

This criterion addresses supplies that will increase salt levels in the groundwater basin, thus reducing the availability of the groundwater supply in the future. It also addresses the availability of the supply following a significant seismic event. The alternatives that rely on the utilization of groundwater (Alternatives 3A and 3B) rank higher than the remaining alternatives relying on imported or local surface supplies. This ranking is due to the removal of highly mineralized groundwater and ultimate salt removal. The groundwater alternatives would also have a supply available following a seismic event, sooner than the imported supplies. This difference between groundwater and surface water supplies is due to the ability to fix wells, pump stations, and smaller diameter pipelines more easily and with local labor, without trying to compete for large diameter pipeline supplies and specialized labor following a major seismic event.

6.3.2.5 Maximize Opportunities for Regional Solutions (Criterion 6)

Demineralization of urban wells associated with Alternatives 3A and 3B would improve the salt balance in the groundwater basin for all users, not just the City and SSCWD. These alternatives also have the advantage of benefiting the region because they provide capacity and flexibility to accommodate water needs of the entire Study Area. Therefore, Alternatives 3A and 3B were assigned a medium (M) ranking. The remaining alternatives were assigned a Low (L) ranking.

6.3.2.6 Minimize Environmental Impacts (Criterion 7)

Developing detention and diversion facilities to convey local stream flows (Alternative 2A) may impact riparian vegetation and habitat at the construction sites as well as downstream due to reduced flows. Therefore, this alternative was assigned a Medium minus (M-) ranking.

Construction in urban areas is generally considered to have less of an environmental impact than construction in rural undeveloped or agricultural areas. Improvements associated with Alternatives 3A and 3B are generally more urban in nature, except for the brine disposal facilities, depending on the technology used.

6.3.2.7 Provide Flexibility for Implementation (Criterion 8)

Alternatives 3A and 3B, relying on the demineralization of groundwater, rank the highest for this criterion because implementation can be phased over time to ensure affordability. Since Alternative 3B is purposefully designed to be phased, it provides the highest level of flexibility to manage the HUA's water resources to meet changing conditions. Based on this analysis Alternative 3A was ranked High (H) and Alternative 3B was ranked High plus (H+).

Alternatives relying on a new or expanded water treatment plant (Alternatives 1A, 1B and 2A) have less flexibility with regard to phasing, as well as in meeting changing conditions over time (e.g., increased demands and further reductions in surface supplies).

6.3.2.8 Minimize Risk of Implementation (Criterion 9)

Alternatives 3A and 3B provide more local control over implementing the demineralization of urban wells than the other alternatives. There are less stringent permitting requirements and institutional arrangements with adding demineralization treatment to wells than with constructing new water treatment plants, expanding the capacity of the San Felipe Division

facilities including the Hollister Conduit, or obtaining new water rights and negotiating storage options.

6.4 Preferred Alternative

Based on the evaluation of alternatives summarized in Table 6-2, groundwater demineralization, Alternatives 3A and 3B, best meets the evaluation criteria.

Since Alternative 3B is a subset of Alternative 3A, Alternative 3B is a logical first step toward demineralization of urban wells to meet MOU water quality goals. Figure 6-11 illustrates the difference between the base case, Alternative 3A and Alternative 3B for average monthly drinking water hardness concentrations based on 2023 conditions. Similarly, Figure 6-12 illustrates the differences among the alternatives for the average monthly recycled water TDS concentrations. Based on initial analyses, it was determined that hardness, not TDS, was the most difficult goal to achieve. In a normal year, Alternative 3B would meet hardness goals in all but three months and would exceed the recycled water TDS limit in the month of July.

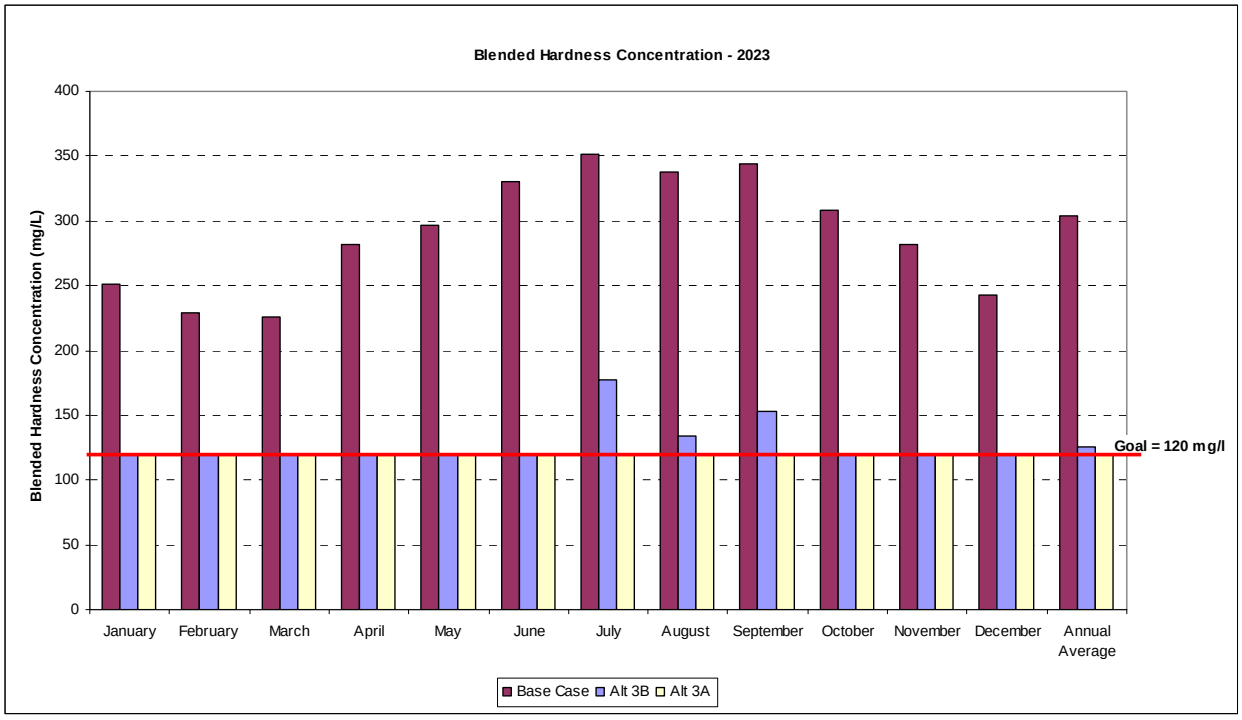


Figure 6-11: Blended Hardness Concentration, Drinking Water for 2023 Conditions

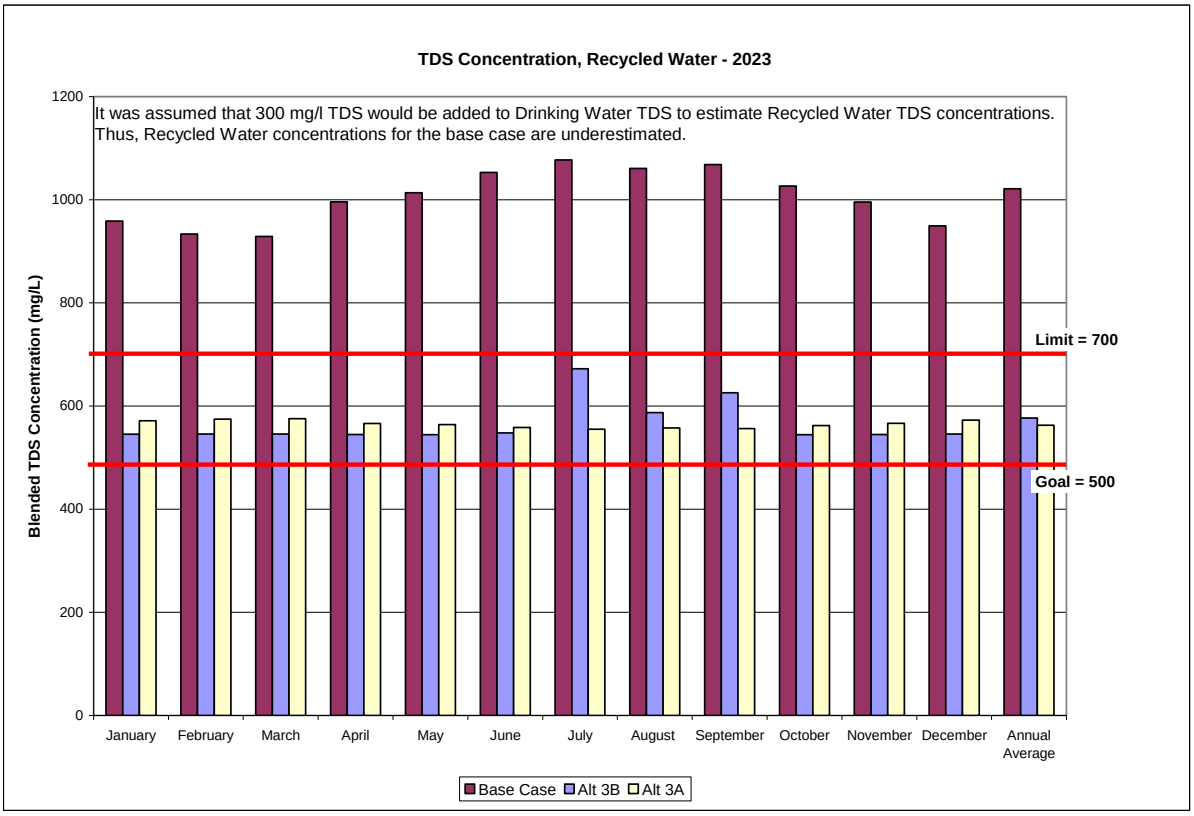


Figure 6-12: Blended TDS Concentration, Recycled Water for 2023 Conditions

The hydraulic distribution system model for the City and Sunnyslope distribution systems was also used to examine the distribution of drinking water hardness and TDS throughout the system for the existing conditions, Alternative 3B and Alternative 3A. The results, described in detail in Appendix H, indicate that Alternative 3B provides significant improvement over existing conditions with respect to the distribution of drinking water meeting both TDS and hardness goals. However, during peak demand months, there remain some hot spots where water from wells without demineralization facilities enters the system. These hot spots are eliminated in the Alternative 3A scenario.

The marginal present value of Alternative 3B, shown in Table 6-3, is approximately $116 million compared to $222 million for Alternative 3A. The difference is attributed to more demineralization facilities which are required in Alternative 3A to overcome the hot spots in the distribution system where water quality is not meeting the MOU goals for hardness and TDS.

In addition to being the lowest cost alternative, Alternative 3B also has the following major benefits:

- Providing a reliable water supply for average, dry, and multiple dry year events without significantly impacting long-term groundwater levels within the subbasins.
- Providing a reliable water supply for agricultural users.
- Providing improved drinking water quality and consumer cost savings.
- Reducing the annual salt load entering the groundwater basin.
- Improved effluent quality facilitating the implementation of recycled water use in the Wright Road / McCloskey Road corridor.
- Reducing percolation to groundwater basin and related contributions to localized high groundwater conditions.

Additionally, the recommended alternative provides the opportunity to evaluate the performance of initial demineralization facilities and the flexibility to add additional demineralization facilities as necessary. The phased approach also presents opportunities for cost savings as demineralization technology improves with time and capital costs are reduced.

The facilities required to implement this preferred alternative are described for water and wastewater in Chapters 7 and 8, respectively. Chapter 9 provides an implementation program including benefit and cost allocation, institutional arrangements, engineering, CEQA compliance, permitting, financing, coordination with ongoing programs, stakeholder outreach, and an implementation schedule.

7.0 Water Master Plan

This chapter presents the recommended improvements required to accommodate planned growth, improve water quality, and ensure long-term water supply reliability through the year 2023. The existing water system facilities were described in detail in Section 2. Recommended improvements described in this chapter were developed based on the hydraulic distribution system model and application of industry standards for a reliable level of performance.

7.1 Water Supply

As described in Chapter 6, the recommended water supply plan is a phased solution which builds upon the Base Case and includes an initial phase of demineralization of select urban wells, continued use of imported CVP supplies treated at the Lessalt WTP, and groundwater softening of several SSCWD wells. This plan provides flexibility to meet the reliability criteria for dry year and drought conditions defined by the MOU. Additionally, this plan provides the water supply and water quality for an integrated plan including wastewater disposal and water recycling.

7.1.1 Existing Urban Groundwater

The City and SSCWD own and operate the existing urban wells described in Chapter 2. These wells would continue to be utilized in the recommended plan. However, four of the wells would be equipped with wellhead demineralization. Water from as many as four SSCWD wells would be conveyed to a softening plant. The remaining wells would be used as needed to meet peak demands; however, in the initial phase, using these wells will result in hot spots which do not meet the MOU goals for water quality. Additional modeling and cost studies will be required during facilities planning and predesign to optimize system operation, determine if additional piping could be used to eliminate or minimize hot spots, and whether or not water from one or more of the wells could be treated at a single demineralization treatment plant to minimize both construction and operation costs.

7.1.2 Imported Surface Water

Imported surface water from the CVP will continue to be a key component of the water supply system. Currently, imported surface water is treated at the Lessalt WTP. However, as described in Chapter 2, the Lessalt WTP has not been able to operate at its design capacity

since it was placed in operation in January 2003. Therefore, the plant is an under utilized asset which could be a cost-effective source of additional high quality drinking water. A predesign report (Kennedy/Jenks, Draft May 2006) has been completed to provide the hydraulic and treatment process improvements to allow the facility to operate at its design capacity of 3.0 mgd. These improvements would allow the Lessalt to provide a treated water supply of up to 3,360 af/yr.

7.1.3 Preliminary Operational Plan

Additional modeling and system optimization studies will be required to evaluate various operating scenarios. However, a preliminary plan for use of the recommended water supply sources is presented in Table 7-1.

Table 7-1: Existing and Projected Annual Water Requirements and Sources of Supply (Acre-Feet/Year)

	100% CVP M&I Deliveries		50% CVP M&I Deliveries	
	2005	2023	2005	2023
Water Requirement	7,965	11,840	7,965	11,840
Sources of Supply				
Lessalt WTP (CVP)	2,375	3,360	1,187	1,680
Urban Groundwater	5,590	8,480	6,778	10,160
Total	7,965	11,840	7,965	11,840

As shown in Table 7-1, existing urban groundwater use will increase by approximately 3,000 af/yr over the planning period with full CVP deliveries. However, under extreme dry weather conditions, imported surface water for M&I use could be reduced to only 50 percent of historic use as described in Chapter 2 and illustrated in Figure 2-3. Under those dry year or drought conditions, additional urban groundwater would be pumped to offset the reductions in imported surface water from the CVP. Recovery of the groundwater basin would occur in wet years and/or through recharge from releases from CVP or Hernandez Reservoir water supplies to the San Benito River.

7.2 Water Production Requirements

Water production requirements should be planned to provide maximum day demand (MDD). The projected MDD and the existing and proposed water production facilities are shown in Figure 7-1 and summarized in Table 7-2. Since City Well No. 6 has had problems with pumping sand and water quality issues, it was not included in the existing production capacity.

To meet the projected MDD, new well capacity in the urban area will be required with a total capacity of between 2 and 4 mgd. The final sizing and timing of these new wells will be based upon the results of additional modeling, final operational plans, and the actual rate of growth in water demand.

To provide a reliable level of service for a system with multiple wells, production facilities should be capable of supplying the MDD with the largest single unit out of service. The largest production facilities are the City Well No. 5 (2.63 mgd) and the Lessalt WTP (3.0 mgd). Table 7-2 shows that sufficient surplus exists to provide for the largest unit out of service at current demand levels. However, as demands increase additional reserve capacity will be needed. This reserve capacity could be provided by rehabilitating some of the existing inactive wells or drilling one or more new wells in the urban area. These options should be evaluated during facilities planning and predesign work to determine the most cost-effective and operationally sound approach.

As described previously in Chapter 2, the Lessalt WTP requires improvements to produce its design capacity of 3.0 mgd. Once these improvements are in place, the Lessalt WTP should be operated as a baseload plant producing 3.0 mgd on an annual basis. Additional production requirements and summer peaks would be met with wells. In dry years or drought conditions, operation of the Lessalt WTP would be modified to treat the available imported CVP supplies and still meet the summer peaks. This modified operation would require more well pumping during the non-peak (winter) periods to offset the reduced production from the Lessalt WTP during those periods. This method of operation is typical of other conjunctive use systems utilizing a combination of surface water and groundwater supplies.

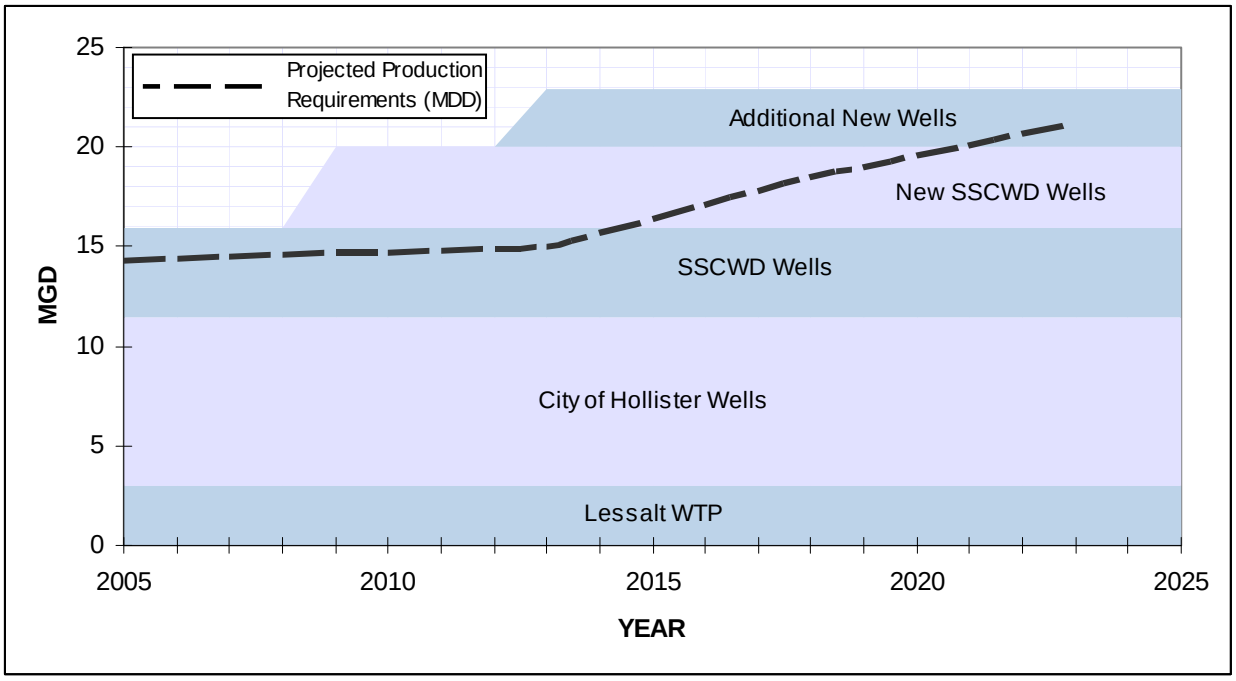


Figure 7-1: Projected Water Production Requirements and Sources of Supply

Table 7-2: Evaluation of Full System Source Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demands (mgd)					
Average Day	7.1	7.5	9.2	10.6	18.0
Maximum Day	14.2	15.0	18.4	21.1	36.0
Available Source (mgd) [a]					
LESSALT (3.0 mgd)	3.00	3.00	3.00	3.00	3.00
Well No.2 Bundeson (1,425 gpm)	2.05	2.05	2.05	2.05	2.05
WellNo.3 Fallon (930 gpm)	1.34	1.34	1.34	1.34	1.34
Well No.4 South Street (1,670 gpm)	2.40	2.40	2.40	2.40	2.40
Well No.5 Nash (1,825 gpm)	2.63	2.63	2.63	2.63	2.63
Southside Well No.2 (950 gpm)	1.37	1.37	1.37	1.37	1.37
Ridgemark Well No.5 (850 gpm)	1.22	1.22	1.22	1.22	1.22
Enterprise Well No.7 (550 gpm)	0.79	0.79	0.79	0.79	0.79
Ridgemark Well No.8 (800 gpm)	1.15	1.15	1.15	1.15	1.15
Lico Well No. 11 (1,300 gpm) [b]	-	1.87	1.87	1.87	1.87
Bray Well No. 12 (1,500 gpm) [b]	-	2.16	2.16	2.16	2.16
Total Available Source (mgd)	16.0	20.0	20.0	20.0	20.0
Source Surplus/(Deficiency) (mgd)	1.8	5.0	1.6	(1.2)	(16,0)

(a) Available source assumes 24 hour operation.
(b) SSCWD is currently installing the Lico and Bray wells. Well capacity is estimated.

7.3 Water Treatment

The recommended plan includes continued treatment of imported surface water at the Lessalt WTP, demineralization of groundwater and groundwater softening.

7.3.1 Lessalt Water Treatment Plant

The existing and proposed processes for the Lessalt WTP are described in Chapter 2 and are shown on Figures 2-7 and 2-8, respectively.

7.3.2 Groundwater Demineralization

The recommended water supply plan is phased demineralization of urban groundwater. The first phase includes demineralization at three City wells and one SSCWD well. Additional water distribution system modeling and economic analyses are required to optimize the location and operation of the demineralization facilities and determine whether one or multiple demineralization treatment plants will be constructed for the City's wells. These additional studies will be conducted as part of facilities planning and predesign. The SSCWD demineralization treatment plant is expected to be constructed at a new well in the Ridgemark area.

At a minimum, bench-scale tests should be conducted as part of engineering predesign to identify the necessary pretreatment requirements and select potential membrane technologies and manufacturers. The bench-scale tests would consist of groundwater sampling and water quality laboratory analyses to identify and quantify specific constituents known to impact membrane selection, performance and operation. Due to relatively high membrane and operating costs, it may be prudent to conduct pilot testing to identify and provide a means of quantifying long-term treatment efficiency and operating costs (e.g., chemical cleaning, TMP, etc.), and familiarize City, SSCWD, and SBCWD staff with this technology and its associated operational and maintenance requirements.

A brine management assessment is being conducted as part of a joint study between SBCWD and the Santa Clara Valley Water District. The brine management alternatives considered in the assessment include evaporation ponds, deep well injection, ocean outfall disposal, product recovery, zero liquid discharge, vibratory shear processes (VESP), and a combination of individual management alternatives. Preliminary results indicate that a combination of the

alternatives is the most attractive since it provides significant salt management benefits at relatively low life cycle costs. The combination solution is comprised of a VESP system followed by evaporation ponds and eventual land disposal of the dried solids.

7.3.3 Groundwater Softening

SSCWD is planning to construct two groundwater softening plants. The first softening plant would be located in the Ridgemark area and would treat water from Ridgemark well No. 8. The second plant is expected to be constructed in the middle pressure zone and treat water from up to three wells, including the Lico well No. 11, Bray well No. 12, and the Southside well No. 2. A fourth well (Campisi) on the proposed site for the softening plant could be used in lieu of the Southside well.

SSCWD has initiated a jar testing study to evaluate both traditional lime softening and pellet softening processes. It is anticipated that the study results, in combination with construction, operation, and maintenance cost estimates will be used as the basis for process selection and design.

The softening plants are expected to produce a water quality that meets the MOU goal for drinking water hardness. However, some demineralization (or blending with demineralized water) will be required to meet the MOU TDS goals for drinking and recycled water.

7.4 Water Distribution System Criteria

Criteria used to evaluate the condition of the existing water system and to plan new facilities are described in the following subsections. Specific criteria have been established based on industry standards and the level of service recommended for a reliable water system. Existing and proposed facilities were evaluated using the hydraulic model described in Appendix H. Facilities that do not meet the minimum criteria have recommended improvements to mitigate the deficiency.

7.4.1 Pipeline Criteria

Distribution and transmission pipelines should be sized for a maximum velocity of 6 feet per second (fps) during peak hour demands. Maximum velocities of 8 fps or more may occur

under fire flow conditions for short sections of mains or for piping within pump and valve station facilities.

7.4.2 System Pressure Criteria

The water system should provide peak hour demand (PHD) at a pressure no less than 30 psi at all service connections throughout the distribution system. To address fire suppression events, the system must be able to provide 20 psi minimum pressure at ground level at all points along the pipeline throughout the distribution system under fire flow conditions plus the maximum day demand.

7.4.3 Storage Volume Criteria

Public water systems are required to provide sufficient storage to meet daily variations in demand, fire flows, and emergency demands such as during power outages and equipment failures. This Master Plan utilizes the following criteria for determination of recommended treated water storage required in each pressure zone.

For reservoir sizing and design, each of the three storage components listed below must be considered:

- Operational storage
- Emergency reserve storage
- Fire suppression storage

Only effective storage may be used in determining actual available or design storage volume. Effective volume is equal to the total volume minus the dead storage built into the reservoir. Total storage volume required has been interpreted as the sum of equalizing storage, fire suppression storage, and emergency reserve storage at an elevation sufficient to provide 20 psi (static) to the highest customer in any pressure zone. In addition, equalizing storage is evaluated with respect to providing 30 psi (static) at the highest customer in a pressure zone.

7.4.3.1 Operational Storage

Operational storage capacity is utilized to meet the daily (diurnal) variations in demand. Peak use periods typically occur during the morning and evening hours, especially during the breakfast and dinner hours. Water is typically withdrawn from storage during these peak

demand periods and replenished during low demand periods during late evening and early morning hours.

For the purposes of this Master Plan, a value of 33 percent of the maximum day demand (MDD) is used to determine the volume of operational storage. This value is based upon a review of available operational data and is consistent with the City's previous Master Plan.

7.4.3.2 Emergency Reserve Storage

The purpose of emergency reserve storage is to provide reliability should sources fail or when unusual conditions impose higher demands than anticipated. The volume of emergency reserve storage required is dependent upon the reliability of the source of supply and the ability to provide an alternative supply. If the system or zone has multiple sources of supply, placing the largest supply source out of service and calculating the volume of water that could be provided by the remaining supply sources can reduce the emergency reserve storage requirement.

For this analysis, the required volume of emergency reserve storage is assumed to be equal to 50 percent of the projected MDD. This emergency reserve storage is also equivalent to 100 percent of the demands for an average day. Since the City and SSCWD water system have multiple wells and sources of supply, this level of service is considered adequate and is similar to the criteria for similar systems throughout California.

7.4.3.3 Fire Suppression Storage

Water systems are required to construct and maintain facilities capable of delivering fire flows in accordance with the determination of the fire flow requirements made by the local fire protection authority while maintaining 20 psi pressure throughout the distribution system. Fire flow requirements for the Hollister Urban Area are assumed to be equal to 3,500 gpm for 4-hours (840,000 gallons) throughout the entire distribution system. The magnitude of the fire suppression storage is the product of the maximum flow rate and duration established by the fire protection authority.

7.4.4 Fire Suppression Criteria

The development of fire suppression criteria consists of two elements; storage volume and available fire flow at a minimum pressure. Storage volume for fire flow was discussed in Section 7.4.3. Criteria for minimum pressure are defined in Section 7.4.2.

7.4.5 Pump Station Criteria

New and existing pump stations should be designed to meet the design flow rate with the largest pump in the station out of service. Due to the frequency of power outages in the Hollister Urban Area, all pump stations should also be provided with standby power.

7.5 Water System Deficiencies

This section discusses deficiencies in the production, storage, and distribution piping identified during the development of this Master Plan. The criteria listed above and the hydraulic model were used to determine deficiencies.

7.5.1 Production Capacity and Booster Pumping

The capacity of the existing source (Lessalt Water Treatment Plant and wells) and booster pump stations have been compared to the projected MDD through buildout. The existing sources assume operation for 24 hours.

Three separate comparisons have been made; the full system, the High Pressure Zone by itself, and the combined High and Middle Pressure Zones. Table 7-2, Table 7-3, and Table 7-4 summarize the results of the three comparisons, respectively.

Table 7-3: Evaluation of High Pressure Zone Source Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demands (mgd)					
Average Day	0.87	0.92	1.02	1.09	1.43
Maximum Day	1.74	1.83	2.03	2.18	2.86
Available Source (mgd) [a]					
Airline Highway BPS (300 gpm)	0.43	0.43	0.43	0.43	0.43
Ridgemark Well No.5 (850 gpm)	1.22	1.22	1.22	1.22	1.22
Ridgemark Well No.8 (800 gpm)	1.15	1.15	1.15	1.15	1.15
Total Available Source (mgd)	2.8	2.8	2.8	2.8	2.8
Source Surplus/(Deficiency) (mgd)	1.1	1.0	0.8	0.6	(0.1)

(a) Available source assumes 24 hour operation.

Table 7-3 summarizes the highest pressure zone (High Pressure Zone) by itself considering all facilities that can deliver water to the zone first to determine adequacy. An analysis was then conducted (summarized in Table 7-4) to evaluate the two highest pressure zones (High and

Middle). Facilities that convey water between the Middle and High Pressure Zones are not considered to be sources in this analysis. For the full system analysis, the Lessalt Water Treatment Plant and wells are considered sources. Water that is provided to a higher pressure zone is considered as source to a lower zone because of the connections between pressure zones that exist in the distribution system through PRVs.

Table 7-4: Evaluation of High and Middle Pressure Zone Source Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demands (mgd)					
Average Day	3.33	3.56	3.93	4.17	6.69
Maximum Day	6.68	7.13	7.86	8.34	13.36
Available Source (mgd) [a]					
LESSALT (3.0 mgd)	3.00	3.00	3.00	3.00	3.00
Memorial BPS (1,000gpm)	1.44	1.44	1.44	1.44	1.44
Southside Well No.2 (950 gpm)	1.37	1.37	1.37	1.37	1.37
Ridgemark Well No.5 (850 gpm)	1.22	1.22	1.22	1.22	1.22
Enterprise Well No.7 (550 gpm)	0.79	0.79	0.79	0.79	0.79
Ridgemark Well No.8 (800 gpm)	1.15	1.15	1.15	1.15	1.15
Lico Well No. 11 (1,300 gpm) [b]	-	1.87	1.87	1.87	1.87
Bray Well No. 12 (1,500 gpm) [b]	-	2.16	2.16	2.16	2.16
Total Available Source (mgd)	8.98	13.0	13.0	13.0	13.0
Source Surplus/(Deficiency) (mgd)	2.3	5.9	5.1	4.7	(0.4)

(a) Available source assumes 24 hour operation.
(b) SSCWD is currently installing the Lico and Bray wells. Well capacity is estimated.

Demands for the various pressure zones are based on the distribution of system demands in the hydraulic model for each of the years evaluated. These demands have been created using existing and projected zoning and land use information.

7.5.1.1 Full System Pressure Zone Analysis

Table 7-2 shows the calculation of source and production adequacy for the full system analysis. The existing source capacity, including the two new SSCWD wells in the middle zone, is adequate to meet projected demands through 2020. Existing demands, without the two new SSCWD wells in the middle zone, equate to approximately 81 percent of current production capacity. Therefore, there is sufficient reserve capacity in the existing facilities to meet demands with the largest unit out of service.

There is a deficiency of approximately 1.2 mgd at the end of the planning period (2023). This deficiency will be made up by constructing new wells in the urban area.

7.5.1.2 High Pressure Zone Analysis

The calculation for source adequacy for the High Pressure Zone is shown in Table 7-3. The source for this zone includes the Ridgemark Wells and the Airline Highway Booster Pump Station. As shown in Table 7-3 the capacity of the existing sources is projected to be greater than the MDD for the High Pressure Zone through the year 2023. However, SSCWD has indicated that an additional well (2,000 gpm) will be drilled in the Ridgemark area.

7.5.1.3 Combined High and Middle Pressure Zones

The calculation for source adequacy for the combined High and Middle Pressure Zones is shown in Table 7-4. Similar to the High Pressure Zone analysis, the combined capacity of the existing sources for the High and Middle Pressure Zones is projected to be greater than the MDD through the year 2023.

7.5.2 Storage

Storage deficiency is evaluated in a manner similar to that used to determine source and production adequacy. Storage in the full system is compared to the required amount of storage (developed in accordance with the criteria listed in Section 7.4.3). Following a full system analysis, the storage in the High Zone was evaluated then the High and Middle Zone requirements were evaluated.

7.5.2.1 Full System Storage Analysis

The calculation of storage adequacy for the full system is shown in Table 7-5. The evaluation indicates that the system is currently deficient in storage by approximately 2 mgal. By 2023, the deficit is projected to be approximately 7.7 mgal.

Evaluation of the storage within the Hollister Urban Area distribution system indicates that there is a disproportionately high volume of storage in the Low Pressure Zone. While this storage volume is applicable to the full system evaluation, it is not available to the upper two pressure zones and thus there are significant deficiencies in the upper zones as described in the following subsections.

Table 7-5: Evaluation of Full System Storage Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demands (mgd)					
Average Day	7.1	7.5	9.2	10.6	18.0
Maximum Day	14.2	15.0	18.4	21.1	36.0
Peak Hour	24.2	25.5	31.3	35.9	61.2
Required Storage Calculations					
Operational Storage (mgal) [a]	4.7	5.0	6.1	7.0	12.0
Emergency Reserve Storage (mgal) [b]	7.1	7.5	9.2	10.6	18.0
Fire Flow Storage (mgal) [c]	0.84	0.84	0.84	0.84	0.84
Required Storage [d]	12.7	13.3	16.1	18.4	30.8
Existing Drinking Storage (mgal)					
Fairview Road (SSCWD)	1.0	1.0	1.0	1.0	1.0
Ridgemark No.1 (SSCWD)	1.0	1.0	1.0	1.0	1.0
Ridgemark No.2 (SSCWD)	0.5	0.5	0.5	0.5	0.5
Fairview Road (City)	1.0	1.0	1.0	1.0	1.0
Park Hill No.1 (City)	2.2	2.2	2.2	2.2	2.2
Park Hill No.2 (City)	4.5	4.5	4.5	4.5	4.5
Sally Flat (City)	0.5	0.5	0.5	0.5	0.5
Total Existing Storage (mgal) [e]	10.7	10.7	10.7	10.7	10.7
Storage Surplus/(Deficiency)	(2.0)	(2.6)	(5.4)	(7.7)	(20.1)

(a) Required Operational Storage based on 33% of MDD.
(b) Required Emergency Reserve Storage based on 50 % of MDD.
(c) Required fire flow storage = Flow * duration (3,500 gpm for 4 hours).
(d) Total required storage is equal to the sum of the required operational storage, emergency reserve storage, and fire flow storage.
(e) Total existing storage includes all storage within the system and is not adjusted for minimum pressures.

7.5.2.2 High Pressure Zone Storage Analysis

Table 7-6 summarizes the calculation of storage adequacy for the High Pressure Zone. This pressure zone has a deficiency of 0.8 to 1.2 mgal between now and 2023. The only way this deficiency can be eliminated (assuming no change in projected demands) is to build new storage facilities within the High Pressure Zone.

7.5.2.3 Combined High and Middle Pressure Zones

The combined High and Middle Pressure Zone analysis is shown in Table 7-7. Analysis results show the largest deficiency of the three analyses is 4.3 mgal under 2023 demands. New storage in either the High or Middle Pressure Zones are required to mitigate this deficiency.

Table 7-6: Evaluation of High Pressure Zone Storage Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demands (mgd)					
Average Day	0.9	0.9	1.0	1.1	1.4
Maximum Day	1.7	1.8	2.0	2.2	2.9
Peak Hour	3.0	3.1	3.4	3.7	4.8
Required Storage Calculations					
Operational Storage (mgal) [a]	0.6	0.6	0.7	0.7	1.0
Emergency Reserve Storage (mgal) [b]	0.9	0.9	1.0	1.1	1.4
Fire Flow Storage (mgal) [c]	0.8	0.8	0.8	0.8	0.8
Required Storage [d]	2.3	2.4	2.5	2.7	3.2
Existing Drinking Storage (mgal)					
Ridgemark No.1 (SSCWD)	1.0	1.0	1.0	1.0	1.0
Ridgemark No.2 (SSCWD)	0.5	0.5	0.5	0.5	0.5
Total Existing Storage (mgal) [e]	1.5	1.5	1.5	1.5	1.5
Storage Surplus/(Deficiency) at 20 psi	(0.8)	(0.9)	(1.0)	(1.2)	(1.7)

(a) Required Operational Storage based on 33% of MDD.
(b) Required Emergency Reserve Storage based on 50% of MDD.
(c) Required fire flow storage = Flow * duration (3,500 gpm for 4 hours).
(d) Total required storage is equal to the sum of the required operational storage, emergency reserve storage, and fire flow storage.
(e) Total existing storage includes all storage within the system and is not adjusted for minimum pressures.

Table 7-7: Evaluation of High and Middle Pressure Zones Storage Adequacy

	Year				
	2005	2013	2018	2023	Buildout
Projected Demand (mgd)					
Average Day	3.3	3.6	3.9	4.2	6.7
Maximum Day	6.7	7.1	7.9	8.3	13.4
Peak Hour	11.3	12.1	13.3	14.1	22.6
Required Storage Calculations					
Operational Storage (mgal) [a]	2.2	2.4	2.6	2.8	4.4
Emergency Reserve Storage (mgal) [b]	3.3	3.6	3.9	4.2	6.7
Fire Flow Storage (mgal) [c]	0.8	0.8	0.8	0.8	0.8
Required Storage [d]	6.4	6.8	7.4	7.8	12.0
Existing Drinking Storage (mgal)					
Fairview Road (SSCWD)	1.0	1.0	1.0	1.0	1.0
Ridgemark No.1 (SSCWD)	1.0	1.0	1.0	1.0	1.0
Ridgemark No.2 (SSCWD)	0.5	0.5	0.5	0.5	0.5
Fairview Road (City)	1.0	1.0	1.0	1.0	1.0
Total Existing Storage (mgal) [e]	3.5	3.5	3.5	3.5	3.5
Storage Surplus/(Deficiency) at 20 psi	(2.49)	(3.3)	(3.9)	(4.3)	(8.5)

(a) Required Operational Storage based on 33% of MDD.
(b) Required Emergency Reserve Storage based on 50% of MDD.
(c) Required fire flow storage = Flow * duration (3,500 gpm for 4 hours).
(d) Total required storage is equal to the sum of the required operational storage, emergency reserve storage, and fire flow storage.
(e) Total existing storage includes all storage within the system and is not adjusted for minimum pressures.

7.5.2.4 Storage Adequacy Summary

There is a need for a large amount of new storage in the upper and middle pressure zones. Because of the large excess storage in the Low Pressure Zone, the total amount of new storage needed to offset the deficiency in the upper two zones is higher than the overall storage deficiency. A schedule of recommended storage improvements is shown in Table 7-8. A total of 11 mgal of new storage is recommended through the year 2023 to address projected deficits. This 11 mgal storage recommendation includes an allowance (approximately 50 percent) for treated water stored in existing and future reservoirs that do not provide the minimum design pressure of 20 psi.

Table 7-8: Recommended Storage Improvement Schedule

	Year				
	2005	2013	2018	2023	Buildout
Existing Storage Surplus/(Deficiency) (mgal)					
System-wide Surplus/(Deficiency)	(2.0)	(2.6)	(5.4)	(7.7)	(20.1)
High Pressure Zone Surplus/(Deficiency)	(0.8)	(0.9)	(1.0)	(1.2)	(1.7)
High/Middle Pressure Zones Surplus/(Deficiency)	(2.9)	(3.3)	(3.9)	(4.3)	(8.5)
New Storage to be Constructed During Interval (mgal)					
New Storage in High Pressure Zone	2.0	--	1.0	-	6.0
New Storage in Middle Pressure Zone	2.0	2.0	2.0	2.0	4.0
New Storage in Low Pressure Zone	--	--	--	--	--
Total New Storage (mgal) [(a)]					
New Storage in High Pressure Zone	2.0	2.0	3.0	3.0	9.0
New Storage in Middle Pressure Zone	2.0	4.0	6.0	8.0	12.0
New Storage in Low Pressure Zone	--	--	--	--	--
Storage Surplus/(Deficiency) After Improvements (mgal)					
System-wide Surplus/(Deficiency)	2.0	3.4	3.6	3.3	0.9
High Pressure Zone Surplus/(Deficiency)	1.2	1.1	2.0	1.8	7.3
High/Middle Pressure Zones Surplus/(Deficiency)	1.1	2.7	5.1	6.7	12.5

Notes:
(a) The year identified for new storage is the latest in which it must be provided. New facilities could be constructed at an earlier time, if desired.
(b) New storage identified for 2005 indicates an existing deficiency.

The new storage could be provided with a single reservoir within a pressure zone or with a combination of reservoirs. The final location of new storage is dependent on the availability of appropriate land, land use and zoning, the availability of larger diameter piping, and other factors.

7.5.3 Distribution Piping

Distribution piping adequacy is based on the ability to meet PHD and fire flow demands and maintain adequate pressures in the piping.

Under current condition, there are only a small number of locations (as determined through the hydraulic model) where the minimum of 30 psi during PHD is not met. These locations are typically near the base of a reservoir and in one case immediately downstream of a PRV set for emergency conditions. New piping can eliminate these deficiencies, so no capital improvements are recommended to mitigate them.

Approximately three of the 644 junction nodes evaluated indicate available fire flow less than 1,500 gpm. Approximately 59 of the junctions have fire flow between 1,500 and 3,500 gpm (the value used in the storage analysis).

The three junctions with flow less than 1,500 gpm are located at the ends of 4- and 6-inch diameter dead-end pipelines that range in length from 500- to 1,100-feet. Dead-end lines with no hydrant on the end of the line have been excluded from the analysis.

7.6 Recommended Water System Improvements

All of the recommended water system improvements and phasing through the year 2023 are presented in Exhibit II. The improvements are phased according to near term (2015) and intermediate term (2023) needs.

8.0 Wastewater Master Plan

Management of wastewater is comprised of three distinct components: collection, treatment, and disposal. Major planning efforts for the treatment and disposal components have been completed by the City of Hollister and SSCWD. The long-term plans outline recommendations and outstanding decisions that need to be made to complete the vision for long-term wastewater treatment and disposal. This chapter summarizes the recommendations from the previously completed plans and technical memoranda (TMs) and describes how the upgraded wastewater treatment and disposal facilities will be incorporated into the overall integrated water resources plan. The documents used to develop the information presented in this chapter include the following:

- City of Hollister Long-term Wastewater Management Program for the DWTP and IWTP, Draft, December 2005
- DWTP Percolation Rate and Storage Alternative Analysis (Revision 2), May 2006
- SSCWD Long-term Wastewater Management Plan, January 2006
- SSCWD Draft Local Wastewater Alternative Predesign TM, June 2006
- Phase I Effluent Management Project Technical Memorandum, May 2006
- San Benito County Water District – Recycled Water Feasibility Study Update, Draft, April 2008
- City of Hollister Supplemental Environmental Impact Report, Draft, December 2007
- SSCWD Simulation of Impacts of Wastewater Alternatives on Groundwater Flow and Salinity, Draft, July 2008

Improvements to the wastewater collection system were not specifically addressed in previously completed studies. This Master Plan provides recommended design criteria for collection system pipelines and lift stations.

8.1 Treatment Plant Improvements

Treatment plant improvements are being implemented by the City of Hollister and SSCWD to meet RWQCB WDR permits and orders. The RWQCB WDR water quality requirements (e.g.

BOD, TSS, ammonia, nitrate, total dissolved solids, sodium, chloride, etc.), summarized in Chapter 3, are intended to protect beneficial use of surface and groundwater.

The treatment plant improvements that have been identified to date focus on typical wastewater constituents such as BOD, TSS, ammonia, and nitrate. Salinity levels in wastewater are expected to be reduced with the implementation of the drinking water improvements described in Chapter 7.

8.1.1 City of Hollister Treatment Improvements

The City of Hollister Long-term Wastewater Management Program for the DWTP and IWTP (Draft, December 2005) evaluated treatment alternatives and identified recommendations for treatment. The following sections summarize the recommendations for the Domestic Wastewater Treatment Plant (DWTP) and Industrial Wastewater Treatment Plant (IWTP).

8.1.1.1 Domestic Wastewater Treatment Plant

A new membrane bioreactor (MBR) process will be constructed at the DWTP to meet permit requirements and meet long-term goals and objectives. The upgrade will accommodate increased flows and will produce treated effluent suitable for the City's long-term effluent management plan (recycled water distribution). The main goals for this treatment plant upgrade are:

- To meet RWQCB effluent quality requirements; and
- To provide additional treatment capacity for planned development in the Hollister Urban Area.

The MBR process is capable of producing high-quality effluent that meets requirements for "Disinfected Tertiary Recycled Water" as defined by the State of California Title 22 recycled water regulations. The MBR process also has the advantage of producing treated wastewater that can be directly treated by reverse osmosis for salinity control. The MBR process will be designed for the following objectives:

- Meet future regulatory requirements
- Maximize the City's effluent disposal options
- Support potential future salinity reduction

- Provide an approved Title 22 recycled water technology

To meet anticipated wastewater effluent quality requirements, the MBR system was designed to produce effluent that will meet a 5 mg/L nitrate limitation. Although the MBR plant produces a high-quality effluent that meets Title 22 requirements, the MBR system does not reduce salinity.

The MBR system will have a rated average dry weather flow capacity of 4.5 mgd and a peak wet weather flow capacity of 5.0 mgd to allow for seasonal variations. This average dry weather flow capacity was originally based on projected 2023 flows assuming wastewater flow would be conveyed to the facility from the SSCWD. However, as described in more detail below, SSCWD has chosen to upgrade their RM1 wastewater treatment plant.

To reduce the construction costs for the new DWTP, only the membranes required to provide a peak wet weather flow capacity of 4.0 mgd will be installed initially. The remaining membranes were initially planned to be installed by 2013 to increase the peak wet weather flow capacity to 5.0 mgd. However, the installation of these additional membranes will likely be delayed until 2018 to 2020, depending on the pace of development in the region and as a result of SSCWD's decision to remain independent. Figure 8-1 shows projected wastewater flows and the rated capacities of the new DWTP following the various expansion phases between 2005 and buildout.

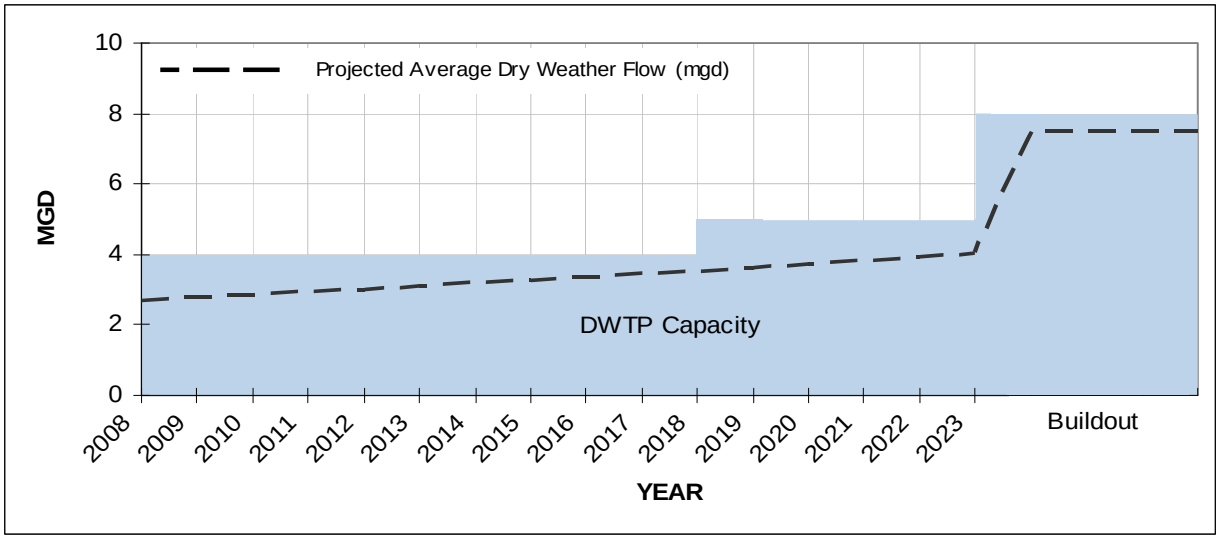


Figure 8-1: Projected Wastewater Flows and Treatment Capacity Requirements

To provide adequate time to properly plan and execute the last two expansion phases, the planning efforts for these expansions should be initiated when wastewater flows are approximately equal to 75 percent of the DWTP's rated capacity.

The proposed 5.0 mgd MBR facility will be located at the existing DWTP site and will replace the existing DWTP pond treatment system. The new treatment facility will reuse the existing influent lift station and headworks elements constructed in 2003. A process flow diagram of the proposed MBR treatment plant is shown in Figure 8-2. Design documents for this new facility were completed and construction bids were received on October 18, 2006. The construction contract was awarded on October 30, 2006 to Overaa Construction. The new wastewater treatment plant is scheduled to be operational by the end of 2008.

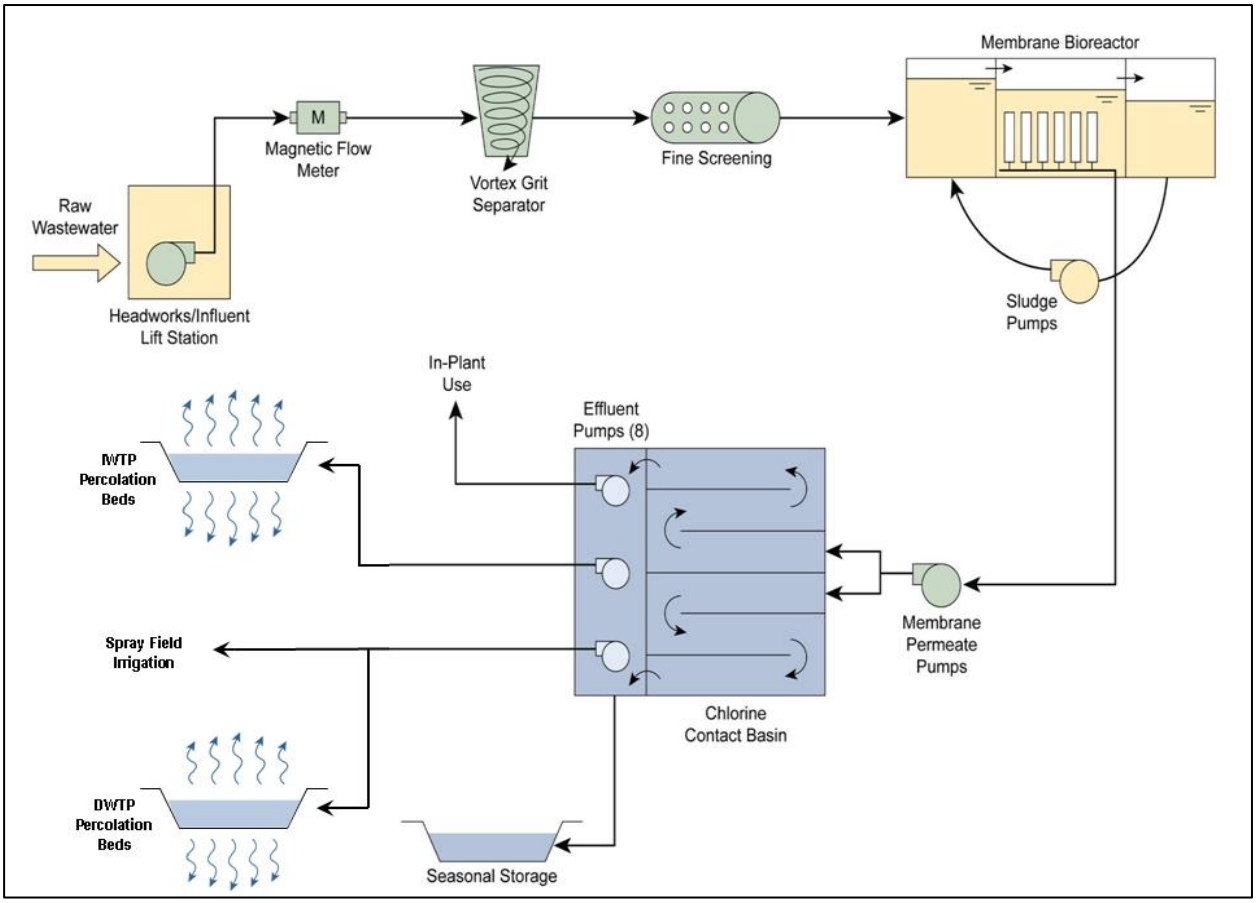


Figure 8-2: Upgraded DWTP Process Schematic

8.1.1.2 Industrial Wastewater Treatment Plant

Evaluations of the IWTP treatment and disposal systems do not indicate any deficiencies. A March 1983 study conducted by San Benito Engineering and Surveying concluded that disposal capacity is the limiting factor at the IWTP. It estimated that the capacity of the storage plus discharge capacity was 7.5 mgd, based on canning season operation, measured percolation rates, and past observations of flow and pond levels. Current influent flows are significantly less than this estimated disposal capacity. Unless unforeseen industrial customers come online, influent flows to the IWTP are expected to decrease once the City implements the long-term wastewater management plan and stops diverting domestic wastewater to the IWTP. Based on these results, there are no proposed improvements for the IWTP beyond identifying a solution to recent TDS, sodium, and chloride permit exceedances. Primary emphasis for improving effluent quality at the IWTP is source control at San Benito Foods and the implementation of a wastewater/storm water separation project.

8.1.2 Sunnyslope County Water District Treatment Improvements

SSCWD's Long-Term Wastewater Management Plan, January 2006, identified two primary alternatives for improvements to the wastewater treatment system serving the SSCWD wastewater service area. The wastewater service area for SSCWD consists exclusively of the Ridgemark Development located south of Airline Highway. The two alternatives for improvements to this wastewater system are as follows:

- Upgrade existing wastewater treatment facilities in the Ridgemark area to respond to more stringent requirements issued by the RWQCB.
- Pump raw wastewater to the City of Hollister's new MBR treatment plant for subsequent treatment and disposal.

The Long-Term Wastewater Management Plan did not include a recommendation as additional collaboration and negotiation with the City of Hollister was necessary to fully evaluate the financial costs of having Ridgemark area flows diverted to the City WWTP. However, after conducting further studies and discussions with the City, SSCWD chose to upgrade the existing wastewater treatment facilities.

Design of the Ridgemark wastewater and recycled water treatment improvements project began in 2008. The wastewater treatment plant will be upgraded with a sequencing batch reactor

(SBR) process which will meet waste discharge requirements for nitrogen, BOD, and TSS. The new SBR process is being designed to accommodate future connections within the existing SSCWD wastewater service area. In addition to the SBR process, the treatment plant improvements will include a new main influent pump station, headworks, solids handling facilities, and site decommissioning. The upgraded plant will also include a future phase, in which recycled water facilities (filtration and disinfection processes), will be added to meet future disposal and water supply needs. Design has been initiated and construction of the wastewater treatment plant upgrade project is expected to be complete in fall 2010, followed by completion of the recycled water facilities by 2011. Figure 8-3 shows a process flow schematic of the proposed SBR plant.

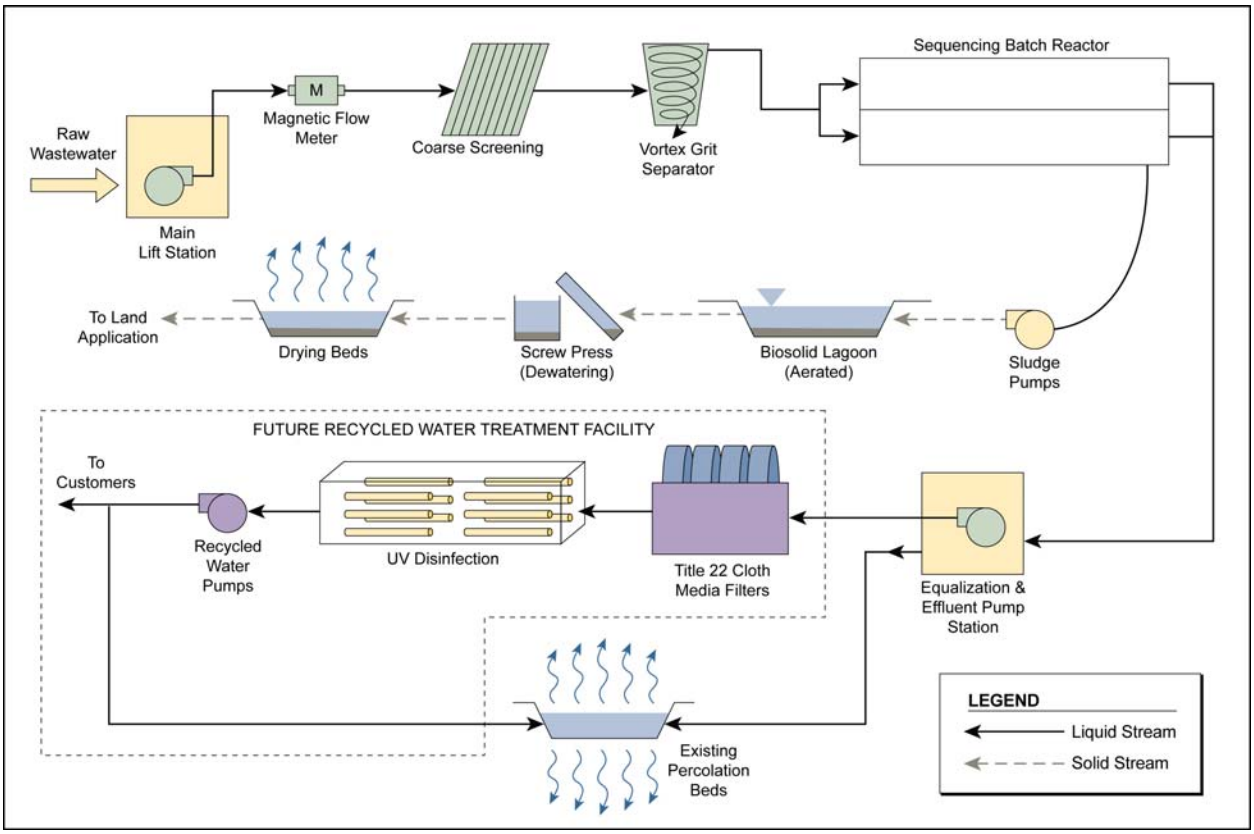


Figure 8-3: Ridgemark Area Wastewater Alternative Process Schematic

8.1.3 Cielo Vista Estates Treatment Improvements

As discussed in Chapter 3, the Cielo Vista Estates Wastewater Treatment Plant currently meets RWQCB discharge requirements. Therefore, no improvements are necessary at this time for the collection, treatment, or disposal components. However, it should be recognized that Cielo

Vista Estates' current WDR permit was adopted in 1987. In the next WDR permit cycle, it is likely that Cielo Vista Estates would be subject to discharge requirements similar to the SSCWD requirements for BOD, TSS, ammonia, nitrate, and salinity. Like SSCWD, Cielo Vista Estates would likely have the option of connecting to the City's system or constructing a new facility. Given the volume of flow routed to the Cielo Vista Estates WWTP relative to the capacity of the new DWTP, conveyance of raw wastewater from Cielo Vista Estates to the DWTP is not expected to significantly impact the facility requirements currently under construction at the DWTP. Therefore, for this Master Plan, it is assumed that Cielo Vista Estates will ultimately connect to the City WWTP.

8.2 Wastewater Disposal Improvements

The City's Long-Term Wastewater Management Program recommended a two-phase approach for interim and long-term effluent disposal management. The two-phase approach is required due to high salinity which limits the use of recycled water for high value crop irrigation, currently identified as the planned long-term disposal project. Interim disposal needs were further refined in the City's DWTP Percolation and Storage Alternative Analysis TM dated May 2006.

The following sections summarize the latest vision of the disposal improvements.

8.2.1 Phase 1 Interim Disposal Facilities

Table 8-1 summarizes maximum disposal needs for the DWTP based on increased wastewater flows from population growth defined by the City and County General Plans.

Table 8-1: City of Hollister DWTP Effluent Disposal Water Balance Summary

Year	Required Disposal Capacity (AF)[a]	Precipitation minus Evaporation (AF)[b]	Percolation Disposal (AF)	Required Spray Field/RW Disposal Capacity (AF)
2008	3,326	120 (Precipitation)	3,047	399
2015 (Interim Project)	4,032	86 (Precipitation)	2,879	1,239
2023 (Long-term Project)	5,040	127 (Precipitation)	840	4,327

Notes:
Based on DWTP Percolation and Storage Alternative Analysis TM dated May 2006
(a) Required Disposal Capacity includes flows from SSCWD
(b) Based on 100-year rainfall event

The City and SBCWD have an agreement that existing flows may be disposed of through the existing percolation ponds but that any new wastewater flows associated with development

shall be disposed of through spray field irrigation or recycled water use. Therefore, a spray field and/or recycled water project will need to be implemented by the end of 2008 to accommodate future growth and new connections.

Phase 1 interim improvements (for disposal from 2008 to 2015) will include a combination of continued percolation at the existing DWTP and IWTP disposal ponds, implementation of a partially-lined seasonal storage reservoir that facilitates percolation, and spray field/recycled water irrigation.

Currently, the DWTP and IWTP dispose of approximately 2.7 mgd of domestic wastewater which is the assumed long-term average percolation capacity. A new 12-inch pipeline from the DWTP to the IWTP for treated effluent conveyance will be constructed to facilitate use of the percolation capacity at the IWTP. This will provide the City with the operational flexibility to manage the existing percolation ponds at the DWTP. As previously discussed, no additional percolation is planned to take place.

The Seasonal Storage Reservoir with capacity of approximately 800 acre-feet will be located at the DWTP site to the west of Highway 156. The Seasonal Storage Reservoir will provide required storage due to limited wet weather percolation capacity and limited irrigation demand during the wet weather season. Treated wastewater will be stored in the reservoir and used for irrigation or percolated during the dry weather season when percolation capacity and irrigation demand increases.

Spray fields and/or recycled water sites are the final component of the interim disposal improvements. As described above, the City and SBCWD have agreed that spray fields and/or recycled water projects will be implemented to increase disposal capacity to accommodate wastewater flow increases. The City, SBCWD, and San Benito County considered five sites for potential use, including the Hollister Municipal Airport, Brookhollow Ranch, Pacific Sod Farm, San Juan Oaks Golf Club, and the proposed Brigantino Riverside Park locations for Phase 1 disposal of recycled water. These sites were evaluated in the Hollister Reclaimed Water Project Supplemental Environmental Impact Report.

In early 2008, the City, SBCWD and San Benito County elected to implement the Phase 1 Recycled Water Project at the Brigantino Riverside Park and the Hollister Municipal Airport.

The disposal site at Riverside Park is approximately 45 acres of turf with an annual disposal capacity of 157 ac-ft. The disposal site at the Hollister Municipal Airport has an irrigable area of approximately 247 acres with an annual disposal capacity of 803 ac-ft. Together, these two sites will provide sufficient disposal capacity through 2015.

Design documents for the conveyance facilities to the Hollister Municipal Airport site have been completed and construction bids were received on June 18, 2008. The construction contract was awarded to Delta Excavating. Construction of both the transmission facilities and on-site irrigation facilities is expected to be complete in spring 2009. Similarly, construction of the Riverside Park facilities is also expected to be complete in spring 2009.

8.2.2 Phase 2 Long-Term Disposal Facilities

The Phase 2 Long-Term Disposal Plan (for disposal from 2015 to 2023 and beyond) includes the addition of a recycled water distribution system to provide a high quality water supply for primarily agricultural uses. However, service to other customers in the region including urban use such as park irrigation and golf course irrigation may also be provided. This second phase is contingent on recycled water salinity levels being reduced to meet crop and landscaping water quality requirements.

Recycled water distribution alternatives and recommendations were developed and identified in the San Benito County Regional Recycled Water Project Feasibility Study, May 2005. As described in Chapter 4, this study was subsequently updated and is included as Appendix I.

The recommended long-term recycled water project is a phased approach. In the first phase, Phase 2A, recycled water would be distributed to agricultural users in the Wright Road / McCloskey Road corridor. The City and SBCWD agreed to size the Phase 1 transmission pipeline such that it would provide sufficient capacity to also serve Phase 2. For Phase 2A, the Phase 1 transmission pipeline would be extended from the intersection of Wright Road and Briggs Road, east along McCloskey Road to Fairview Road.

As development in Wright / McCloskey corridor occurs and recycled water production exceeds irrigation demands within this area, Phase 2B would be implemented. The Phase 2A facilities will provide opportunities for future, Phase 2B, use in the Lone Tree area, Santa Ana Valley, East of Fairview Road or other areas. Alternatively, since the Phase 2A investment would be

relatively minimal, the phased approach provides flexibility to distribute water to the San Juan Valley if future circumstances indicate that this would be a preferred strategy.

The proposed Phase 2A facilities are illustrated in Figure 8-4. Up to an estimated 4,200 af/yr may be available when the recycled water quality meets agricultural water quality objectives.

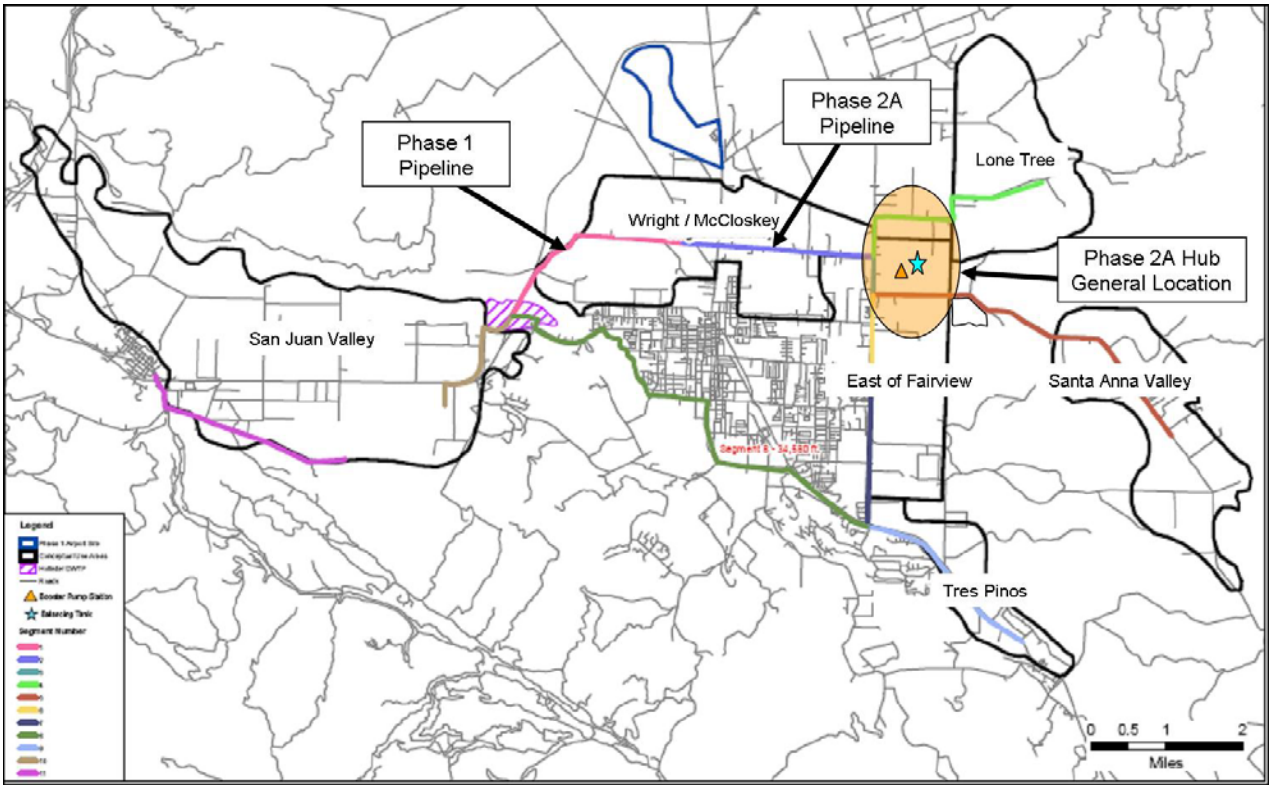


Figure 8-4: Recommended Phase 2A Recycled Water Transmission System

8.2.3 SSCWD Disposal Facilities

As described in Section 8.1, SSCWD's upgraded wastewater treatment plant will include a recycled water treatment facility capable of producing high-quality effluent that meets requirements for "Disinfected Tertiary Recycled Water" as defined by the State of California Title 22 recycled water regulations.

The SSCWD recycled water project will provide recycled water to the Ridgemark Golf Course for irrigation. Since the recycled water is expected to have a high salt content, the recycled water project will include blending with current golf course irrigation water, either groundwater or CVP supply. The recycled water facility will deliver between 158 and 261 af/yr to the golf course depending on the supply with which it is blended.

8.3 Wastewater Collection System Improvements

Collection system improvements to accommodate future growth include laterals to new customers, pump station upgrades, new pump stations, existing collection system replacement, and other improvements. Currently, the City and SSCWD do not have collection system models to evaluate required improvements. It is recommended that a collection system model be developed similar to the model for the water distribution system to determine system capacities, deficiencies, and optimum methods for expansion. In addition, this model would serve as a resource for the development of the City's and SSCWD's Sanitary Sewer Management Plans, respectively, as required by California's Statewide WDR[1].

8.3.1 City of Hollister Collection System Improvements

Over the planning horizon of this Master Plan (to 2023), development of approximately 2,760 acres is envisioned throughout the Hollister Urban Area including residential, rural, commercial, and industrial properties. New development is generally situated along the perimeter of the existing urban area to the north, east, and south as shown on Exhibit III. The following subsections describe the recommended wastewater collection system design criteria for gravity systems, lift stations, and force mains.

8.3.1.1 Gravity Systems Design Consideration

All gravity system sewers should be designed to be consistent with the following design criteria described in this subsection. Gravity sewers may be classified as follows:

- Lateral – A sewer that has no other common sewers discharging into it.
- Submain – A sewer that receives flow from one or more lateral sewers.
- Main or Trunk – A sewer that receives flow from one or more submain.
- Interceptor – A sewer that receives flow from a number of main or trunk sewers, force mains, etc.

Design Period. Service laterals and collection sewers shall be designed for the ultimate development of the tributary areas. Trunk and interceptor sewers design period selection should

[1] Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, Water Quality Order No. 2006-0003 (Sanitary Sewer Order), May 2, 2006.

be based on an evaluation of economic, functional, and other considerations. Some of the factors that should be considered in the evaluation are:

- Possible solids deposition, odors, and pipe corrosion that might occur at initial flows.
- Population and economic growth projections and the accuracy of the projections.
- Comparative costs of staged construction alternatives.
- Effect of sewer sizing on land use and development.

Design Basis. Sewer systems shall be designed on the basis of per capita flows for the design period in conjunction with a peak factor, or approved alternative methods. Design calculations for trunk and interceptors sewers shall be submitted to the City or SSCWD for approval. Replacement mains or rehabilitation of existing mains shall be designed on the basis of measured flows with approval of the authorized agency.

Designing for average daily wastewater flows for new systems should be based on per capita flows. Existing water systems within the area can be used to help substantiate the selection of per capita flows.

Generally, the sewers shall be designed to carry at least the peak hourly flow when operated at capacity. Peak hourly flow should be the design average daily flow in conjunction with a peaking factor. The peaking factor used for the City of Hollister DWTP improvements is 2.0.

Use of per capita flows and the peaking factor is intended to cover normal infiltration and inflow (I/I) for systems built with modern construction techniques. However, an additional allowance should be made for I/I with existing conditions such as high groundwater, older systems, or a number of illicit connections. I/I allowances for existing systems should be made from actual flow data to the greatest extent possible. Domestic wastewater flows in the City of Hollister averaged 2.72 mgd in 2004 with little I/I observed. A 10 percent allowance for I/I is included in the sizing of the improvements to the City DWTP.

Minimum Sewer Diameter. In general, no sewer shall be less that 6 inch in diameter, except in special cases. The following is a set of design criteria for determining sewer size using Manning's equation:

- Pipe Diameter
  - 12-inch and smaller: ½ full at peak flow
  - Greater than 12-inch: ¾ full at peak flow
- Velocity
  - Minimum: 2 feet per second
  - Maximum: 10 feet per second
- Manning's Roughness Coefficient (n): 0.013
- Minimum Slope Requirements:
  - 6-inch Diameter: 1.0 ft per 100 ft
  - 8-inch Diameter: 0.40 ft per 100 ft
  - 10-inch Diameter: 0.30 ft per 100 ft
  - 12-inch Diameter: 0.24 ft per 100 ft
  - 14-inch Diameter: 0.17 ft per 100 ft
  - 16-inch Diameter 0.14 ft per 100 ft

Alignment. Generally, gravity sewers shall be designed with straight alignment between manholes. However, curved sewers may be approved where circumstances warrant.

8.3.1.2 Lift Stations

Location and Site Selection. Wastewater lift stations are usually located at the low point of the service area. The pump discharges to the treatment works or to a high point in the sewer system for continued conveyance by gravity. Generally, lift stations should only be used when gravity flow is not possible.

There is often little choice in siting sewage lift stations. Locations should be sited as far as practical from present or proposed residential areas to reduce community impacts. The amount of land required is a direct function of the station's size and type and of the need or desire for ancillary facilities such as a maintenance building. The station should be sited to accommodate reasonable pumping head, force main length, and depth of the gravity influent sewer(s). Other considerations include:

- Access for maintenance vehicles.
- Local land use and zoning regulations.
- Location on public right-of-ways versus private easements or site acquisition by the sewer purveyor.
- Permits (or variances) which might be required, such as grading, building, etc.
- Availability of needed utilities, such as water, electricity, and natural gas.
- Applicable noise ordinances, especially when an emergency backup generator is present.
- Space for future expansion, especially if population growth or development in the drainage area may increase substantially.

Flood Protection. The lift station shall be designed to remain fully operational during a 100-year rainfall event.

Design Flow Rates. The firm capacity of a lift station shall be equal to or greater than the peak hourly design flow. This peak design flow should be based on projected growth in the tributary area, future improvements anticipated in the collection system, and any phased improvements planned for the lift station and force main. It should also allow for reasonable amount of wear to pump equipment, particularly in a tributary area that is at or near buildout. Because mechanical and electrical equipment is typically designed for a 20-year life expectancy, it is recommended that the peak design flow be based on a 20-year forecast or greater.

In addition to establishing the peak design flow, it is also necessary to review minimum flows and determine how the lift station will operate under low flow conditions.

System Hydraulics. System hydraulics should provide an optimum balance for the force main characteristics, pump selection, and minimum and maximum flows. The force main should be small enough diameter to minimize solids deposition yet large enough that the total head permits a good pump selection and minimizes the requirements for surge protection facilities. Recommended sizing considerations for force mains are covered in the next subsection.

Lift stations should be designed to operate under the full range of project system hydraulic conditions. Both new and old pipe conditions should be evaluated, along with various

combinations of operating pumps and minimum and maximum flows, to determine the highest head and lowest head pumping conditions. The system should be designed to prevent a pump from operating for long periods of time beyond the pump manufacturer's recommended normal operating range.

Selection of head loss coefficient for pipes and valves should be conservative to allow for installation of equipment variations and normal aging of the pumping system.

Number of Pumps. The number of pumps selected shall allow the station to provide the peak design flow with the largest pump out of service. Also, the number of pumps should correlate to the wetwell size and prevent excessively short periods between pump starts. On constant speed lift stations, the number of pumps is often based on the pumping capacity required to provide a minimum scour velocity in the force main.

Pump Selection. Pumps should be designed for pumping sewage and capable of passing solids at least 3 inches in diameter. Pump suction and discharge should be 4 inches or greater.

Flow Measurement. Suitable devices for measuring sewage flow shall be provided at lift stations. Run timers should be provided on all pumps.

A wide variety of lift station level and flow control devices and instrumentation exists. Consider strategies that use instrumentation, monitoring, control, or process-driven concepts to integrate flow measurement into the overall perspective of the lift station design. With complete information at hand, or data available for computer analysis, greater gains can be made in operating efficiency, maintenance prediction, budgeting, and other useful productivity steps.

8.3.1.3 Force Mains

Except for small grinder or effluent pump installations, piping for force mains should not be less than 4 inches in diameter. As a general rule, whenever the velocity exceeds 8 foot per second, a larger diameter force main should be used.

At pumping capacity, a minimum self-scouring velocity of 2 foot per second should be maintained unless flushing facilities are provided. Velocities should not exceed 8 foot per

second. Optimum velocities for reducing maintenance costs and preventing accumulation of solids range between 3.5 and 5 foot per second.

As a general rule, the following appurtenances should be provided on each force main:

- Air relief valve(s) placed at high points in the force main to relieve air locking.
- Blow-offs placed at low points of force mains where gritty material can accumulate and restrict flow.
- Thrust restraint to restrain or anchor the force main and prevent excessive movement and joint separation.

8.3.2 SSCWD Collection System Improvements

The SSCWD collection system serves the Ridgemark area and has approximately 1,200 connections and future development is expected to add approximately 460 housing units. Figure 8-5 shows the envisioned future development areas. Collection system upgrades will include construction of 6- to 8-inch diameter gravity sewers and pump stations to convey wastewater to treatment facilities.

Planned near-term capital improvements include upgrades or relocation of the Oak Creek Lift Station and replacement of the forcemain from Oak Creek to RM I. Main lift station upgrades would also be implemented in conjunction with wastewater upgrades to convey wastewater to the upgrade treatment plant.

8.3.3 Cielo Vista Estates Collection System Improvements

The Cielo Vista Estates collection system has adequate capacity to meet current wastewater flows. There is no future development planned for this area. Therefore, no improvements are planned at this time.

8.3.4 Septic Tank Service Areas

Within the Hollister Urban Area, it is estimated that approximately one percent of existing homes utilize septic tanks and leach fields for wastewater disposal. Local ordinances described in Chapter 4 define the requirements and limitations for new septic systems. It is assumed that

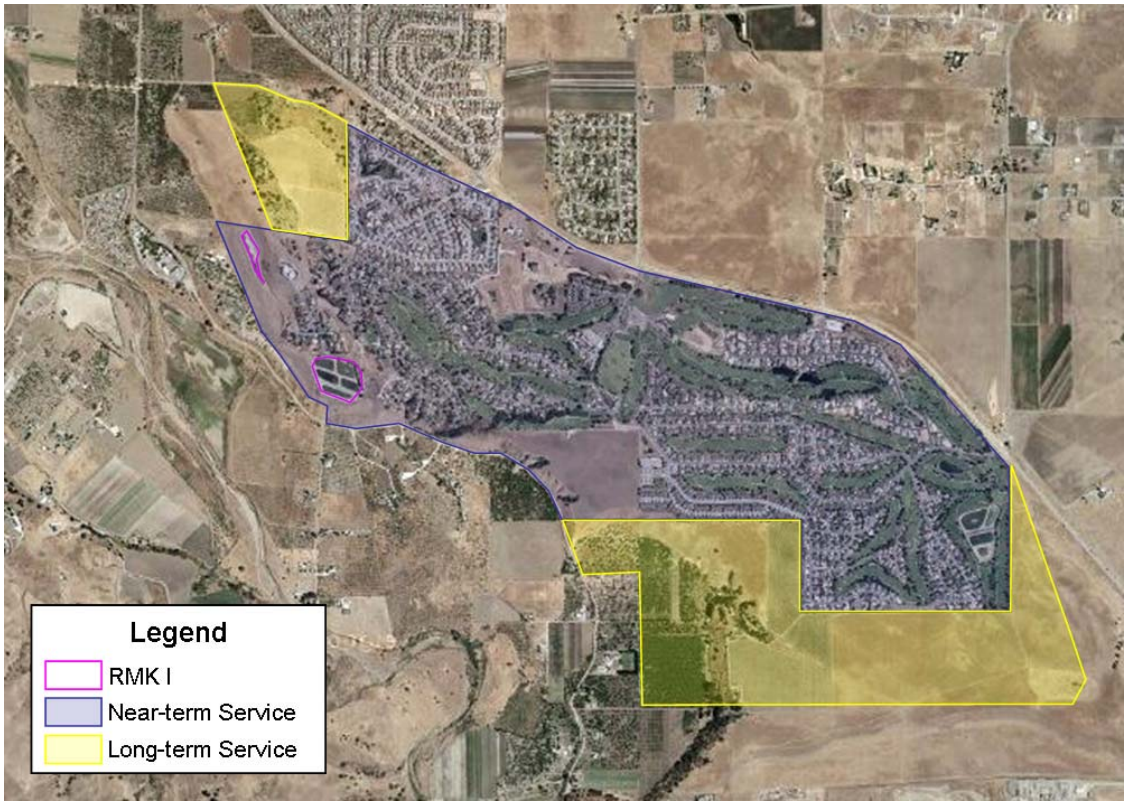


Figure 8-5: Future Development in SSCWD Wastewater Service Area

septic service areas will be connected to the City wastewater system in the future if water quality or operational problems develop. However, due to the relatively small number of septic systems, these flows will not significantly impact the City WWTP.

For the special study areas identified in Chapter 4, most rely on septic systems. Program solutions for future monitoring of these special study areas are presented in Chapter 5.

8.4 Recommended Wastewater System Improvements

All of the recommended wastewater system improvements and phasing through the year 2023 are presented in Exhibit III. The improvements are phased according to near term (2015) and intermediate term (2023) needs.

9.0 Implementation Program

The previous chapters of this Master Plan provided background information, described the alternatives development and evaluation process, and identified the recommended water and wastewater facilities. This chapter presents the activities required for implementation including benefit and cost allocation, institutional agreements, engineering, CEQA compliance, permitting, coordination with ongoing programs, stakeholder outreach, financing, an implementation schedule, and recommended next steps.

9.1 Integrated Water and Wastewater Plan

The recommended facilities for the water and wastewater systems are described in Chapters 7 and 8, respectively. This section describes the integrated water and wastewater plan.

9.1.1 Description of Integrated Plan

The integrated water and wastewater plan is summarized in Table 9-1 and Figure 9-1. The integrated plan includes common elements for program solutions and the base case water, wastewater, and recycled water facilities. The urban water supply plan is a phased solution implementing first Alternative 3B – Phased Demineralization of Urban Wells, and later, if required, expanding the demineralization of urban wells in accordance with Alternative 3A – Demineralization of Urban Wells to Meet MOU Goals. The need for and timing of future expansion should consider both growth in water demand and the performance of and ability to optimize the initial phase of demineralization. There may be opportunities to optimize the initial demineralization facilities using a new approach for well operations and/or additional infrastructure improvements. Additionally, as the demineralization technology develops, there could be lower cost treatment and brine disposal options in the future. The flexibility provided by the phased solution will allow the MOU Parties to revisit this Master Plan by 2015 and evaluate the need to expand demineralization and the timing of the expansion.

The integrated plan provides the facilities required to meet the water and wastewater needs of the Hollister Urban Area through the year 2023. However, the plan also provides flexibility to respond to changing conditions and a framework to meet the water and wastewater needs at buildout conditions. For example, as shown in Table 9-1, there is a menu of long-term water supplies and regional options. This menu consists of alternatives developed and analyzed in this Master Plan. Between the year 2023 and buildout, an additional 8,300 ac-ft of water will

be required on an annual basis. To meet this long-term need, the menu shown on Table 9-1 provides a starting point for pursuing the required water supplies. Due to the time required for developing major water supply projects, it is recommended that all of these potential sources of supply be investigated in parallel to provide the most flexibility for future development.

Table 9-1: Integrated Water and Wastewater Master Plan

2023 Master Plan		Long Term Water Supplies and Regional Options	
Common Elements	Urban Water Supply Plan		
Program Solutions Water Conservation Softener Ordinance Salinity Education Dual Distribution Systems in New Developments Base Case Facilities Lessalt Upgrade SSCWD Softening and Demineralization Projects SSCWD Ridgemark WWTP and Recycled Water Projects Treated Water Storage Facilities Phase 2A Recycled Water Facilities (By 2015) New Wells DWTP Expansion	Alternative 3B – Phased Demineralization of Urban Wells (By 2015) Alternative 3A – Demineralize Urban Wells to Meet MOU Water Quality Goals	Alternative 1A – Exchange Agricultural CVP Supply for Recycled Water – Treat Locally and/or Use for Exchange as Part of Regional Option Alternative 1B – Reallocate Unused CVP M&I Entitlements Alternative 2A – Develop Local Surface Water Supply	Concept 4 – Utilize Water from High Groundwater Basins Exchange North Area Groundwater for CVP Supply from PVWMA Demineralize or Soften Groundwater from San Juan Subbasin and Import to Urban Area
		Other Water Supplies and Options Identified Through Ongoing Regional Studies and Future Updates to Master Plan	

Implementation Timing ↓

Implementation Timing →

9.1.2 Compliance with MOU

As described in Chapter 1, this Master Plan was initiated by the MOU Parties in accordance with a Memorandum of Understanding executed in 2004. The MOU was subsequently amended in early 2008 to include SSCWD. The overall intent of the MOU is to develop a comprehensive Master Plan to address the long-term water and wastewater needs of the Hollister Urban Area using an integrated approach.

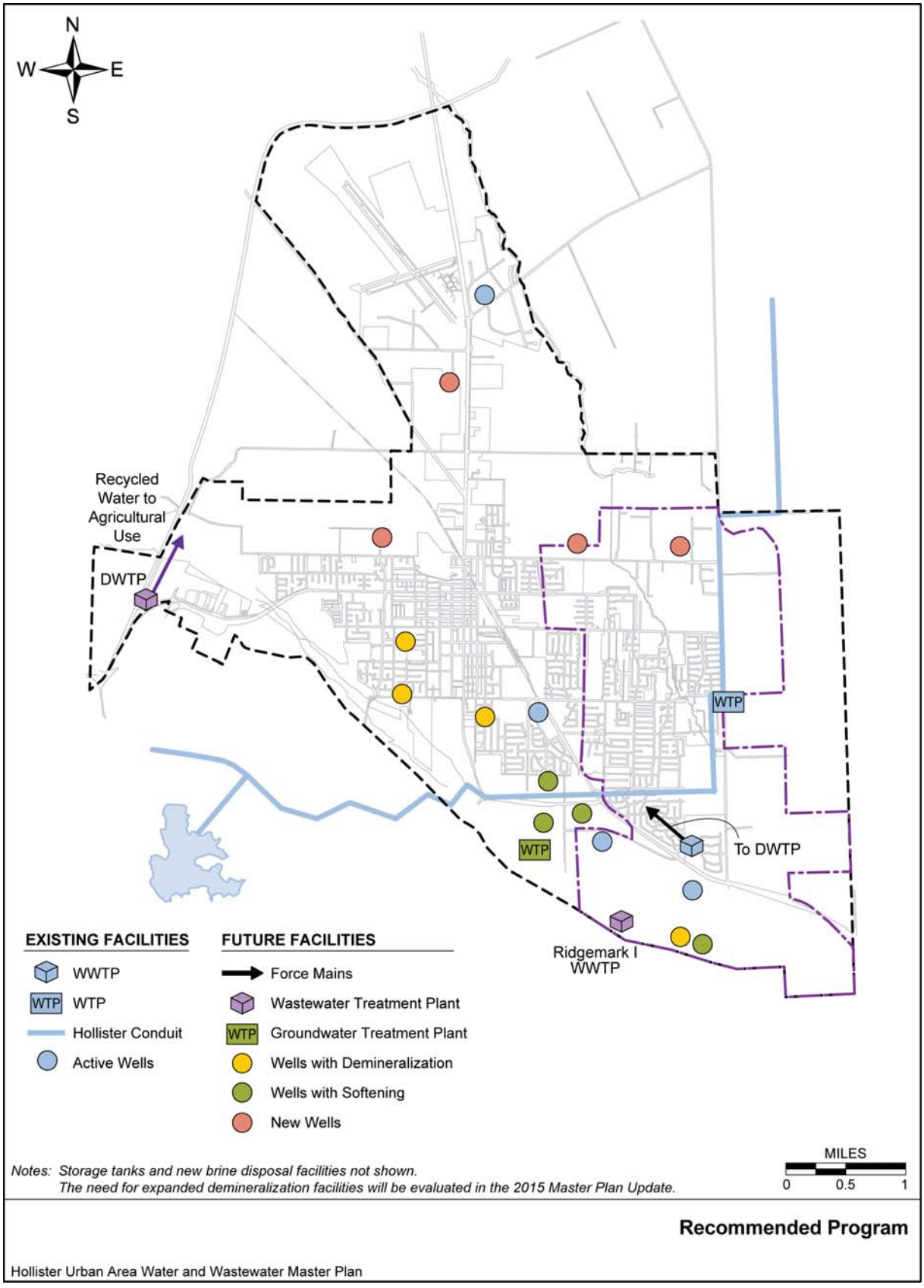


Figure 9-1: Recommended Program

The goals of the Master Plan are based upon the principles and objectives defined in the MOU. These objectives were refined through input received from the Governance and Management Committee members. The following goals were used in developing this Master Plan:

- Improve the municipal, industrial, and recycled water quality
- Increase the reliability of the water supply
- Coordinate infrastructure improvements for water and wastewater systems
- Implement goals of the Groundwater Management Plan
- Integrate the Long-term Wastewater Management Program
- Support economic growth and development consistent with the City of Hollister and San Benito County General Plans and Policies
- Consider regional issues and solutions

The integrated water and wastewater plan described in this Master Plan meets all of the principles and objectives defined by the MOU. The benefits of this integrated plan to the Hollister Urban Area are summarized in the following section.

9.1.3 Benefits of Integrated Plan

By providing an integrated approach to water resources management for the Hollister Urban Area, this Master Plan provides additional benefits and opportunities outside the Study Area. The major actions and benefits resulting from the integrated water resources plan are summarized in Figure 9-2.

Implementation of the recommended program improves M&I supply reliability by decreasing future dependency on imported CVP water which is subject to supply limitations due to both natural and administrative droughts. As described in Section 5.2, demineralization of groundwater provides benefits to both drinking water and recycled water users, while limiting demineralization and brine disposal operations to a single stream. Demineralization of local groundwater wells provides improved drinking water quality and results in significant consumer cost savings, while also resulting in improved recycled water quality and a reduction in the annual salt load entering the groundwater basin. The latter is consistent with the Groundwater Management Plan and supports the long-term viability of the groundwater basin.

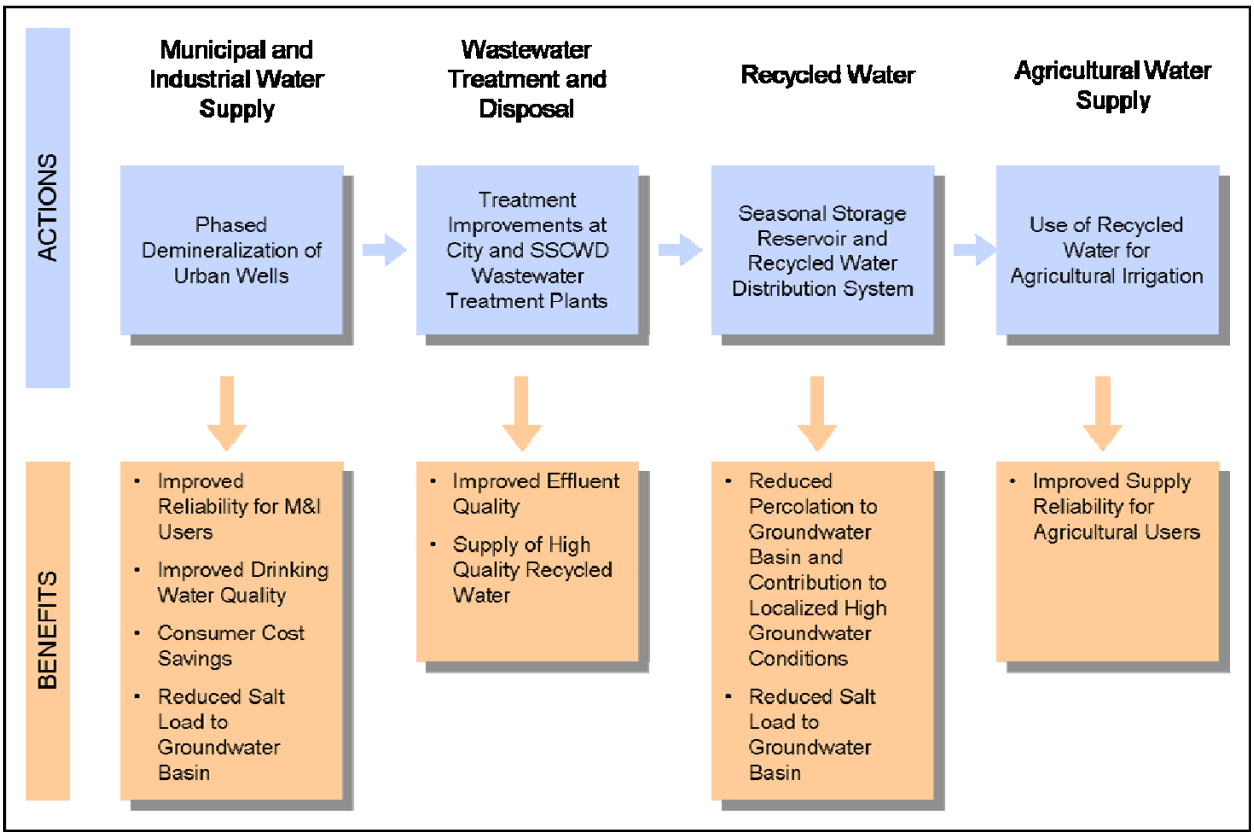


Figure 9-2. Major Actions and Benefits of Integrated Water Resources Plan

The treatment improvements at the City's DWTP and SSCWD's Ridgemark Wastewater Treatment Plant will provide improved effluent quality resulting in cost-effective effluent disposal through implementation of the recycled water program. Additionally, implementation of the recycled water program improves the reliability of water supply to agricultural users in San Benito County. Distribution of recycled water for agricultural purposes will also reduce percolation to the groundwater basin and contributions to localized high groundwater conditions in San Juan Valley.

A secondary benefit of the use of recycled water is that it could free up imported CVP supplies for other uses. This freed up CVP water could be used for future urban water needs or used as part of an exchange with regional partners in a comprehensive water management program.

9.1.4 Estimated Costs

Estimated costs for water and wastewater facilities are presented in Chapter 6 and in Appendix J. Total estimated capital costs (in 2008 dollars) for new facilities for Alternative 3B (Phased Demineralization of Urban Wells) are $133 million, as illustrated in Figure 9-3. Projects that

are currently under construction, estimated at $100 million, including the DWTP, Seasonal Storage Reservoir, Phase 1 Recycled Water Project and two new wells at SSCWD, are not included in the total estimated capital costs. Capital costs for potential future phases of demineralization are also not included; these could total up to $57 million.

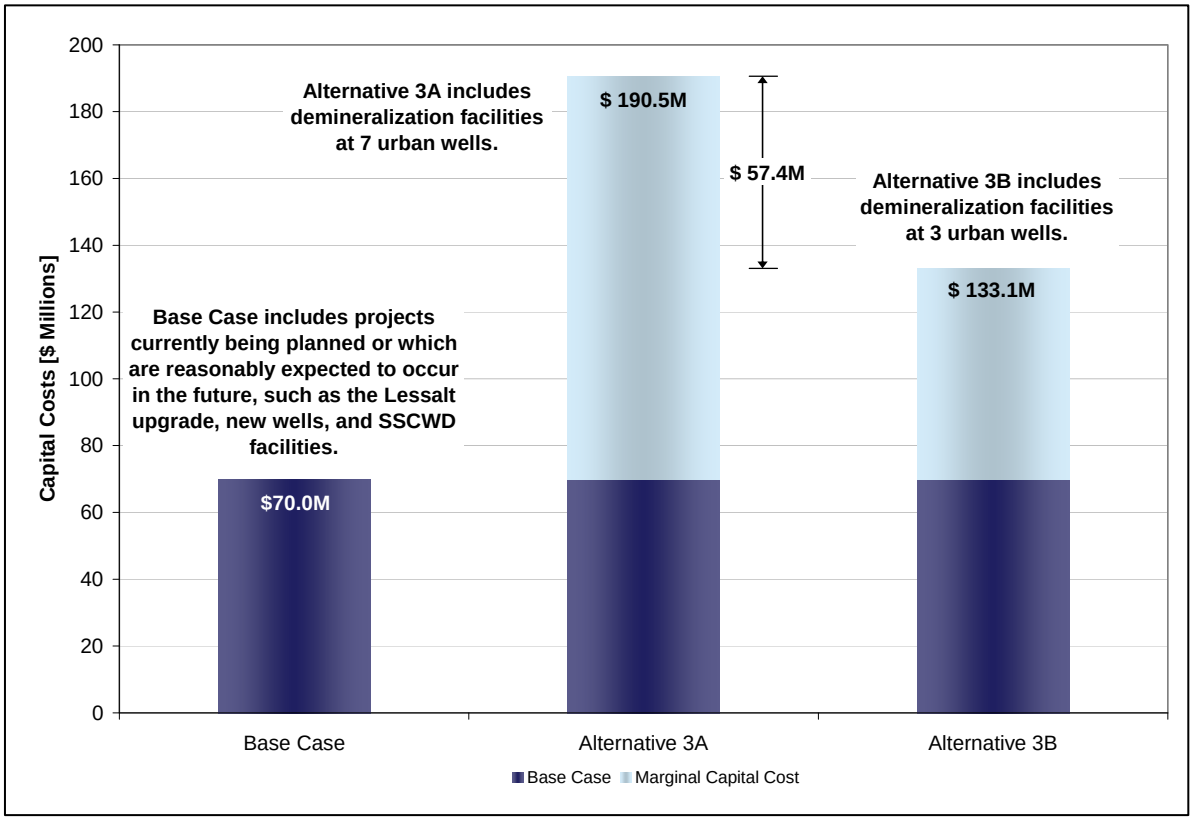


Figure 9-3. Capital Costs for Recommended Program

The total estimated capital cost includes $70 million for facilities included in the Base Case, as shown in Figure 9-3. As described in Chapter 5, Base Case projects are those which are currently being planned and projects which are reasonably expected to occur in the foreseeable future. Therefore, the marginal estimated capital cost for facilities included in Alternative 3B is $63 million.

9.1.5 Recommended Phasing

In order to comply with regulatory requirements, there are current projects underway which are scheduled to be complete by the end of 2008. These current projects include the City of Hollister DWTP, the Seasonal Storage Reservoir, and the Phase 1 Recycled Water Facilities. This Master Plan builds upon these current projects.

It is recommended that this Master Plan be implemented in three phases as follows:

- Phase 1 – Near Term (To 2015)
- Phase 2 – Intermediate Term (To 2023)
- Phase 3 – Long Term (After 2023)

The timing of these three phases and the major projects for each phase are presented in Figure 9-4.

The first phase (Phase 1) would extend to 2015. This is the date established in the MOU for implementation of a recycled water program meeting the water quality goals of the MOU. The program solutions would be implemented during Phase 1. Modifications and improvements to the Lessalt WTP would be completed by 2010 to allow this facility to produce 3.0 mgd and meet all current drinking water regulations. Additionally, SSCWD will implement a softening program in the Ridgemark area and upgrade the Ridgemark Wastewater Treatment Plant in order to be compliant with its regulatory requirements by 2010. The first phase of groundwater demineralization facilities would be completed, including demineralization at three City wells and one SSCWD well. SSCWD will also construct a softening plant in the Fairview pressure zone. The final elements of Phase 1 include construction of additional treated water storage facilities, the Phase 2A Recycled Water Facilities in the Wright Road / McCloskey corridor as identified in the Recycled Water Feasibility Study Update, and the SSCWD Ridgemark Recycled Water Facilities. In addition to these projects, Phase 1 includes on-going study and development of a long term water supply to meet the demands projected for buildout conditions.

Phase 2 would include the improvements required from 2015 to 2023, which is the end of the planning period for this Master Plan. During Phase 2, a second phase of demineralization facilities may be considered for implementation at City and SSCWD wells dependent on the development of drinking water demands in the HUA and the ability to optimize water quality distribution with only Phase 1 demineralization facilities coupled with distribution system improvements. Additional treated water storage facilities and the development of two new wells are required to meet projected growth in the HUA. Between 2018 and 2020, a 1.0 mgd expansion of the City of Hollister DWTP would also be completed by adding additional membrane capacity. Moreover, the RWQCB requires that the City of Hollister begin planning

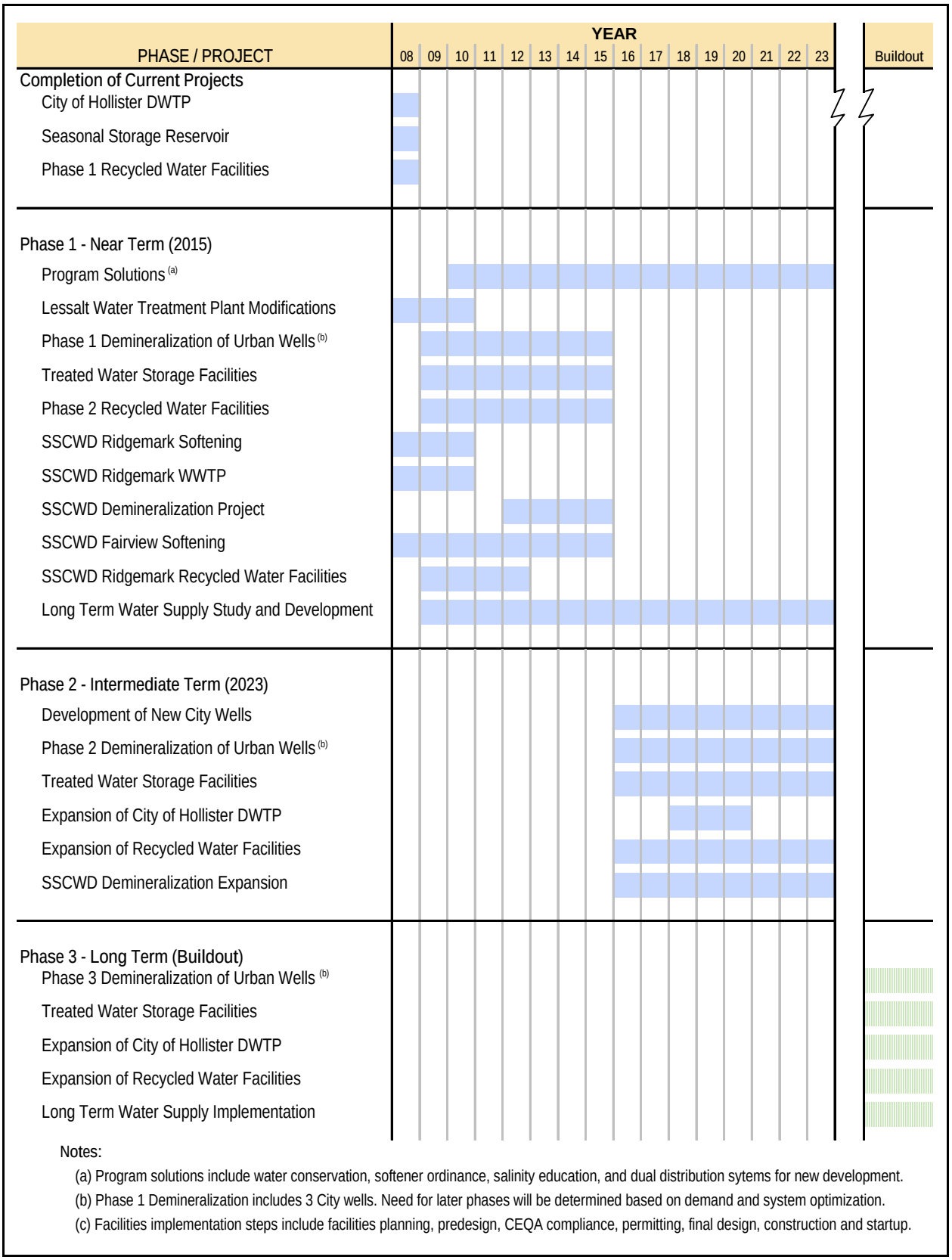


Figure 9-4: Implementation Program Phasing

to expand the DWTP when flows reach 75 percent of design capacity. It is projected that this DWTP expansion planning would occur during the Phase 2 timeframe.

The final phase (Phase 3) would be to buildout. Future updates to this Master Plan will more precisely define the needs and timing of the facilities required after 2023. Expansion of the City DWTP and the recycled water facilities will be required and additional demineralization facilities may be necessary. However, as shown in Table 9-1, the most significant element for buildout conditions will be the implementation of a long-term water supply to meet projected demands for buildout conditions.

9.2 Benefit and Cost Allocation

Implementation of this Master Plan will result in the benefits described in Section 9.1.3. The purpose of this section is to present a preliminary benefit and cost allocation approach.

9.2.1 Benefit and Cost Allocation Methods

Benefit and cost allocation requires consideration and selection of the appropriate methodology. The fundamental issue for the recommended program in this Master Plan is the equitable distribution of costs for a multi-purpose program serving multiple agencies.

Table 9-2: Summary Comparison of Cost Allocation Methods

Cost Allocation Method	Advantages	Disadvantages
Methods Without Use of Benefits		
Split Joint Costs Equally Among Purposes	Relatively Easy to Implement	May Not Result in Feasible Solution Since Total Cost Allocation May Exceed Benefits
Joint Costs Allocated According to Share of Use	Suitable for Single Purpose Project	Not Possible When Multiple Users Have Different Measures of Use
Joint Costs Allocated to Share of Separable Costs	Relatively Easy to Implement	May Note Result in Feasible Solution Since Total Cost Allocation May Exceed Benefits
Methods With Use of Benefits		
Separable Costs Remaining Benefits (SCRB)	Generally Accepted Method Used by Federal Agencies; Long History	Requires Benefits Data and Estimated Costs for Projects with Alternative Sizing and Configuration; Multiple Iterations
Alternative Justifiable Expenditure	Useful If Alternative Projects Have Been Identified	May Not Reflect Cost That Each User Imposes on the Project
Share of Total Benefits	Relatively Easy to Implement	May Not Reflect Cost That Each User Imposes on the Project
Negotiated Cost Share	Combines SCRB Type Information and Institutional Arrangements	May Be Difficult to Justify Results to Ratepayers and Financing Sources

Some costs may be assigned solely to a single purpose or agency. These directly assignable costs are referred to as specific costs.

Other costs cannot be assigned to a single beneficiary because they serve multiple purposes or agencies. These costs are referred to as joint costs. There are a variety of methods for allocation of joint costs as shown in Table 9-2, which also summarizes the major advantages and disadvantages of these alternative methods. Each of these alternative methods was considered in developing an approach for use in this Master Plan.

9.2.2 Recommended Framework for Benefit and Cost Allocation

The recommended framework for use in allocating costs in this Master Plan is based upon a combination of the approaches in Table 9-2 and is presented in Figure 9-5. This approach utilizes both the Share of Use and Share of Benefits approaches for allocation of joint costs.

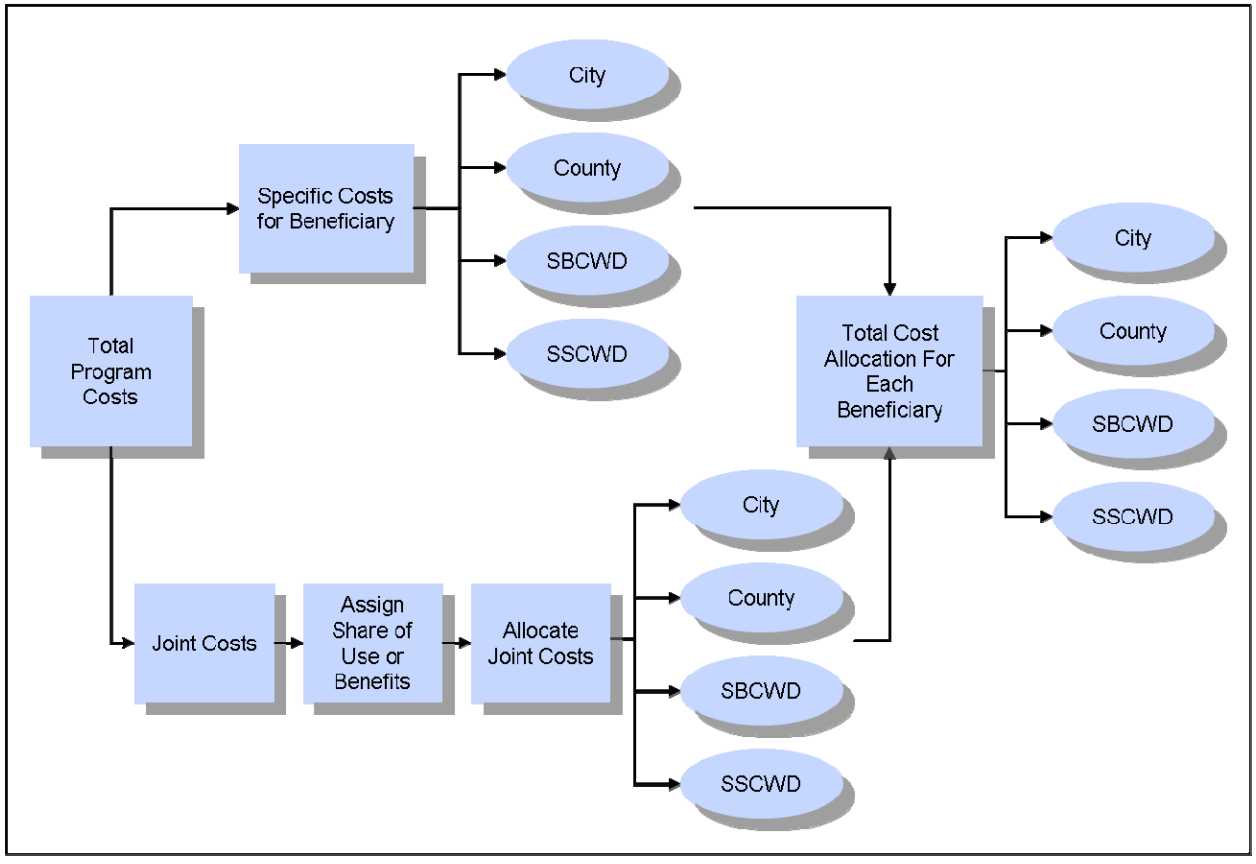


Figure 9-5: Framework for Cost Allocation

Table 9-3: Specific and Joint Costs

Project	Estimated Cost	Specific Costs				Joint Costs
		City	County	SBCWD	SSCWD	
Water Facilities						
New City Wells	1,730,000	1,730,000				
SSCWD New Well (2000 gpm)	800,000				800,000	
Lessalt WTP Upgrade Project	3,110,000					3,110,000
Demineralization	57,400,000					57,400,000
SSCWD Ridgemark Softening	4,520,000				4,520,000	
SSCWD Fairview Softening	11,650,000				11,650,000	
SSCWD Demineralization Project	10,000,000				10,000,000	
SSCWD Deep Well Injection	7,020,000				7,020,000	
Treated Water Storage	11,730,000					11,730,000
Subtotal	107,960,000	1,730,000			33,990,000	72,240,000
Wastewater Facilities						
DWTP Expansion (4 to 5 mgd)	1,000,000	1,000,000				
SSCWD Ridgemark WWTP	9,720,000				9,720,000	
Subtotal	10,720,000	1,000,000			9,720,000	
Recycled Water Facilities						
Phase 2A Recycled Water Project	10,455,000					10,455,000
SSCWD Ridgemark Recycled Water	3,940,000				3,940,000	
Subtotal	14,395,000				3,940,000	10,455,000
Total	133,075,000	2,730,000			47,650,000	82,695,000

9.2.2.1 Specific Costs

The first step in the cost allocation process shown in Figure 9-5, is to define the specific costs for each beneficiary. As previously described, specific costs are those costs which are attributed to only one beneficiary. Table 9-3 presents the specific costs associated with the recommended program. SSCWD projects have been allocated, as specific costs, to SSCWD. Additionally, the costs for new City wells and the DWTP expansion have been allocated to the City.

9.2.2.2 Joint Costs

As shown in Table 9-3, the remaining joint costs after assignment of the specific costs total $82,695,000. These are the joint costs which must be allocated among the MOU Parties.

Costs for the Lessalt WTP Upgrade Project and the Treated Water Storage may be allocated according to use by the City and SSCWD. Review of past agreements, historical and future usage, and additional modeling will be used to develop equitable sharing of these costs. For example, if the use of water from these facilities is equally divided, then the costs would be split 50 percent each to the City and SSCWD.

Allocation of joint costs for the groundwater demineralization at City wells and the recycled water facilities will be more complex. These two program elements total $67.86 million and serve multiple beneficiaries and it is recommended that the joint costs for these facilities be allocated in proportion to the share of benefits provided. An example of the application of the share of benefits methodology is provided in Table 9-4.

Table 9-4: Example Application of Share of Use Methodology for Allocation of Joint Costs

Beneficiary	Assigned Benefit ($ Millions)	Percent of Total Benefits (%)	Cost Allocation ($ Millions)
Beneficiary A	60	50	40
Beneficiary B	30	25	20
Beneficiary C	18	15	12
Beneficiary D	12	10	8
Totals	120	100	80

Note: The total valuation of all benefits is $120 million. The total estimated capital cost is $80 million.

9.2.3 Benefit Valuation and Assignment

In order to allocate joint costs among the MOU Parties, the program benefits must be defined, valued, and assigned.

The seven major program benefits were introduced and defined in Section 9.1.3. The valuation of benefits provides the basis for allocating costs among program beneficiaries. A benefit valuation methodology has been developed for each benefit and is described in Table 9-5. The three methodologies used to value program benefits include avoided cost, consumer cost savings and potential revenue.

In addition to assigning benefit valuations, the program benefits must be allocated to the beneficiaries. A preliminary assignment has been developed, as shown in Table 9-6; however, these assignments must be confirmed and quantified. The benefit allocation is the key component in the allocation of joint costs for groundwater demineralization and recycled water facilities. Therefore, it is expected that significant negotiations will be required to build consensus among the MOU Parties and finalize these benefit allocations.

Table 9-5: Benefit Valuation Methodology for Major Program Benefits

Benefit	Valuation Method
Water Supply	
Improved Supply Reliability for M&I Users	Avoided cost of developing alternative supply such as purchase and delivery of additional CVP supply.
Improved Supply Reliability for Agricultural Users	Avoided cost of developing alternative supply such as purchase and delivery of additional CVP supply.
Drinking Water Quality	
Improved Drinking Water Quality and Consumer Cost Savings	Drinking water quality currently meets all primary drinking water standards. Improvements would reduce TDS (secondary standard) and hardness (no established standard) levels. Cost savings would be from elimination of home softeners, extended useful life of home plumbing and appliances, and reduced consumption of detergents and bottled water.
Reduced Salt Load to Groundwater Basin	Contributes to implementation of Groundwater Management Plan and long-term viability of groundwater basin to provide water supply and support the economy of San Benito County.
Effluent Disposal from Wastewater Treatment	
Improved Effluent Quality and Cost Effective Effluent Disposal	Upgraded treatment meets requirements of WDR orders for City and SSCWD. Benefit to be valued as the avoided cost of alternative method of effluent disposal such as additional spray fields or seasonal surface water discharge.
Reduced Percolation to Groundwater Basin and Contribution to Localized High Groundwater Conditions	Primary benefit to San Juan Valley and avoidance of damage to agricultural crops.
Supply of High Quality Recycled Water	Revenue from sale of high quality recycled water.

Table 9-6: Preliminary Benefit Assignment

Benefit	City	County	SBCWD	SSCWD
Water Supply				
Improved Supply Reliability for M&I Users	X	X		X
Improved Supply Reliability for Agricultural Users			X	
Drinking Water Quality				
Improved Drinking Water Quality and Consumer Cost Savings	X	X		X
Reduced Salt Load to Groundwater Basin	X	X	X	X
Effluent Disposal from Wastewater Treatment				
Improved Effluent Quality and Cost Effective Effluent Disposal	X	X		X
Reduced Percolation to Groundwater Basin and Contribution to Localized High Groundwater Conditions	X	X	X	
Supply of High Quality Recycled Water			X	X

9.2.4 Allocation of Sunk Costs

In addition to the program costs presented in Table 9-3, there are existing sunk costs which must be included in the benefit and cost allocation. Specifically, the City has financed the construction of the Phase 1 Recycled Water Facilities which contributes to improved reliability for agricultural users, supply of high quality recycled water and reduced percolation to the groundwater basin. The total estimated capital cost for the Phase 1 disposal facilities, including design and construction of the conveyance and irrigation systems at both the airport and Brigantino site, is approximately $18.1 million. This capital cost does not include the purchase of the Brigantino property, which is estimated to be an additional $5 million. It should be noted that SBCWD agreed to pay for the cost of over-sizing a section of the Phase 1 recycled water transmission pipeline to the airport site, such that the pipe would be properly sized for Phase 2 recycled water use. SBCWD agreed to pay approximately $830,000 for over-sizing the Phase 1 facility.

9.2.5 Summary

As shown in Figure 9-5, the specific costs and allocated share of joint costs are added to develop the total cost allocation for each of the MOU Parties. It is important to differentiate between cost allocation and cost sharing. While cost allocation distributes the cost of the program, it does not represent what each MOU Party may ultimately pay. The benefit and cost allocation framework in Figure 9-5 will serve as a starting point for negotiations between the MOU Parties. Prior agreements, institutional considerations, and other factors will need to be addressed during the negotiations.

The discussion in this section focuses on capital costs. During negotiations, O&M costs, O&M responsibility, and ownership issues should also be included in the overall process.

9.3 Institutional Arrangements

The institutional arrangements established for completion of this Master Plan were defined in the MOU. The MOU also presented an initial framework for implementation of the Master Plan. However, as recognized in the MOU, the results of the Master Plan and the implementation of its recommendations will require modified and/or new institutional arrangements.

9.3.1 Roles and Responsibilities

The MOU specifies the following roles and responsibilities.

Article 2.2.4 - Within the Hollister Urban Area all wastewater shall be treated at a central wastewater treatment plant and implementing Ordinances/Regulations shall be consistent with that requirement. This provision shall not preclude satellite wastewater separation plants for the recovery of water for local recycling or the upgrading of the SSCWD Ridgemark Estates Wastewater Treatment Plants for local recycling.

Article 2.2.6 - Urban water supply including the treatment of surface and groundwater for wholesale delivery shall be the responsibility of the San Benito County Water District. Continued, managed use of groundwater is necessary to protect portions of the Hollister Urban Area including the City of Hollister Industrial and Domestic Wastewater Treatment Plants and areas susceptible to liquefaction from the adverse impacts of high groundwater. To achieve this continued and managed use of groundwater, groundwater supplies from the existing City of Hollister wells will be made available to SBCWD for water supply purposes only if the City of Hollister consents and agrees to specific terms and conditions for that use. To achieve this continued and managed use of groundwater, groundwater supplies from the existing SSCWD wells will be made available to SBCWD for water supply purposes only if SSCWD consents and agrees to specific terms and conditions for that use.

Article 2.2.7 - Centralized wastewater treatment including specialized treatment, as required to produce reclaimed water for agricultural purposes and disposal by means other than reclamation shall be the responsibility of the City of Hollister.

Article 2.2.8 - Marketing and distribution of recycled water outside the city limits of Hollister and outside the Sphere of Influence of SSCWD shall be the responsibility of SBCWD. Marketing and distribution of recycled water for M&I use inside the Sphere of Influence of SSCWD shall be the responsibility of SSCWD. The marketing and distribution of recycled water for agricultural use inside the Sphere of Influence of SSCWD shall be the responsibility of SBCWD.

9.3.2 Framework for Implementation

Implementation of the extensive program and numerous facilities defined by this Master Plan will be challenging and will require the development of numerous institutional arrangements.

Technical, financial, and legal evaluations will be required to determine the range of institutional arrangements required for implementation.

An example framework for implementation of the Phase 2A Recycled Water Program is presented in Figure 9-6. This example utilizes contractual arrangements among the various parties. Other institutional models, such as creating a new regional agency (e.g. Regional Water Authority), should also be evaluated.

Development, evaluation, and implementation of the necessary institutional arrangements will be complex and require extensive time to complete. To continue with the immediate next steps for Master Plan implementation, the MOU Parties should build on the MOU described in the previous subsections.

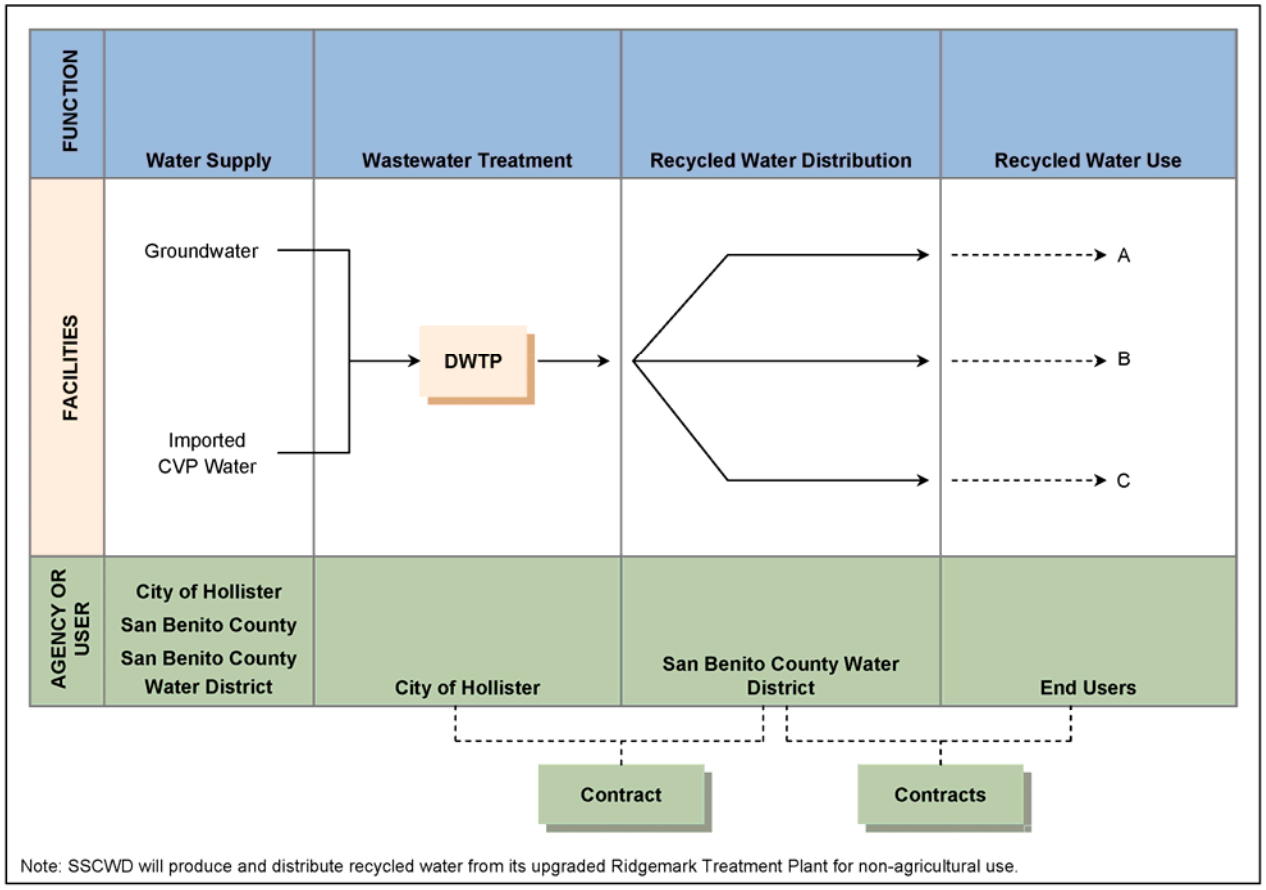


Figure 9-6: Example Institutional Framework for Recycled Water Implementation

9.3.3 Amendment to MOU

The most expeditious way to proceed with the recommended next steps for the implementation of this Master Plan would be to develop an amendment to the MOU in accordance with Article 13. This amendment would provide the basis for completing the necessary benefit and cost allocation, engineering, environmental compliance, permitting, financing, and stakeholder outreach. For example, the first amendment could provide a new cost sharing formula for completing the benefit and cost allocation, and identify the MOU Member responsible for leading the effort.

9.4 Engineering

The technical work completed for this Master Plan provides a framework for water and wastewater facilities required through the year 2023. The recommended facilities and timing are described in detail in Chapters 7 and 8, and in Figures 9-1 and 9-4. The preliminary location of new water and wastewater facilities are shown in Exhibits II and III, respectively. These locations and pipeline alignments are preliminary and final locations will be determined during facilities planning and predesign work.

The next step in implementation will be to conduct facilities planning for the recommended program. The objective of facilities planning will be to refine costs, support the benefit and cost allocation process, conduct additional distribution system modeling, evaluate the advantages and disadvantages of wellhead versus centralized demineralization and additional brine disposal alternatives. Following facilities planning, predesign studies will be initiated. The purpose of the predesign studies is to evaluate the sizing, location, operational requirements, and related issues in greater detail. The City's DWTP project has already been defined in previously completed studies and a facilities planning study for the Phase 2A Recycled Water Project is in progress. Additionally, SSCWD has initiated engineering studies for its wastewater treatment plant and recycled water project.

As noted on Figure 9-3, engineering work would include facilities planning, predesign, design, construction management, and startup. Many of the proposed improvements will be phased and the engineering work would be scheduled accordingly. The delivery method for new facilities will also be evaluated. For example, design/build should be evaluated for some facilities as a method to expedite project completion. Construction contract packaging should also be evaluated to provide the greatest opportunities for competitive bidding by contractors.

9.5 Environmental Compliance

The recommended facilities will require environmental compliance with the California Environmental Quality Act (CEQA) to evaluate the environmental impacts of the projects. The required environmental compliance documents should be completed in conjunction with the engineering predesign studies.

9.6 Permitting

Numerous federal, state, and local permits will also be required for project implementation. The required permits will be identified during the preparation of the engineering predesign studies and environmental compliance documents. A permitting strategy should be developed to minimize project delays and potential mitigation costs. This permitting strategy should be developed as one of the immediate next steps in the implementation of this Master Plan.

9.7 Coordination with Ongoing Projects and Programs

Implementation of this Master Plan should be coordinated with other ongoing programs. Program coordination will provide opportunities for optimizing facilities sizing and reducing overall costs. Coordination of activities may also assist in identifying regional benefits and partnerships for cost sharing. Some of the major ongoing programs for coordination include the following:

- City of Hollister Long-term Wastewater Management Plan
- SSCWD Long-term Wastewater Management Plan
- Recycled Water Program
- Pajaro Watershed Groundwater Desalination Feasibility Study
- Pajaro River Watershed Integrated Regional Water Management Program

Other projects in progress by the MOU Parties should also be monitored to investigate opportunities for facilities optimization and cost savings. For example, SSCWD is currently studying deep well injection for disposal of brine from its demineralization facilities. If this disposal method proves to be feasible and cost effective, the City may want to partner with SSCWD rather than use more traditional, land and capital intensive, brine disposal methods.

9.8 Stakeholder Outreach

Stakeholder outreach was an integral part of the development of this Master Plan. Continued successful implementation of the Master Plan recommendations will require a proactive approach to the various interest groups and stakeholders in the Hollister Urban Area. Some of the key stakeholders that must be included in this program are as follows:

- General public
- Local interest groups (business, environmental, and others)
- Agricultural interests (for marketing of recycled water)
- Regulatory agencies
- City, County, SBCWD, SSCWD, elected officials, and staff
- Regional interests outside San Benito County

A first step in developing a responsive stakeholder outreach program would be to update the Communications Plan developed for the completion of this Master Plan.

9.9 Financing

9.9.1 Estimated Program Costs

The estimated capital costs through the year 2023 are presented in Table 9-7. The costs in this table are organized by phase and project type. As described in Chapter 4, all costs are based on 2008 dollars. Estimated costs for water and wastewater facilities are presented in Chapter 6 and in Appendix J.

9.9.2 Internal Funding Opportunities

The MOU Parties will be responsible for their respective portion of the infrastructure projects in the recommended program as well as the cost of operating the systems. It is likely that a combination of revenue sources will be required to pay back capital obligations and meet operational expenses. All internal funding sources such as rate structure changes, water and wastewater fees, connection fees or property tax adjustments are ultimately derived from customers or users.

Each of the MOU Parties should update their financial and rate studies to reflect the projects identified in this Master Plan and the results of the benefit and cost allocation.

Table 9-7: Estimated Capital Costs

Project	Estimated Capital Cost ($)		
	Phase 1 (2015)	Phase 2 (2023)	Total
Water Facilities			
New Wells		1,730,000	1,730,000
SSCWD New Well (2000 gpm)	800,000		800,000
Lessalt Upgrade Project	3,110,000		3,110,000
Demineralization	57,400,000		57,400,000
SSCWD Softening at Well #8	4,520,000		4,520,000
SSCWD Softening Plant	11,650,000		11,650,000
SSCWD Demineralization Project	10,000,000		10,000,000
SSCWD Deep Well Injection	7,020,000		7,020,000
Treated Water Storage	6,400,000	5,330,000	11,730,000
Subtotal	100,900,000	7,060,000	107,960,000
Wastewater Facilities			
DWTP Expansion (4 to 5 mgd)		1,000,000	1,000,000
SSCWD Ridgemark WWTP	9,720,000		9,720,000
Subtotal	9,720,000	1,000,000	10,720,000
Recycled Water Facilities			
Phase 2A Recycled Water Project	10,455,000		10,455,000
SSCWD Ridgemark Recycled Water	3,940,000		3,940,000
Subtotal	14,395,000		14,395,000
Total	125,015,000	8,060,000	133,075,000

Note: The costs in this table do not include water distribution pipelines and wastewater collection pipelines, or the costs associated with projects currently underway, including the DWTP, Phase 1 Recycled Water Project, the Seasonal Storage Reservoir and two new wells in SSCWD. Demineralization costs only include Phase 1 Demineralization. The need for expanded demineralization facilities will be evaluated in the 2015 Master Plan Update.

9.9.3 State / Federal Funding Opportunities

In addition to local financing options, grants and loans can be pursued for the required improvements. There are many federal and state water, wastewater and recycled water infrastructure funding programs. California, a national leader in terms of size and volume of statewide funding programs, derives a great portion of grant funds from voter-approved specific allocation statewide general obligation bond issues. The water, wastewater and recycled water infrastructure funding sources which may be suitable for projects within the recommended program are listed below. For a complete description of each funding source and the projects for which it may be applicable, as well as funding limits, terms and contact information, see Appendix K.

- Proposed State Water Bond Fund
- Infrastructure State Revolving Fund Program

- Safe Drinking Water State Revolving Fund
- Local Water Supply Construction (Proposition 82)
- Clean Water State Revolving Fund
- Water Recycling Construction Program
- Water Recycling State Revolving Fund

In order to maximize the potential funding available through the loans and grants listed above, a funding implementation strategy should be developed which considers the sequence and schedule for the Hollister Urban Area projects coincident with the availability of funds and their respective timeframes, funding limits and interest rates (for loans). Once a prioritized list of funding mechanisms is prepared, the next steps for obtaining the individual loans and/or grants to fund these projects would be to submit pre-applications for each program. It is recommended that the MOU Parties work together on the development of the funding implementation strategy and, where applicable, apply for loans/grants jointly.

9.10 Use of Master Plan Processes and Tools

The MOU Parties have invested substantial resources to the completion of this Master Plan. The processes and tools developed as part of this work should be utilized in the future evaluation of proposed new developments, proposed land use changes, refinements to the recommended facilities, and potential regional projects and programs. Some of the processes and tools to be utilized include the following:

- Process and criteria established for evaluation of alternatives
- Economic analyses including the potential for consumer cost savings from improved water quality
- Water distribution system model for the City of Hollister and SSCWD water systems
- Groundwater model developed previously and used in this planning work
- Fact sheets developed to assist with the public information and education programs

It is also recommended that this Master Plan be updated prior to 2015. The update to the Master Plan in this timeframe will be able to adjust the recommendations for facilities and timing based upon actual growth rates, progress made in program implementation, and potential new issues and opportunities. The 2015 update should specifically address the need to expand demineralization facilities and long-term water supply options.

9.11 Recommended Implementation Schedule and Next Steps

Implementation of this Master Plan will require overall program and individual facilities activities. Current projects shown in Figure 9-3 are already under construction or in predesign or design. The next major facilities would be implemented as part of Phase 1 through 2015. Figure 9-7 illustrates the recommended implementation schedule and the steps required to ensure timely completion of the Phase 1 facilities.

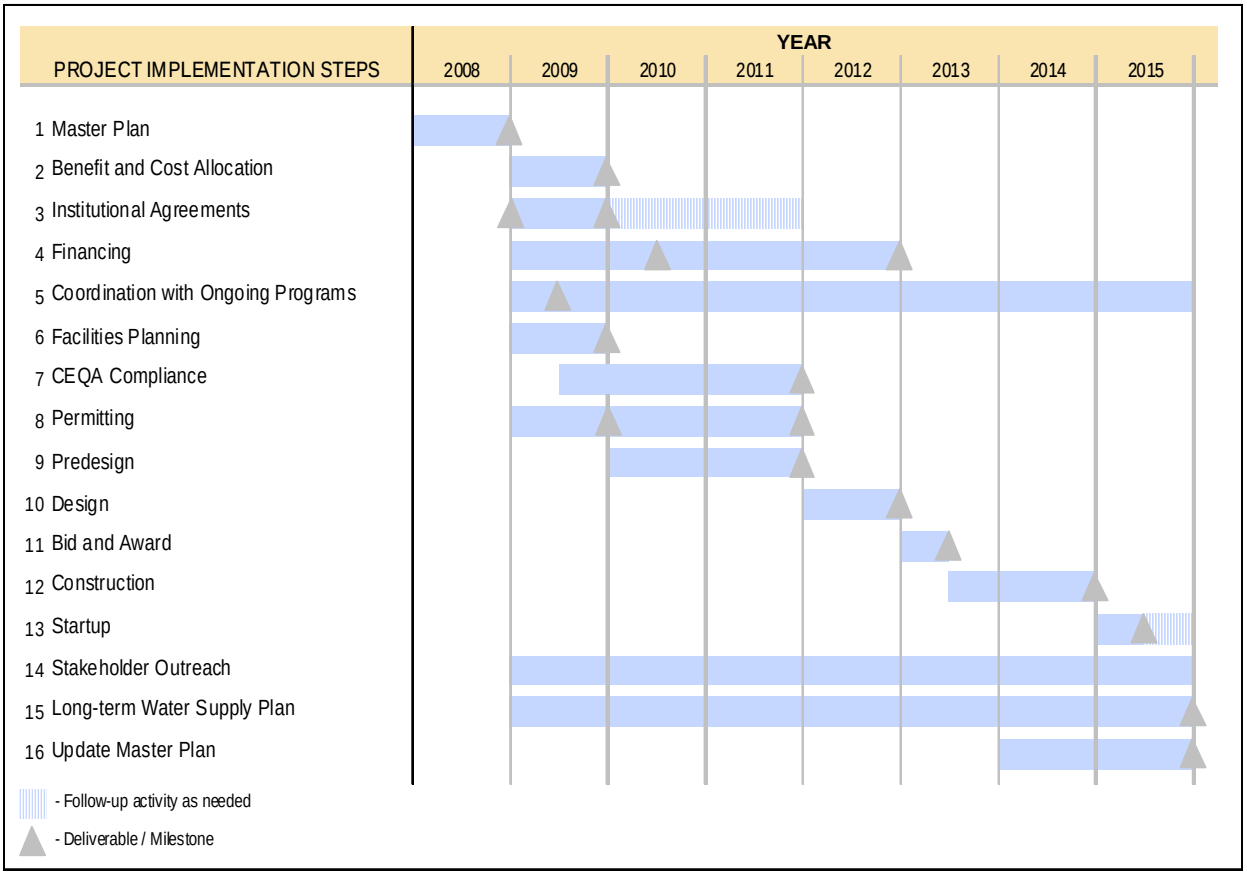


Figure 9-7: Implementation Schedule through 2015

The recommended next steps are the critical actions for implementation of this Master Plan, which include the following:

- **Benefit and Cost Allocation**

  The program costs associated with the implementation of this Master Plan should be shared among the MOU Parties according to the level of benefit each party receives. In many cases, program costs cannot be assigned to a single beneficiary, because they serve multiple users or purposes. Therefore, a framework for benefit and cost allocation has been developed. The cost allocation should be initiated immediately following the

completion of this Master Plan to ensure that implementation of the program stays on schedule. The effort will require the cooperation of each MOU Party and should result in a table identifying each program element, its total cost and the cost allocated to each MOU Party. The cost allocation should be completed by the end of 2009.

- **Institutional Agreements**

  The most expeditious way to proceed with the recommended next steps for implementation of this Master Plan would be to develop an amendment to the MOU in accordance with Article 13. The MOU should be amended in two steps.

  The first step would be to provide the basis for completing the initial implementation steps, including the benefit and cost allocation, initial financing strategy, facilities planning, and stakeholder outreach. This amendment will be required immediately following completion of this Master Plan.

  The second amendment would address engineering, environmental compliance, permitting, and continued financing and stakeholder outreach for the facilities to be constructed by 2015. This amendment should be finalized immediately following the completion of the benefit and cost allocation by the end of 2009.

  Finally, a third amendment could be prepared to address the responsibilities for ownership and operation of the facilities to be constructed by 2015. However, alternative institutional agreements should also be evaluated as part of this process.

- **Financing**

  A list of potential grants and loans was presented in Section 9.9. A funding implementation strategy should be developed to prioritize those grants and loans based on their respective timeframes, funding limits and interest rates. The prioritization of grants and loans should begin immediately upon completion of this Master Plan to facilitate timely submission of applications. It is recommended that the MOU Parties work together on the development of the funding implementation strategy and, where applicable, apply for loans/grants jointly. Finally, each of the MOU Parties should update their financial and rate studies to reflect the projects identified in this Master Plan.

- **Coordination with Ongoing Programs**

  There are a number of ongoing projects and programs which are integral parts of the recommended program. A comprehensive program schedule should be developed which

identifies the linkages between programs and the critical path tasks. This overall program schedule should be prepared by mid-2009 and then monitored and updated on a monthly basis by a single implementation program manager. All MOU Parties should provide input to the overall program schedule development and regular updates.

- **Engineering**

  The recommended facilities described in this Master Plan are based upon preliminary sizing, locations, and operational scenarios. Facilities planning is required to refine cost estimates, support the benefit and cost allocation, conduct additional distribution system modeling to optimize piping and evaluate operational scenarios, evaluate the advantages and disadvantages of wellhead demineralization versus centralized demineralization and consider additional brine disposal alternatives. The facilities plan should be completed by 2010 and include details regarding Phase 1 demineralization of urban wells, the treated water storage reservoirs, and the Phase 2 recycled water facilities. Due to the interconnectedness of the water distribution system, the facilities plan should also include the SSCWD softening projects.

  Following completion of the facilities plan, predesign and final design of the facilities would be completed. The responsible parties for these efforts should be identified in the institutional agreements, as described above. Final design should be complete by 2013.

- **CEQA Compliance**

  CEQA compliance has been completed for the City and County General Plans, the Groundwater Management Plan Update, and the City of Hollister DWTP improvements. The degree to which that CEQA coverage applies to the Master Plan must be confirmed. If additional CEQA compliance is needed for the Master Plan, it could be accomplished through a programmatic EIR or as part of EIRs for the individual facilities improvements. Since the Lessalt WTP was completed for water quality purposes, additional CEQA coverage may be necessary for the currently proposed plan.

  The project EIRs for each facility, respectively, should be prepared in conjunction with the predesign task, such that they are completed by 2012.

- **Permitting Strategy**

  Numerous federal, state, and local permits will be required for implementation of the recommended facilities. It is recommended that a comprehensive permitting strategy be developed to minimize potential delays and mitigation costs. This strategy should

include early contacts with critical regulatory agencies to define permitting needs and should be completed by the end of 2009. Following that, permitting should be conducted during the predesign task, so that all permits have been obtained by 2012.

- **Stakeholder Outreach**

  Stakeholder outreach has been an important component of developing this Master Plan. Fact sheets and public workshops were utilized to educate the public and obtain input. Similar activities should be used during program implementation to provide public education on critical items (i.e. water softener ordinance, salinity education, and water recycling) and to maintain public support for the program.

- **Long-term Water Supply Plan**

  As indicated in previous sections of this chapter, substantial additional water supplies will be required for the Study Area at buildout conditions. Due to the time required to develop new water supplies in California, preliminary work should be initiated to investigate the identified options. To preserve flexibility it may be necessary to secure water rights, begin negotiations with regional partners, and purchase property. All MOU Parties should participate in this process. The long-term water supply plan should be documented in conjunction with the 2015 Master Plan Update.

- **Update Master Plan**

  This Master Plan should be updated prior to 2015 to adjust the recommendations for facilities and timing based on actual growth rates, progress made in program implementation, and potential new issues and opportunities. The MOU Parties should each participate in the Master Plan Update.

LEGEND

General Plan Land Use

City of Hollister

- AGRICULTURE
- AIRPORT
- AIRPORT SUPPORT
- DOWNTOWN COMM & MIXED-USE
- GENERAL COMMERCIAL
- HIGH DENSITY RESIDENTIAL
- INDUSTRIAL
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- MIXED-USE
- N GATEWAY COMMERCIAL
- OPEN SPACE
- PUBLIC
- RURAL RESIDENTIAL
- WEST GATEWAY

San Benito County

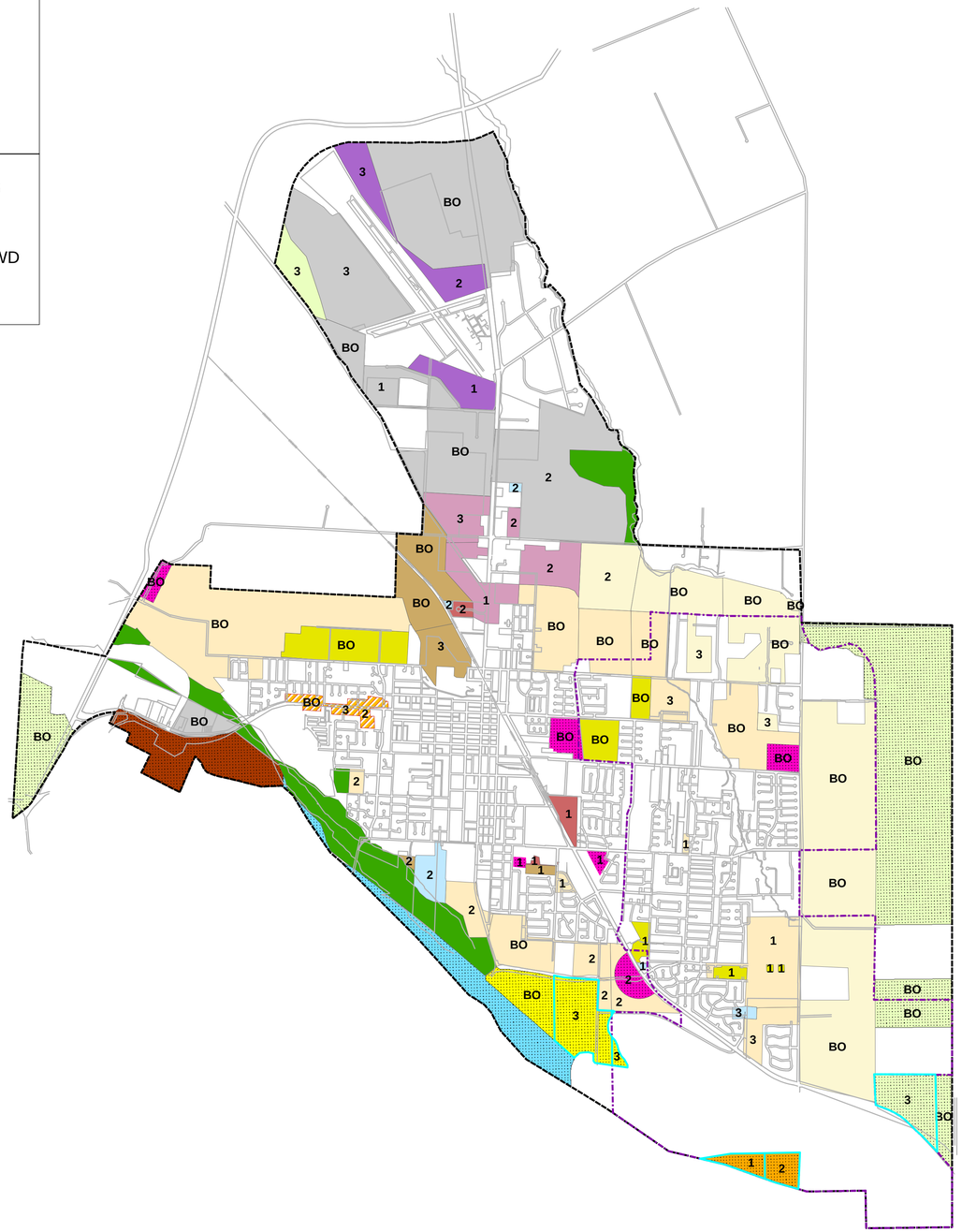
- AGRICULTURAL PRODUCTIVE
- FLOOD PLAIN
- MINERAL RESOURCES
- RURAL
- RURAL/URBAN

Phasing

- **1** 2013
- **2** 2018
- **3** 2023
- **BO** Buildout

Other Features

- Study Area
- Sunnyslope CWD
- Streets



HDR Engineering, Inc.

Scale

1" = 2500'

0 2,500 5,000 Feet

HOLLISTER URBAN AREA
WATER AND WASTEWATER MASTER PLAN

FUTURE LAND USES
AND PHASING

EXHIBIT I

LEGEND

Existing Facilities

- Tanks
- PRVs
- Wells
- Pumps
- Hollister Conduit
- WTP LESSALT WTP

Pipelines (in)

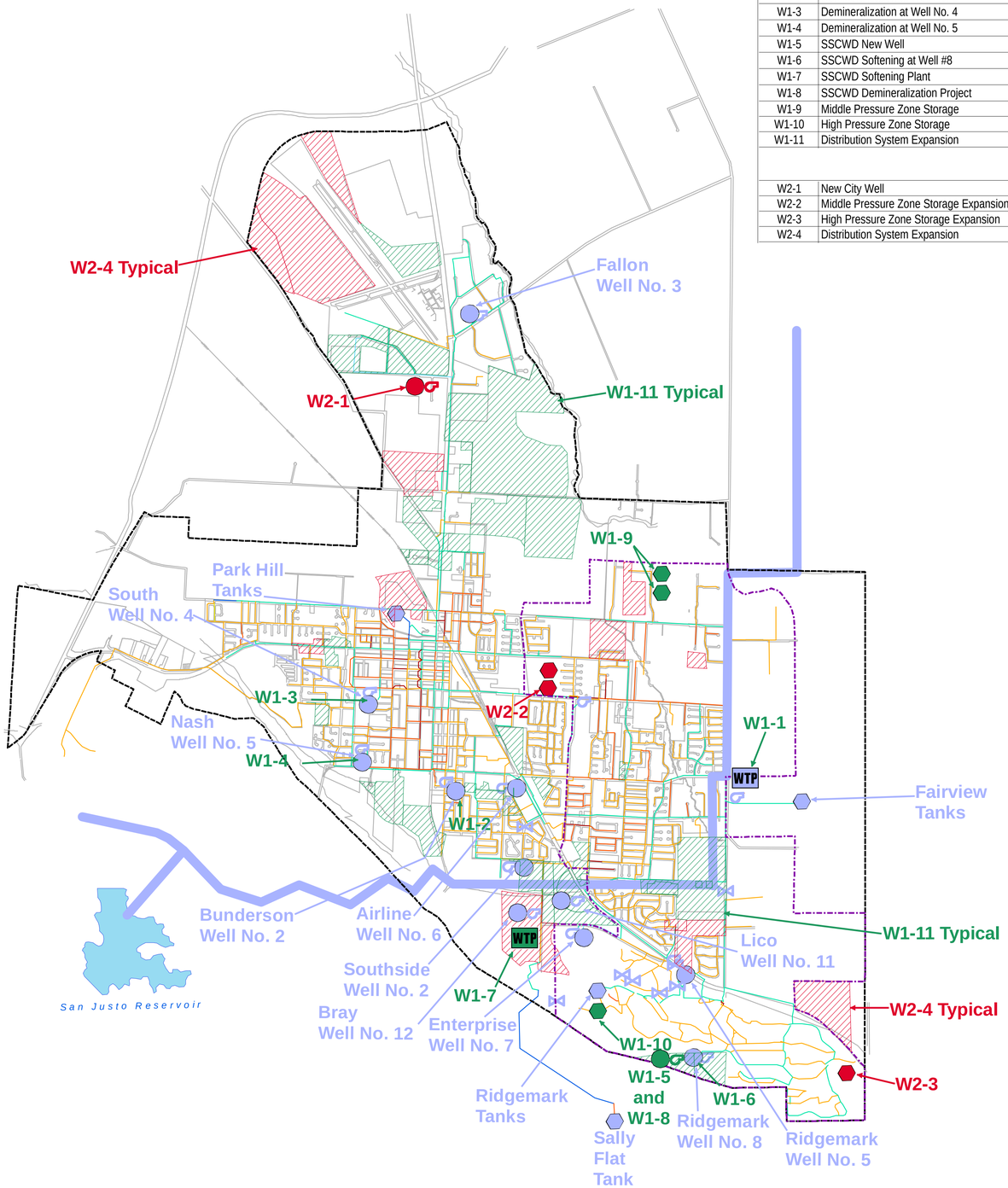
- 4
- 6
- 8
- 10
- 12
- 14
- 16

Proposed Additions

- WTP Softening Plant
- Phase 1 Well
- Phase 2 Well
- Phase 1 Tanks
- Phase 2 Tanks

Other Features

- Study Area
- Sunnyslope CWD
- Streets



Project Number	Project Title	Description
	Phase 1 - Near Term (2015)	
W1-1	Lessalt Upgrade Project	Disinfection byproduct reduction project and hydraulic improvements
W1-2	Demineralization at Well No. 2	Wellhead demineralization at Well No. 2, Bunderson, 2.1 mgd capacity, and brine disposal system
W1-3	Demineralization at Well No. 4	Wellhead demineralization at Well No. 4, South, 2.4 mgd capacity, and brine disposal system
W1-4	Demineralization at Well No. 5	Wellhead demineralization at Well No. 5, Nash, 2.6 mgd capacity, and brine disposal system
W1-5	SSCWD New Well	New 2000 gpm well in high pressure zone
W1-6	SSCWD Softening at Well #8	Groundwater softening plant at Ridgemark Well No. 8 in high pressure zone
W1-7	SSCWD Softening Plant	Groundwater softening plant, 5.4 mgd capacity, in middle pressure zone
W1-8	SSCWD Demineralization Project	Add wellhead demineralization in high pressure zone, 2.9 mgd capacity, and brine disposal system
W1-9	Middle Pressure Zone Storage	Add 4 MG of treated water storage capacity in the middle pressure zone
W1-10	High Pressure Zone Storage	Add 2 MG of treated water storage capacity in the high pressure zone
W1-11	Distribution System Expansion	Expand water distribution system to serve new areas and developments
	Phase 2 - Intermediate (2023)	
W2-1	New City Well	New 1320 gpm well in low pressure zone
W2-2	Middle Pressure Zone Storage Expansion	Add 4 MG of treated water storage capacity in the middle pressure zone
W2-3	High Pressure Zone Storage Expansion	Add 1 MG of treated water storage capacity in the high pressure zone
W2-4	Distribution System Expansion	Expand water distribution system to serve new areas and developments

HDR Engineering, Inc.

Scale
1" = 2500'

0 2,450 4,900 Feet

HOLLISTER URBAN AREA
WATER AND WASTEWATER MASTER PLAN

EXISTING AND PROPOSED
WATER FACILITIES

EXHIBIT II

LEGEND

Existing Facilities

- WWTP — Wastewater Treatment Plant
- Existing Manholes

Proposed Additions

- Recycled Water Infrastructure

Other Features

- Study Area
- Sunnyslope CWD
- City of Hollister (Current Service Area)
- Streets

Project Number	Project Title	Description
	Phase 1 - Near Term (2015)	
WW1-1	SSCWD Ridgemark WWTP	Modify Ridgemark I WWTP to provide tertiary treatment
WW1-2	Phase 2A Recycled Water Project	Install infrastructure required to convey recycled water to agricultural use sites in Wright / McCloskey corridor
WW1-3	SSCWD Ridgemark Recycled Water	Install infrastructure required to convey recycled water to M&I use sites in SSCWD. Specific locations to be determined.
WW1-4	Collection System Expansion	Expand existing sewer collection system to serve new areas and developments
	Phase 2 - Intermediate (2023)	
WW2-1	DWTP Expansion	Expand rated capacity of DWTP from 4 to 5 mgd
WW2-2	Collection System Expansion	Expand existing sewer collection system to serve new areas and developments

HDR Engineering, Inc.

Scale
1" = 2500’

0 3,000 6,000 Feet

HOLLISTER URBAN AREA
WATER AND WASTEWATER MASTER PLAN

EXISTING AND PROPOSED WASTEWATER FACILITIES

EXHIBIT III

Executive Summary

The Hollister Urban Area Water and Wastewater Master Plan (Master Plan) provides a comprehensive plan and implementation program to meet the existing and future water resources needs of the Hollister Urban Area. This Master Plan was initiated through a Memorandum of Understanding (MOU) developed in 2004 by the City of Hollister, San Benito County, and the San Benito County Water District (SBCWD), and which was later amended to include Sunnyslope County Water District (SSCWD), hereafter referred to as the MOU Parties. This executive summary provides an overview of the background, alternatives development and evaluation, and the recommended program described in this Master Plan.

ES-1 Background

The Hollister Urban Area is located in San Benito County, California, approximately 50 miles southeast of the City of San Jose and 40 miles east of Monterey Bay. The Hollister Urban Area includes the City of Hollister and adjacent unincorporated areas of San Benito County designated for urban development as shown in Figure ES- 1. This Master Plan has been developed to identify water and wastewater service to development defined by the City of Hollister and San Benito County General Plans.

ES-1.1 Memorandum of Understanding

The goals of the Master Plan are based upon the principles and objectives defined in the MOU. The following goals were used in developing this Master Plan:

- Improve municipal, industrial, and recycled water quality
- Increase the reliability of the water supply
- Coordinate infrastructure improvements for water and wastewater systems
- Implement goals of the Groundwater Management Plan
- Integrate the Long-term Wastewater Management Program (LTWMP)
- Support economic growth and development consistent with the City of Hollister and San Benito County General Plans and Policies
- Consider regional issues and solutions

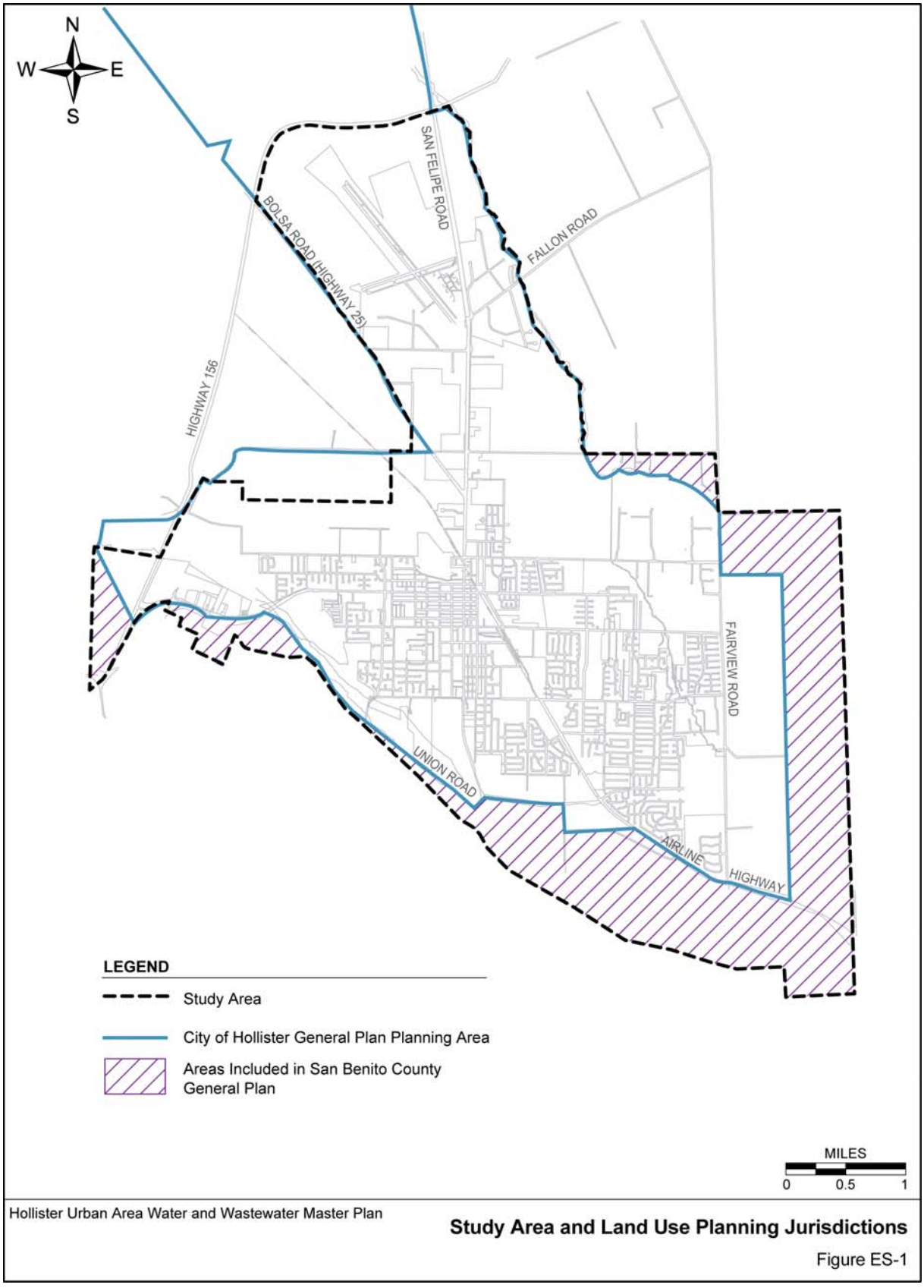


Figure ES-1: Study Area and Land Use Planning Jurisdictions

ES-1.2 Problem Definition

Northern San Benito County has a diverse and complex water supply system composed of groundwater, local rivers and creeks, imported surface water, and significant opportunities for recycled water use. Although treated drinking water meets all primary federal and state drinking water regulations, hardness and minerals in the water supply need to be reduced. The high mineral content of drinking water creates taste and odor issues for consumers, and additional cost for soap and detergent, more frequent replacement of hot water heaters, and installation and operation of home softening units. The high level of minerals in the treated wastewater limits both disposal and recycling options due to adverse impacts to crops and groundwater. The reliability of imported surface water has declined significantly and the sustainability of local supplies requires review to ensure long-term economic growth of the Hollister Urban Area.

The water resource issues that must be addressed in the Hollister Urban Area include the following:

- Quality of drinking water and recycled water
- Reliability of water supply
- Coordination of water and wastewater system improvements
- Regional balance of water resources including high groundwater areas

ES-1.3 Objective

The objective of this Master Plan is to provide a long term vision, through 2023, of water and wastewater management actions and infrastructure improvements for management of those resources for the Hollister Urban Area. As described in the MOU, this Master Plan provides a comprehensive plan describing (1) capacity and estimated cost of physical facilities, and (2) an implementation program including institutional arrangements, engineering, CEQA compliance, permitting, financing, coordination with ongoing projects and programs, stakeholder outreach, and scheduling.

ES-1.4 Stakeholder Involvement

The development of a comprehensive and responsive Master Plan involved extensive communications with key stakeholders. There are three primary groups of stakeholders involved in this Master Plan project: the agencies represented by the Governance Committee, the Management Committee, and the public. Five public workshops were held during the preparation of this Master Plan to present study findings and obtain input from interested parties.

ES-1.5 Existing Water Facilities

The two major water systems are operated by the City of Hollister and SSCWD. Although the two agencies maintain specific service areas, their water supply and distribution systems are interconnected and can exchange water as necessary to satisfy customer demand. Within the Hollister Urban Area there are also numerous small and community water systems.

Water supplies for the Hollister Urban Area are provided by groundwater and imported Central Valley Project (CVP) surface water supplies. The SBCWD has jurisdiction throughout the County for surface water management and groundwater replenishment. The San Felipe Distribution System is operated by the SBCWD and delivers imported water for groundwater recharge, agricultural irrigation, and domestic and municipal supply.

Facilities for water supply, treatment, and distribution include wells, the Lessalt Water Treatment Plant, pipelines, pump stations, and treated water storage reservoirs. The existing water facilities are shown in detail on Exhibit II at the end of this report.

ES-1.6 Existing Wastewater Facilities

Five wastewater treatment plants treat the domestic, commercial, and industrial wastewater flows generated within the Hollister Urban Area. The existing wastewater facilities are owned by three separate entities, the City of Hollister, SSCWD, and San Benito County (Cielo Vista Estates Wastewater Treatment Plant).

The wastewater facilities also include collection system pipelines, interceptors, and lift stations. Currently, wastewater effluent disposal is by evaporation and percolation. The existing wastewater facilities are shown on Exhibit III at the end of this report.

ES-2 Alternatives Development and Evaluation

A comprehensive planning process was utilized to develop and evaluate a wide range of alternatives for integrated water resources management as illustrated in Figure ES-2. The planning process involved establishing the basis of planning, development of and initial screening of concepts, and final evaluation of alternative plans.

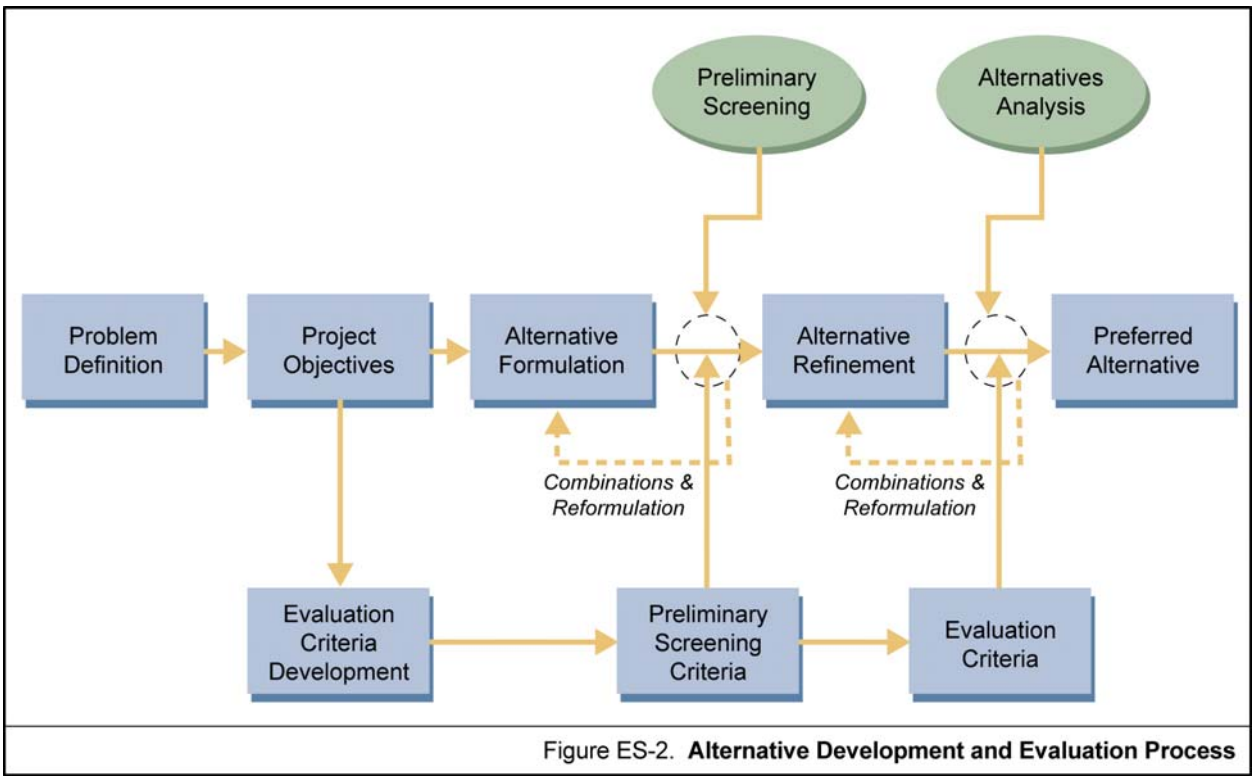


Figure ES-2. **Alternative Development and Evaluation Process**

Figure ES- 2: Alternative Development and Evaluation Process

ES-2.1 Planning Period

The planning period for this study extends 18 years, from 2005 to 2023. The initial year of the planning period was selected to provide a common baseline date for existing data related to land use, water supply and demand, and wastewater flows. The final year of the planning period coincides with the planning horizon of the adopted General Plan for the City of Hollister.

ES-2.2 Projected Water Demands

Demand projections are required to identify Study Area water supply needs for the planning horizon. Water demand projections were based on 2005 water demands data and patterns, planned land uses, estimated system losses, land use unit demands, and anticipated levels of water conservation. Use of General Plan land uses within the Study Area is a critical aspect for projecting future water demands because the land uses reflecting the City and County's plans and policies of the two General Plans have been through rigorous public review and environmental compliance. Water demands for the Study Area are currently 7,965 acre-feet (ac-ft). Annual water demands are projected in increase to 11,840 ac-ft by 2023 and approximately 20,150 ac-ft at buildout as shown in Figure ES-3.

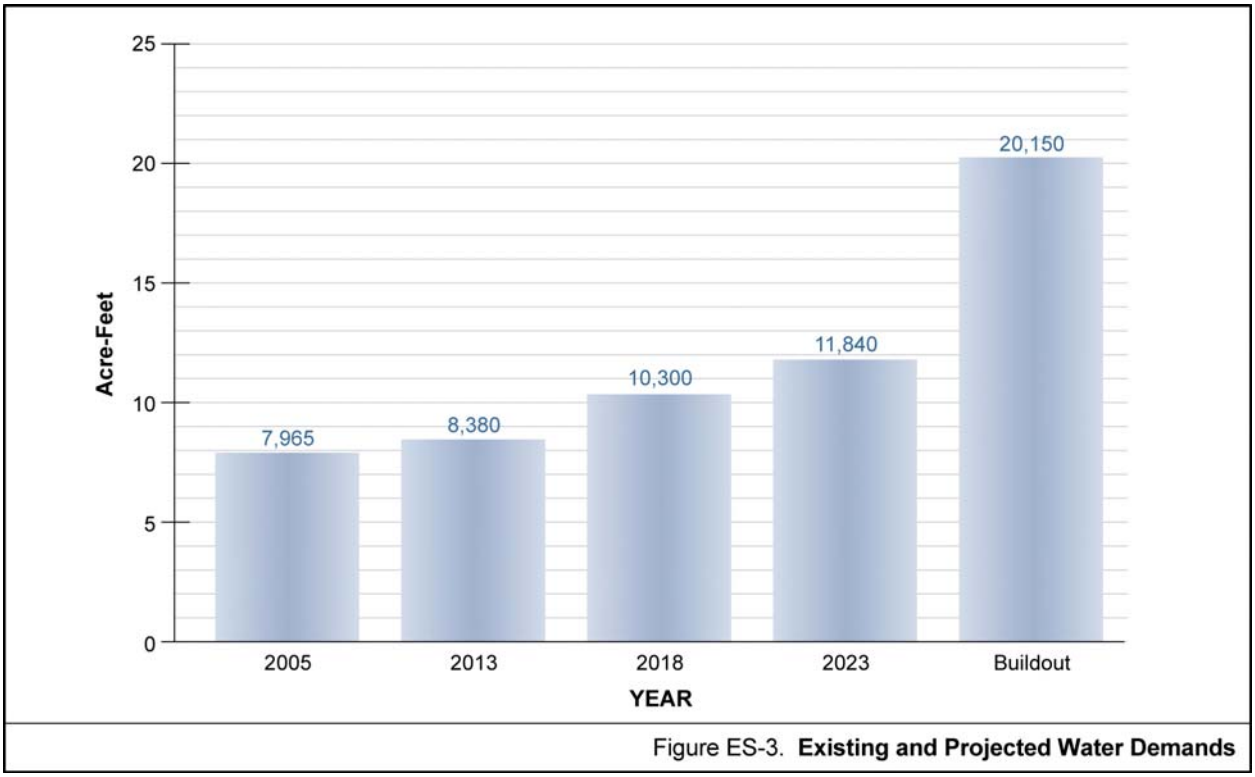


Figure ES-3. **Existing and Projected Water Demands**

Figure ES- 3: Existing and Projected Water Demands

ES-2.3 Projected Wastewater Flows

Existing and projected wastewater flows were developed as part of the Long-term Wastewater Management Program (Draft, March 2007). Existing average dry weather flows (ADWF) are approximately 3.0 million gallons per day (mgd) and are projected to increase to 4.5 mgd by 2023. The existing ADWF includes wastewater from the City (2.7 mgd) and the SSCWD (0.3 mgd). The projected ADWF for 2023 includes 4.04 mgd from the City, to be treated at the new Domestic Wastewater Treatment Plant (DWTP), and 0.46 mgd from SSCWD, to be treated at the Ridgemark Wastewater Treatment Plant.

ES-2.4 Description and Screening of Alternative Concepts

Four overall concepts were developed to meet the goals of this Master Plan. The four concepts were developed through the evaluation of previous and ongoing projects; initial feasibility evaluations of major components (i.e., groundwater demineralization and softening); and workshops conducted with the Management Committee, the Governance Committee, and the public.

The current urban water supply does not meet secondary drinking water standards for salinity leading to poor taste and high consumer costs. The high salinity also limits the options available for recycling water following wastewater treatment. The ability to use recycled water would provide an additional source of water and improve the overall reliability of water supply. Addressing the water supply and water quality issues provides direct benefits to consumers and allows for implementation of wastewater treatment producing valuable recycled water. Therefore, the four concepts were focused on the water supply and water quality aspects of the integrated water resources plan as follows:

- Concept 1 – Increase Use of Imported Surface Water
- Concept 2 – Utilize Local Surface Water Supplies
- Concept 3 – Demineralization of Urban Wells
- Concept 4 – Utilization of Water from High Groundwater Basins

ES-2.5 Formulation of Alternatives

The initial screening of overall concepts resulted in five detailed alternatives for further analysis. The five alternatives are listed below:

- Alternative 1A – Exchange agricultural CVP supply with recycled water
- Alternative 1B – Reallocate unused CVP M&I entitlements
- Alternative 2A – Capture intermittent creek flows
- Alternative 3A – Demineralization to meet MOU goals
- Alternative 3B – Phased demineralization of urban wells

ES-2.6 Evaluation of Alternatives

Evaluation criteria were developed based upon the principles and objectives defined in the MOU and through workshops with the Governance Committee, Management Committee, and the public. The evaluation criteria established through this process are as follows:

- Minimize Costs
- Meet Drinking Water Quality Goals
- Meet Recycled Water Quality Goals
- Balance Water Supply for Enhanced Reliability
- Maximize Availability of Supplies
- Maximize Opportunities for Regional Solutions
- Minimize Environmental Impacts
- Provide Flexibility for Phased Implementation
- Minimize Risk of Implementation

ES-3 Recommended Program

Based upon the evaluation of alternatives, groundwater demineralization, Alternatives 3A and 3B, was determined to best meet the evaluation criteria. Alternative 3B is essentially a subset of Alternative 3A; thus, Alternative 3B – Phased Demineralization of Urban Wells was

determined to be a logical first step toward meeting MOU goals and is the recommended plan. Some of the major benefits of the recommended program include the following:

- Providing a reliable water supply for average, dry, and multiple dry year events without significantly impacting long-term groundwater levels within the subbasins.
- Providing a reliable water supply for agricultural users.
- Providing improved drinking water quality and consumer cost savings.
- Reducing the annual salt load entering the groundwater basin.
- Improved effluent quality facilitating the implementation of recycled water use in the Wright Road / McCloskey Road corridor.
- Reducing percolation to groundwater basin and related contributions to localized high groundwater conditions.

The major actions and benefits resulting from the integrated water resources plan are summarized in Figure ES-4.

ES-3.1 Facilities

The integrated water and wastewater plan is summarized in Table ES-1 and Figure ES-5. The integrated plan includes common elements for program solutions and water, wastewater, and recycled water facilities. The urban water supply plan is a phased solution which includes an initial phase of demineralization of select urban wells, continued use of imported CVP supplies treated at the Lessalt WTP, and groundwater softening of several SSCWD wells.

The integrated plan provides the facilities required to meet the water and wastewater needs of the Hollister Urban Area through the year 2023. However, the plan also provides flexibility to respond to changing conditions and a framework to meet the water and wastewater needs at buildout conditions. For example, as shown in Table ES-1, there is a menu of long-term water supplies and regional options. This menu consists of alternatives developed and analyzed in this Master Plan.

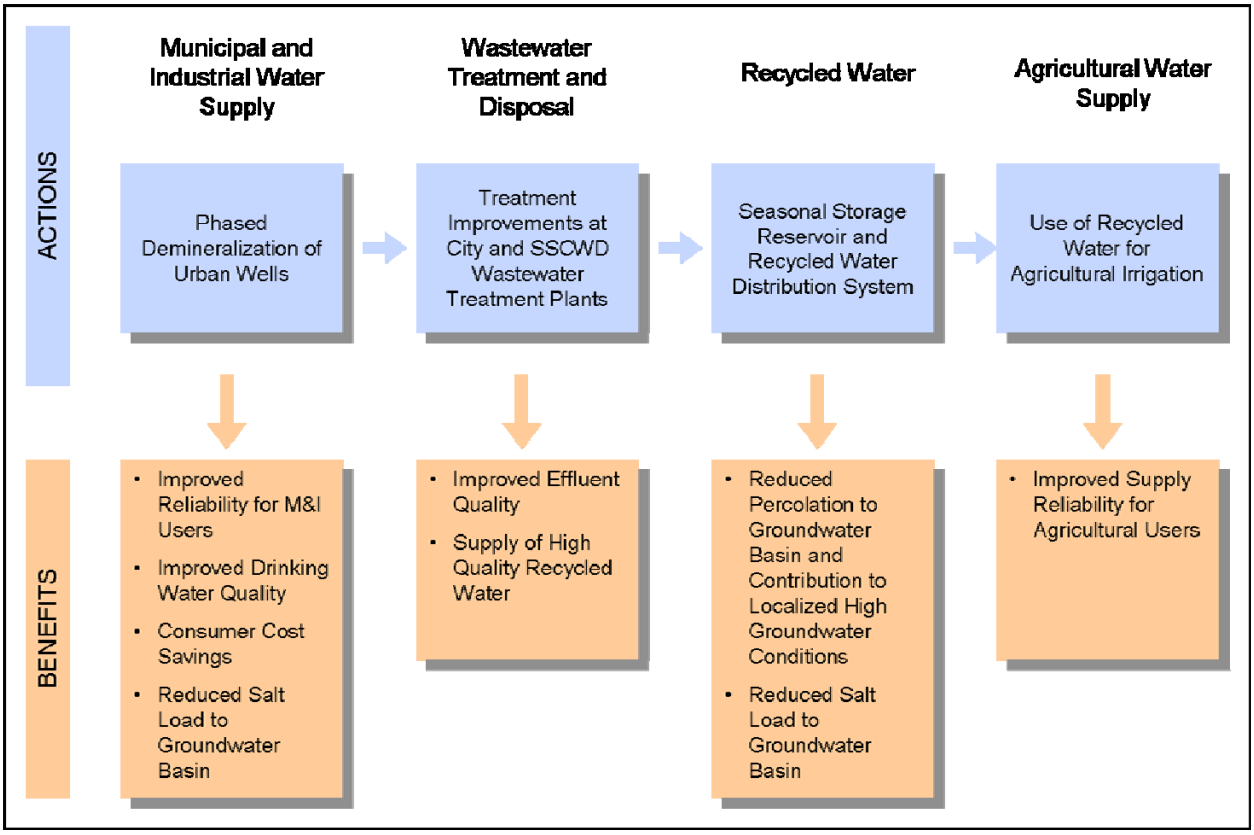


Figure ES- 4: Major Actions and Benefits of Integrated Water Resources Plan

Between the year 2023 and Buildout, an additional 8,300 ac-ft of water will be required on an annual basis. To meet this long-term need, the menu provides a starting point for pursuing the required water supplies. Due to the time required for developing major water supply projects, it is recommended that all of these potential sources of supply be investigated in parallel to provide the most flexibility for future development.

The major facilities required for the preferred plan are shown in Figure ES-5. In an initial phase, Phase 1, new demineralization water treatment facilities would be provided for three existing City wells and one SSCWD. Later, if required, additional demineralization facilities would be added at other urban wells. In addition to demineralization, SSCWD would also construct a groundwater softening plant. Wastewater treatment would be provided by the new City of Hollister Domestic Wastewater Treatment Plant and the upgraded SSCWD Ridgemark Wastewater Treatment Plant. Disposal of treated wastewater from the City's plant would be

Table ES- 1: Integrated Water and Wastewater Master Plan

2023 Master Plan		Long Term Water Supplies and Regional Options	
Common Elements	Urban Water Supply Plan		
Program Solutions Water Conservation Softener Ordinance Salinity Education Dual Distribution Systems in New Developments Base Case Water, Wastewater, and Recycled Water Facilities Lessalt Upgrade WWTP Project Phase 1 Disposal SSCWD Softening and Demineralization Projects SSCWD Ridgemark WWTP and Recycled Water Projects Treated Water Storage Facilities Phase 2A Recycled Water Facilities (By 2015) New Wells DWTP Expansion	Alternative 3B – Phased Demineralization of Urban Wells (By 2015 Alternative 3A – Demineralize Urban Wells to Meet MOU Water Quality Goals	Alternative 1A – Exchange Agricultural CVP Supply for Recycled Water – Treat Locally and/or Use for Exchange as Part of Regional Option Alternative 1B – Reallocate Unused CVP M&I Entitlements Alternative 2A – Develop Local Surface Water Supply	Concept 4 – Utilize Water from High Groundwater Basins Exchange North Area Groundwater for CVP Supply from PVWMA Demineralize or Soften Groundwater from San Juan Subbasin and Import to Urban Area
		Other Water Supplies and Options Identified Through Ongoing Regional Studies and Future Updates to Master Plan	

Implementation Timing

Implementation Timing

accomplished by Phase 1 spray fields at the Hollister Municipal Airport and irrigation at Riverside Park and in Phase 2A by irrigation use in the Wright Road / McCloskey Road corridor. Similarly, SSCWD would dispose of treated wastewater through irrigation at the Ridgemark Golf Course.

ES-3.2 Phasing

In order to comply with regulatory requirements, there are current projects underway which are scheduled to be complete by the end of 2008. These current projects include the City of Hollister DWTP, the Seasonal Storage Reservoir, and the Phase 1 Recycled Water Facilities. This Master Plan builds upon the current projects.

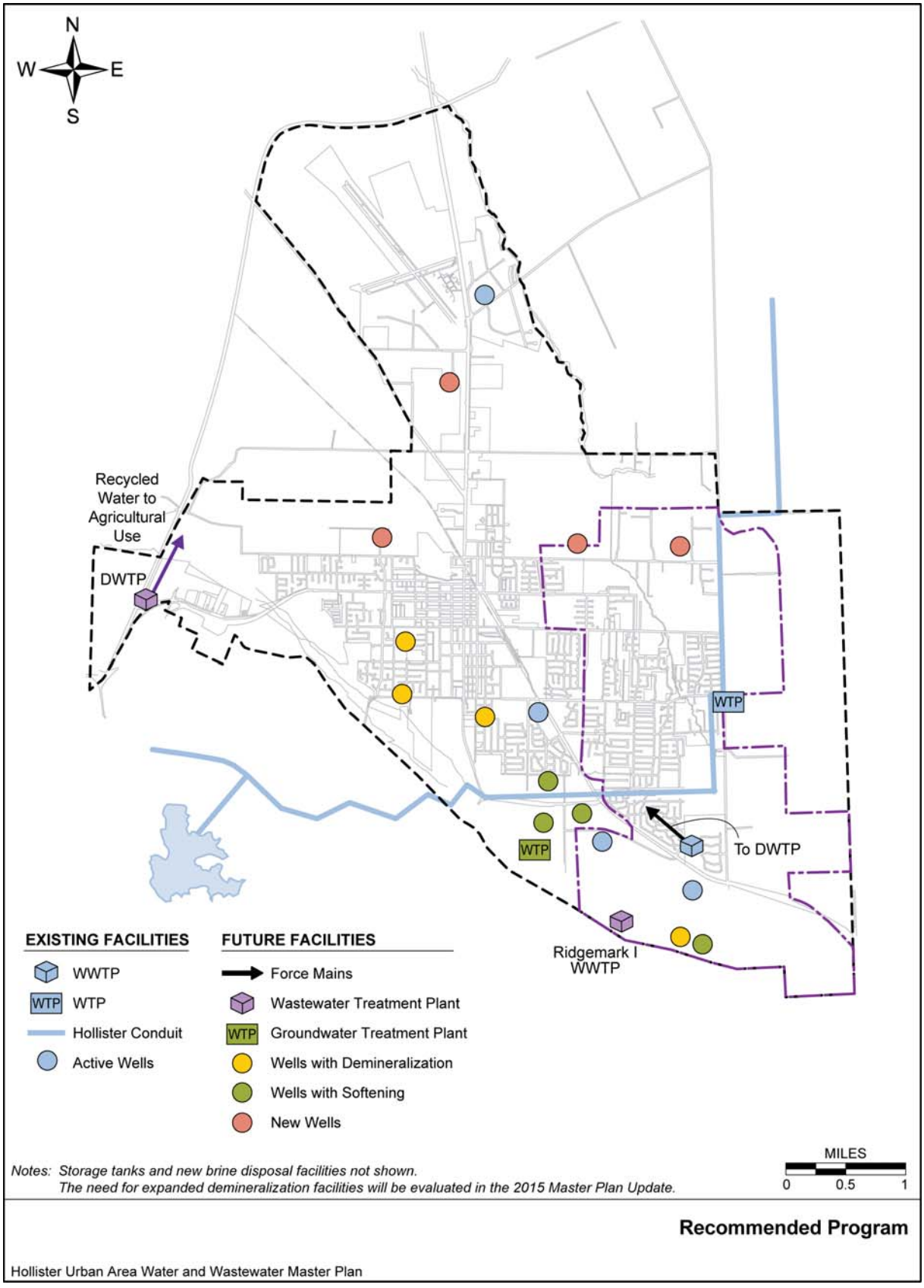


Figure ES-5: Recommended Program

The facilities in the recommended plan would be implemented in three phases as shown in Figure ES-6. The three phases would be as follows:

- Phase 1 – Near Term (To 2015)
- Phase 2 – Intermediate Term (To 2023)
- Phase 3 – Long Term (After 2023)

The first phase (Phase 1) would extend to 2015. This is the date established in the MOU for implementation of a recycled water program meeting the water quality goals of the MOU. The program solutions would be implemented during Phase 1. Modifications and improvements to the Lessalt WTP would be completed by 2010 to allow this facility to produce 3.0 mgd and meet all current drinking water regulations. Additionally, SSCWD will implement a softening program in the Ridgemark area and upgrade the Ridgemark Wastewater Treatment Plant in order to be compliant with its regulatory requirements by 2010. The first phase of groundwater demineralization facilities would be completed, including demineralization at three City wells and one SSCWD well. SSCWD will also construct a softening plant in the Fairview pressure zone. The final elements of Phase 1 include construction of additional treated water storage facilities, the Phase 2A Recycled Water Facilities in the Wright Road / McCloskey corridor as identified in the Recycled Water Feasibility Study Update, and the SSCWD Ridgemark Recycled Water Facilities. In addition to these projects, Phase 1 includes on-going study and development of a long term water supply to meet the demands projected for buildout conditions.

Phase 2 would include the improvements required from 2015 to 2023, which is the end of the planning period for this Master Plan. During Phase 2, a second phase of demineralization facilities may be considered for implementation at City and SSCWD wells dependent on the development of drinking water demands in the HUA and the ability to optimize water quality distribution with only Phase 1 demineralization facilities coupled with distribution system improvements. Additional treated water storage facilities and the development of two new wells are required to meet projected growth in the HUA. Between 2018 and 2020, a 1.0 mgd expansion of the City of Hollister DWTP would also be completed by adding additional membrane capacity. Moreover, the RWQCB requires that the City of Hollister begin planning to expand the DWTP when flows reach 75 percent of design capacity. It is projected that this DWTP expansion planning would occur during the Phase 2 timeframe.

The final phase (Phase 3) would be to buildout. Future updates to this Master Plan will more precisely define the needs and timing of the facilities required after 2023. Expansion of the City DWTP and the recycled water facilities will be required and additional demineralization facilities may be necessary. However, as shown in Table ES-1, the most significant element for buildout conditions will be the implementation of a long-term water supply to meet projected demands for buildout conditions.

ES-3.3 Estimated Costs

The estimated capital costs for the recommended program through 2023 are summarized in Table ES-2. The costs in this table are organized by phase and project type. All estimated capital costs are based on 2008 dollars.

Table ES- 2: Summary of Capital Improvement Program

Phase/Facilities	Estimated Capital Cost ($)	
Phase 1 (2015)		
Water	100,900,00	
Wastewater	9,720,000	
Recycled Water	14,395,000	
Subtotal Phase 1		125,015,000
Phase 2 (2023)		
Water	7,060,000	
Wastewater	1,000,000	
Subtotal Phase 2		8,060,000
Total (Phase 1 & 2)		133,075,000
Less Base Case		70,025,000
Marginal Total Cost		63,050,000

Note: The costs in this table do not include water distribution pipelines and wastewater collection pipelines, or the costs associated with projects currently underway, including the DWTP, Phase 1 Recycled Water Project, the Seasonal Storage Reservoir and two new wells in SSCWD. Demineralization costs only include Phase 1 Demineralization. The need for expanded demineralization facilities will be evaluated in the 2015 Master Plan Update.

The MOU Parties should update financial and rate studies to reflect the projects identified in this Master Plan. In addition to local financing options, grants and loans should be investigated for the required improvements. The water, wastewater and recycled water infrastructure funding sources which may be suitable for projects within the recommended program are listed below.

- Infrastructure State Revolving Fund Program
- Safe Drinking Water State Revolving Fund

- Local Water Supply Construction (Proposition 82)
- Clean Water State Revolving Fund
- Water Recycling Construction Program
- Water Recycling State Revolving Fund

It is recommended that the MOU Parties work together on the development of a funding implementation strategy and, where applicable, apply for loans/grants jointly.

ES-3.4 Benefit and Cost Allocation

The fundamental issue for the recommended program in this Master Plan is the equitable distribution of costs for a multi-purpose program serving multiple agencies.

Some costs may be assigned solely to a single purpose or agency. These directly assignable costs are referred to as specific costs. Other costs cannot be assigned to a single beneficiary because they serve multiple purposes or agencies. These costs are referred to as joint costs.

There are a variety of methods for allocation of joint costs. The recommended framework for use in allocating costs in this Master Plan, illustrated in Figure ES-6, is based upon a combination the Share of Use and Share of Benefits approaches.

The first step in cost allocations is to define the specific costs for each beneficiary. As Table ES-3 shows, the specific costs are approximately $2.73 million for the City and approximately $47.65 million for SSCWD. The remaining joint costs after assignment of the specific costs total $82,695,000. These are the joint costs which must be allocated among the MOU Parties.

Table ES- 3: Summary of Specific and Joint Costs

Project Category	Estimated Cost	Specific Costs				Joint Costs
		City	County	SBCWD	SSCWD	
Water Facilities	107,960,000	1,730,000			33,990,000	72,240,000
Wastewater Facilities	10,720,000	1,000,000			9,720,000	
Recycled Water Facilities	14,395,000				3,940,000	10,455,000
Total	133,075,000	2,730,000			47,650,000	82,695,000

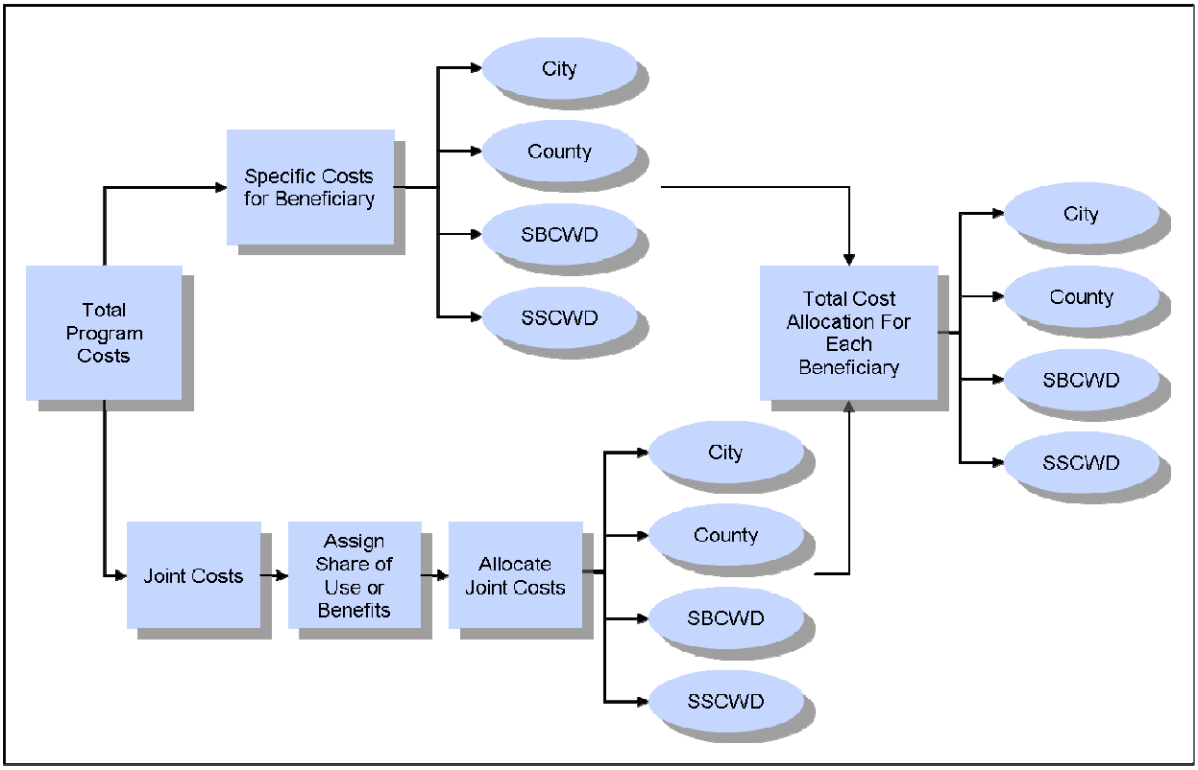


Figure ES- 6: Framework for Benefit and Cost Allocation

Costs for the Lessalt WTP Upgrade Project and the Treated Water Storage may be allocated according to use by the City and SSCWD. Review of past agreements, historical and future usage, and additional modeling will be used to develop equitable sharing of these costs.

Allocation of joint costs for the groundwater demineralization at City wells and the recycled water facilities will be more complex. These two program elements serve multiple beneficiaries and it is recommended that the joint costs for these facilities be allocated in proportion to the share of benefits provided.

In order to allocate joint costs among the MOU Parties, the program benefits must be valued and allocated to the beneficiaries. A preliminary benefit allocation is presented in Table ES-4.

Table ES- 4: Preliminary Benefit Assignment

Benefit	City	County	SBCWD	SSCWD
Water Supply				
Improved Supply Reliability for M&I Users	X	X		X
Improved Supply Reliability for Agricultural Users			X	
Drinking Water Quality				
Improved Drinking Water Quality and Consumer Cost Savings	X	X		X
Reduced Salt Load to Groundwater Basin	X	X	X	X
Effluent Disposal from Wastewater Treatment				
Improved Effluent Quality and Cost Effective Effluent Disposal	X	X		X
Reduced Percolation to Groundwater Basin and Contribution to Localized High Groundwater Conditions	X	X	X	
Supply of High Quality Recycled Water			X	X

The benefit allocation is the key component in the allocation of joint costs for groundwater demineralization and recycled water facilities. Therefore, it is expected that significant negotiations will be required to build consensus among the MOU Parties and finalize the allocations presented above.

As Figure ES-6 illustrates, the specific costs and allocated share of joint costs are added to develop the total cost allocation for each of the MOU Parties. It is important to differentiate between cost allocation and cost sharing. While cost allocation distributes the cost of the program, it does not represent what each MOU Party may ultimately pay.

The benefit and cost allocation framework in Figure ES-6 will serve as a starting point for negotiations between the MOU Parties. Prior agreements, institutional considerations, and other factors will need to be addressed during the negotiations.

ES-3.5 Recommended Implementation Schedule and Next Steps

Implementation of this Master Plan will require overall program activities and individual facilities activities. The current projects shown in Figure ES-7 are already under construction or in design. The next major facilities would be implemented as part of Phase 1 through 2015. Figure ES-8 illustrates the recommended implementation schedule and the steps required to ensure timely completion of the Phase 1 facilities.

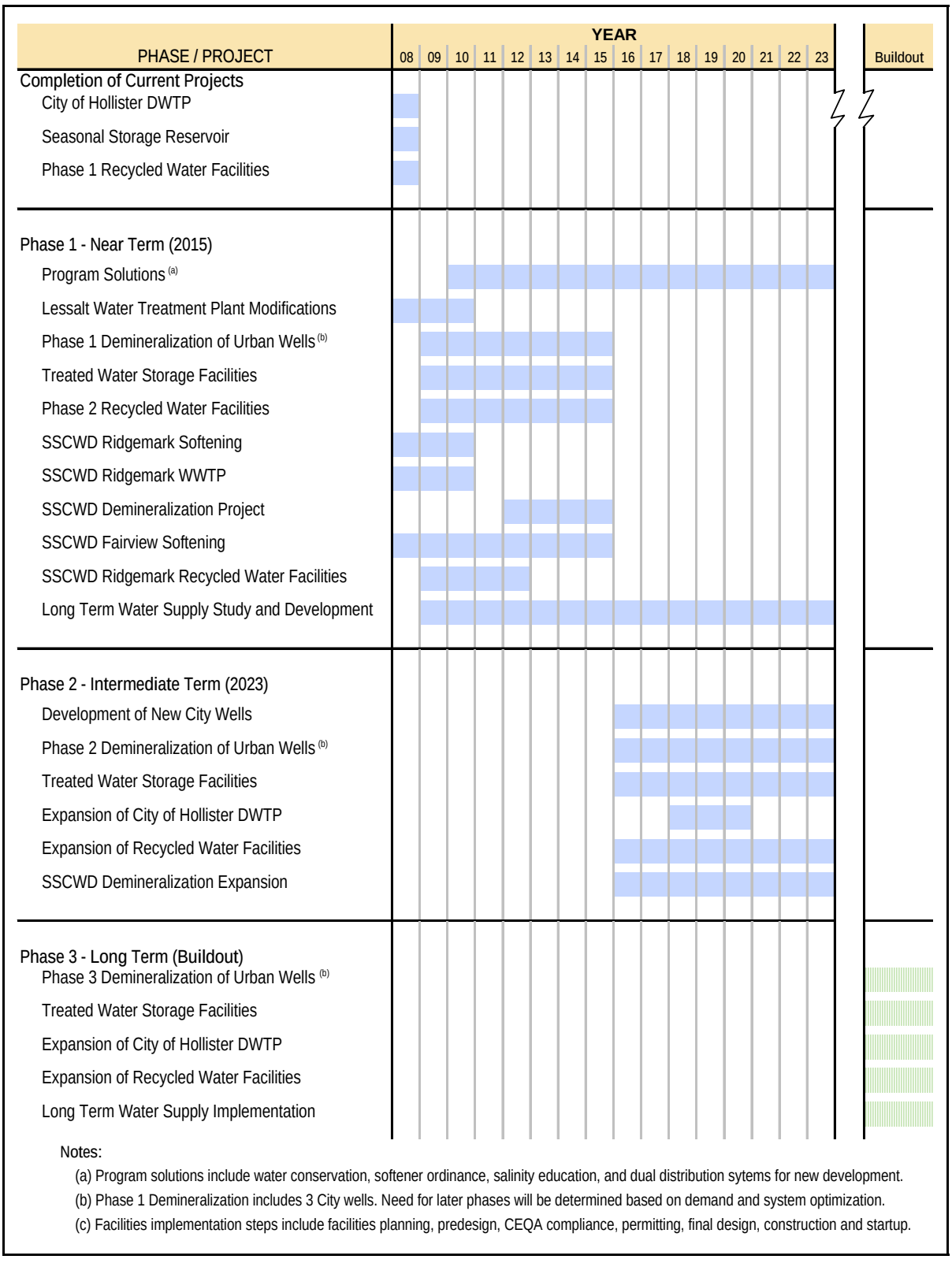


Figure ES- 7: Implementation Program Phasing

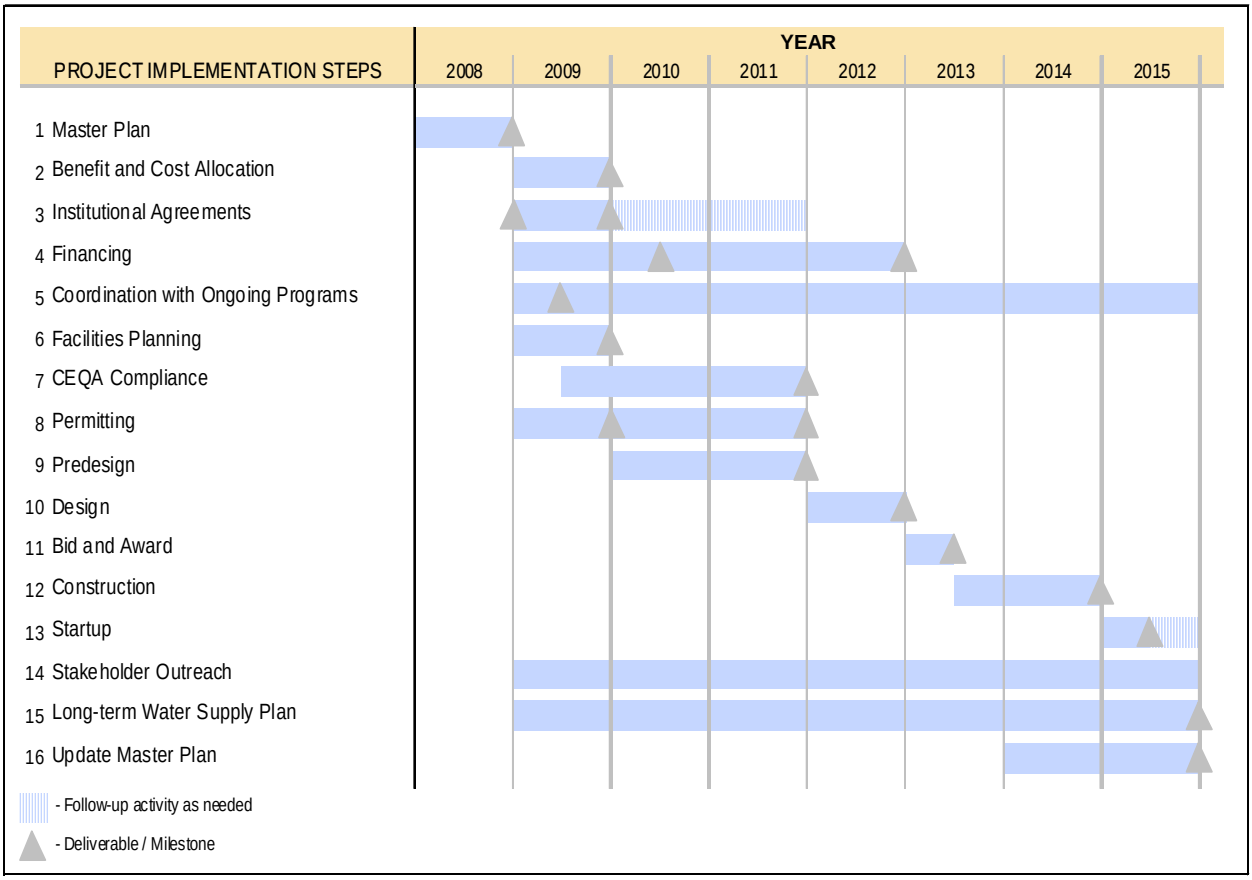


Figure ES- 8: Implementation Schedule through 2015

The following recommended next steps are the critical actions for implementation of this Master Plan:

- **Benefit and Cost Allocation**

  The program costs associated with the implementation of this Master Plan should be shared among the MOU Parties according to the level of benefit each party receives. In many cases, program costs cannot be assigned to a single beneficiary, because they serve multiple users or purposes. To ensure that implementation of this Master Plan stays on schedule, cost allocation should be initiated immediately. The effort will require the cooperation of each MOU Party and should result in a table identifying each program element, its total cost and the cost allocated to each MOU Party. The cost allocation should be completed by the end of 2009.

- **Institutional Agreements**

  The most expeditious way to proceed with the recommended next steps for implementation of this Master Plan would be to develop an amendment to the MOU in accordance with Article 13. The MOU should be amended in two steps.

  The first step would be to provide the basis for completing the initial implementation steps, including the benefit and cost allocation, initial financing strategy, facilities planning, and stakeholder outreach. This amendment will be required immediately following completion of this Master Plan.

  The second amendment would address engineering, environmental compliance, permitting, and continued financing and stakeholder outreach for the facilities to be constructed by 2015. This amendment should be finalized immediately following the completion of the benefit and cost allocation by the end of 2009.

  Finally, a third amendment could be prepared to address the responsibilities for ownership and operation of the facilities to be constructed by 2015. However, alternative institutional agreements should also be evaluated as part of this process.

- **Financing**

  A funding implementation strategy should be developed to prioritize the recommended grants and loan opportunities based on their respective timeframes, funding limits and interest rates. The prioritization of grants and loans should begin immediately upon completion of this Master Plan to facilitate timely submission of applications. It is recommended that the MOU Parties work together on the development of the funding implementation strategy and, where applicable, apply for loans/grants jointly. Finally, each of the MOU Parties should update their financial and rate studies to reflect the projects identified in this Master Plan.

- **Coordination with Ongoing Programs**

  There are a number of ongoing projects and programs which are integral parts of the recommended program. A comprehensive program schedule should be developed which identifies the linkages between programs and the critical path tasks. This overall program schedule should be prepared by mid-2009 and then monitored and updated on a monthly basis by a single implementation program manager. All MOU Parties should provide input to the overall program schedule development and regular updates.

- **Engineering**

  The recommended facilities described in this Master Plan are based upon preliminary sizing, locations, and operational scenarios. Facilities planning is required to refine cost estimates, support the benefit and cost allocation, conduct additional distribution system modeling to optimize piping and evaluate operational scenarios, evaluate the advantages and disadvantages of wellhead demineralization versus centralized demineralization and consider additional brine disposal alternatives. The facilities plan should be completed by 2010 and include details regarding Phase 1 demineralization of urban wells, the treated water storage reservoirs, and the Phase 2 recycled water facilities. Due to the interconnectedness of the water distribution system, the facilities plan should also include the SSCWD softening projects.

  Following completion of the facilities plan, predesign and final design of the facilities would be completed. The responsible parties for these efforts should be identified in the institutional agreements, as described above. Final design should be complete by 2013.

- **CEQA Compliance**

  CEQA compliance has been completed for the City and County General Plans, the Groundwater Management Plan Update, and the City of Hollister DWTP improvements. The degree to which that CEQA coverage applies to the Master Plan must be confirmed. If additional CEQA compliance is needed for the Master Plan, it could be accomplished through a programmatic EIR or as part of EIRs for the individual facilities improvements. Since the Lessalt WTP was completed for water quality purposes, additional CEQA coverage may be necessary for the currently proposed plan.

  The project EIRs for each facility, respectively, should be prepared in conjunction with the predesign task, such that they are completed by 2012.

- **Permitting Strategy**

  Numerous federal, state, and local permits will be required for implementation of the recommended facilities. It is recommended that a comprehensive permitting strategy be developed to minimize potential delays and mitigation costs. This strategy should include early contacts with critical regulatory agencies to define permitting needs and should be completed by the end of 2009. Following that, permitting should be conducted during the predesign task, so that all permits have been obtained by 2012.

- **Stakeholder Outreach**

  Stakeholder outreach has been an important component of developing this Master Plan. Fact sheets and public workshops were utilized to educate the public and obtain input. Similar activities should be used during program implementation to provide public education on critical items (i.e. water softener ordinance, salinity education, and water recycling) and to maintain public support for the program.

- **Long-term Water Supply Plan**

  As previously described, substantial additional water supplies will be required for the Study Area at buildout conditions. Due to the time required to develop new water supplies in California, preliminary work should be initiated to investigate the identified options. To preserve flexibility it may be necessary to secure water rights, begin negotiations with regional partners, and purchase property. All MOU Parties should participate in this process. The long-term water supply plan should be documented in conjunction with the 2015 Master Plan Update.

- **Update Master Plan**

  This Master Plan should be updated prior to 2015 to adjust the recommendations for facilities and timing based on actual growth rates, progress made in program implementation, and potential new issues and opportunities. The MOU Parties should each participate in the Master Plan Update.