WATER SUPPLY ASSESSMENT
FOR
GUSTINE ANNEXATION SOUTHEAST

City of Gustine, Public Works
October 18, 2017

CITY ADMINISTRATIVE DRAFT
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INTRODUCTION

Background

The California Water Code requires coordination between land use lead agencies and public water suppliers to ensure that prudent water supply planning has been conducted and that planned water supplies are adequate to meet both existing and planned future project demands. Senate Bill 610 amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. The statute requires detailed information regarding water availability to be provided to land use decision-makers in cities and counties prior to consideration for approval of statutorily-defined proposed development projects. The statute also requires this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by a city or county on such projects.

Water Code Sections 10910-10915[1] require land use lead agencies to identify the public water system[2] that may supply water for a proposed development project and to request from said public water system a ***water supply assessment*** ("WSA") for the project. If there is no "public water system" as defined in the statute, the lead agency for the project must conduct the assessment. The purpose of the WSA is to demonstrate that the public water system, or the agency providing water supplies to the proposed development project if there is no public water system, has sufficient water supplies to meet the water demands associated with the proposed project in addition to meeting the existing and other planned future water demands projected for the next 20 years.

Format of WSA

The format of this WSA is based upon guidance provided by the California Department of Water Resources in its "Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to assist water suppliers, cities, and counties in integrating water and land use planning," dated October 8, 2003.

This WSA will be included as an appendix to the environmental document for the proposed project described in this WSA, and the City of Gustine City Council will consider the conclusions reached in this document when analyzing the proposed project's potential impacts on water supply.

Description of Proposed Project

The proposed Southeast Gustine Annexation (the "Project") includes the pre-zoning, amendment of the General Plan, and annexation of approximately 219 acres in western Merced County into the City of Gustine ("City"). The properties and boundaries of the land proposed to be annexed are shown on **Figure 1**, and are generally bounded on the south by Noble Road, on the west by South Mills Road, on the east by South Hunt Road, and on the north by the existing city limits. The Project is bounded by urban development to the north and agricultural land uses in the other directions. The Project site generally is located in the County of Merced, to the southeast of the City's existing City limits as shown on **Figure 2**. The Project is within both the City's General Plan boundaries and the Merced Local Agency Formation Commission's approved sphere of influence for the City.

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[1] All statutory references are to the California Water Code unless otherwise noted.
[2] Water Code §10910(b).

Figure 1
Proposed Project Map Exhibit

Source: Draft Southeast Gustine Master Plan, October 24, 2017, p. 7 (Figure 1-2)

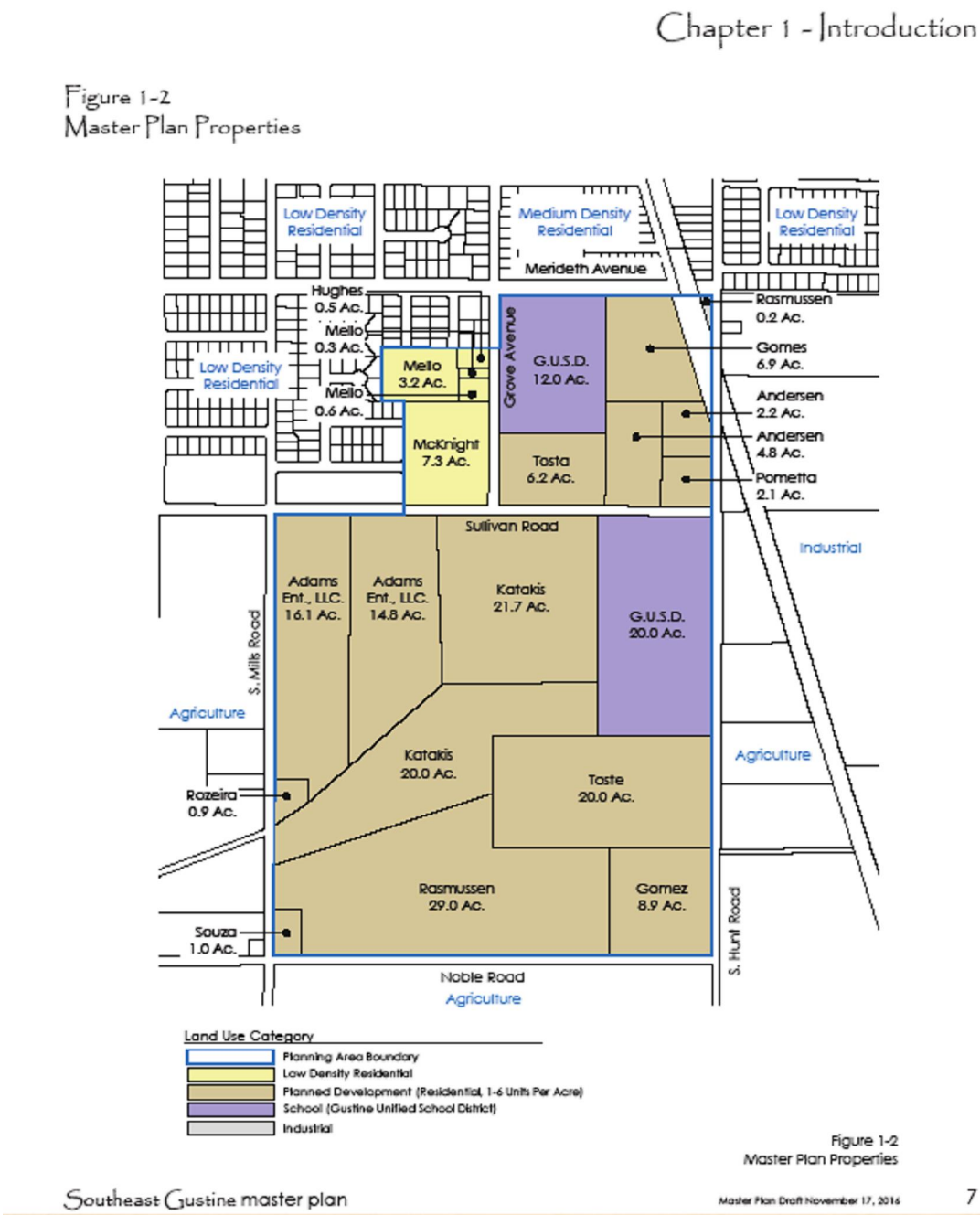
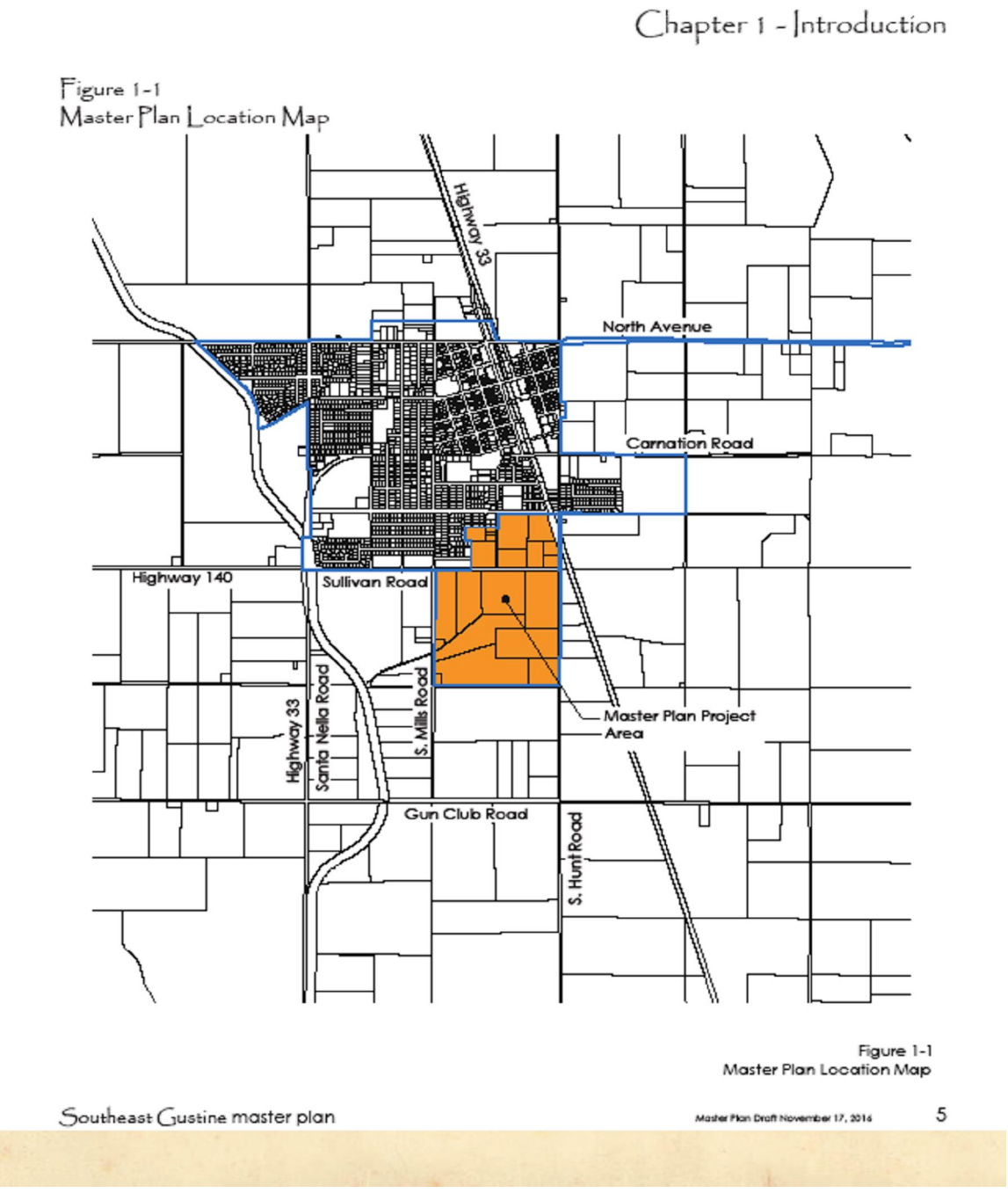


Figure 2
Site Location Exhibit

Source: Draft Southeast Gustine Master Plan, October 24, 2017, p.5 (Figure 1-1)



The Project also includes the proposed development of the property to be annexed, which includes approximately 758 homes and a 12-acre City park. The proposed land uses for the proposed annexation area are illustrated in **Figure 1**, and summarized in **Table 1.** Existing uses in the Project area that likely would not develop further primarily include two schools operated by the Gustine Unified School District. These two schools currently are connected to the City's water supply system and these are included in the City's existing water demand. While there is no "public water system" as statutorily defined, the City is the agency that will supply water for the Project utilizing its existing groundwater supply system.

Table 1
Project Anticipated Land Uses and Densities

General Plan Land Use Designation	Undeveloped Acres	Developed Acres	Anticipated Density
Low Density and Planned Development Residential (2-6 dwelling units per acre)	175.0	0	758 dwelling units total (4.33 units per acre)
Open Space/City Park	12.0	0	n/a
Two Existing Schools	0	32	n/a
TOTAL	**187.0**	**32**	n/a

Comparison of Existing Conditions and Project Conditions

The 219-acre Project area is currently dedicated to agricultural, rural residential, and school uses. A portion of the agricultural land is irrigated with canal water from CCID. This canal water will become unavailable to the Project site upon annexation to the City as CCID will require deannexation from the irrigation district. Historically, CCID canal water previously used by lands deannexed from the CCID are put to beneficial use elsewhere within the CCID boundaries. Consequently, canal water currently used in the Project site will be used elsewhere within CCID and replenish groundwater in similar amounts. As described above, development of the property to Project conditions at full build-out will require an additional 440 acre feet of groundwater annually, requiring additional water to be pumped from the aquifer each year. The purpose of the WSA is to demonstrate that the City has planned water supplies to meet the water demands associated with the Project, in addition to meeting the City's existing and planned future water demands projected for the next 20 years.

City's Current Water Supply System

The City's current water supply system is solely a groundwater-based system. In 2016, the City supplied 1,203 acre-feet of groundwater for its customers. The City's water supply system consists of four active wells, one stand-by well, a 75,000 gallon elevated storage tank, and the associated distribution system. Three of the four wells and the storage tank are automatically controlled and monitored by a SCADA system at the City's wastewater facility. Well 7 is not and operates on system pressure. The pumping capacity of the four active wells range from 500 to 2,200 gallons per minute (gpm). The system is fully interlinked so that a well in any location within the City can supply water to any other location within the City. All of the wells and the tank are automatically controlled and monitored by a SCADA system at City's wastewater plant. The City

monitors any groundwater contamination and cleanup of contamination occurs upon detection. Water quality from the City's four active wells meets all regulatory standards.[3]

In 2016, the City had 1,857 service connections. All but ten of the service connections are metered service connections. All new water connections of any type are metered by the City.

ELEMENTS OF A WATER SUPPLY ASSESSMENT

Does SB610 Apply to the Proposed Project? [Sections 10910(a) and 10912(a)(1)]

The City has determined that the Project is subject to the requirements of the California Environmental Quality Act (CEQA), California Public Resources Code §§21000 et seq. Consequently, the Project is subject to the SB610 provisions. For purposes of complying with SB610, Water Code §10912(a) provides that a "project" includes a residential development of 500 or more dwelling units. The proposed Project includes approximately 758 residential units at full build-out and therefore qualifies as a "project" as defined by Water Code §10912(a).

Who will Prepare the Water Supply Assessment? (Identify Responsible Public Water System or Lead Agency) [Section 10910(b)]

Often a "public water system" as defined in Water Code Section 10912(c) would prepare a water supply assessment. Such a water system means one that provides "piped water to the public for human consumption that has 3,000 or more service connections." Id. As noted above, the City has less than 2,000 service connections; consequently there is no "public water system" that meets the statutory definition that will provide water to the Project. Water C. § 10912(c). Even after full build-out of the Project, the City would still have fewer than the 3,000 service connections necessary to trigger a status as a public water system. In such an instance, the lead agency for the Project, is responsible for preparation of a water supply assessment. For the Project, therefore, the City must prepare the WSA. The City of Gustine – Community Development Department Planning Division has identified the City of Gustine - Public Works Water Department as the department responsible for the assessment.

Prior to preparation of this WSA, the City has consulted with Merced Local Agency Formation Commission pursuant to Water Code Section 10910(b). Other than the City, there are no entities serving domestic water supplies whose service area includes the Project site and there are no public water systems adjacent to the Project site, so no consultations with such entities are possible. Water Code Section 10910(b).

Was Project Subject to a Previous Assessment? [Section 10910(h)]

According to the City, the Project has not been subject of a previous water assessment that complied with the necessary provisions of law governing water supply assessments.

[3] Information from City Department of Public Works and Appendix 1 – City of Gustine Drinking Water Consumer Confidence Reports 2011-2015

Is There a Current Urban Water Management Plan? [Section 10910(c)]

According to the City, there is no current, adopted Urban Water Management Plan since the City does not meet the thresholds required for creation and adoption of such a plan. The City does not serve more than 3,000 customers or deliver more than 3,000 acre feet of water per year. According to statute, when there is no current Urban Water Management Plan, the City's WSA for the Project shall be prepared on available information and shall include a discussion with regard to whether the City's total projected water supplies available during normal, single dry, and multiple dry years during a 20-year projection will meet the projected water demand associated with the Project, in addition to the City's existing and planned future uses, including agricultural and manufacturing uses. Water Code Section 10910(c)(3). This required discussion largely is the subject of the rest of this WSA.

Water Supply Information in General and No Wholesale Water Supplies [Section 10910(d)]

Section 10910(d)(1) requires identification of existing water supplies by specifying water supply entitlements, water rights, or water service contracts relevant to the Project and a description of the quantities of water obtained by the City pursuant to these water supply entitlements, water rights, or water service contracts in previous years. The City does not currently receive wholesale supplies of water. The City does not currently receive surface water supplies from any sources. The water supply for the City is solely groundwater. This water supply has been used by the City since the City's inception. The Delta-Mendota groundwater subbasin is not adjudicated, and the City is not legally limited to a specific annual withdrawal. The City utilizes the groundwater by right as a groundwater appropriator. The City's Year 2002 Water Master Plan identified 2,400 afy as the groundwater supply available for the City.[4] This supply amount was derived from joint efforts undertaken by the City and the Central California Irrigation District evaluating Hydrogeologic conditions in the vicinity of the City.[5]

The City historically has been able to meet all water demands with available groundwater supplies from the Delta-Mendota subbasin. The City's historical water production from 2006 through 2016 is summarized in **Table 2** below.

Table 2[6]

Amount of Groundwater Pumped by City (AF-Y) 2006-2016

Basin Name	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Delta-Mendota Subbasin	1,330	1,466	1,338	1,043	1,163	1,156	1,260	1,271	1,149	1,054	1,203
Percent of Total Supply	100	100	100	100	100	100	100	100	100	100	100

See Section entitled "Gustine's Groundwater Water Supply" for the balance of the analysis of the City's groundwater supply source.

[4] "City of Gustine Year 2002 Water Master Plan," February 2003 (adopted March 3, 2003), Stoddard & Associates.
[5] "Groundwater Conditions in the Vicinity of the City of Gustine, California," September 2001, Kenneth D. Schmidt and Associates, pp 30-31.
[6] Data provided by City of Gustine Department of Public Works.

Water Demand for Project and Other Uses in City and Dry-Year(s) Demand [Section 10910(c)(3)]

This section analyzes water demand for the Project, for existing uses in the City, for planned future uses in the City over a 20-year period, and dry-year(s) demands.

Demand for Project.

A separate study was commissioned to analyze water demand for the Project.[7] See **Appendix 3**.
This WSA assumes that the land uses on the undeveloped land within the Project will be built-out in the 20-year time horizon of the WSA, and that the two existing public schools within the Project site will remain in the same use over the 20-year horizon. As noted previously, these two schools are connected to the existing City water supply system and thus are included in the City's existing water demand. Based upon those assumptions, the study of the hydrogeologic factors for the Project estimated the total water needs for the Project at build-out to be approximately 440 acre-feet per year, as summarized in **Table 3**.[8] This calculation of 440 acre feet per year was the base case for water demand and did not include any new measures or conditions that would reduce water demand. Consequently, it is the most conservative scenario for Project water supply.

Table 3
Water Demand for Project by Land Use Summary (AF-Y)

Land Use Designation	Anticipated DU or Acreage	Total Annual AF Demand
Low Density Residential[9]	758 du	390
Open Space/City Park	12 acres	50
Two Existing Schools	32 acres	n/a since included in Existing City demand
Total:	**n/a**	**440**

Demand for Existing City Uses.

The City's water demand for existing uses in the City conservatively is estimated to be 1,300 afy. This estimate is more than the average per year actually produced by the City from 2006 to 2016 as shown in Table 2. The average production over 2006 to 2016 was 1,221 af-y.

Demand for Planned City Uses Other Than Project Over 20 Years.

The City's estimated water demand for planned future uses over the next 20 years not included in the Project were derived from population growth projections provided by the City. Due to limitations on actual water service data, the City developed a proxy calculation for water use that uses residential connections as representative of water use by all land uses in the City. This calculation leads to a water demand for "residential" service connection of .76 a-f each year[9]. However each such "residential service connection" allocation of .76 a-f/year also accounts for non-residential growth in the City.

[7] See Appendix 2 (Schmidt 2017)
[8] Schmidt 2017, p. 33.
[9] See Appendix 3 (Osner 2017).

For example, since the Project contains 758 dwelling units with an annual demand of 440 acre-feet, the water demand for each dwelling unit in the Project is .58 a-f/year. The difference between this demand of .58 a-f/year and the .76 a-f/year ascertained as a proxy for all water demand in the City (.17 a-f/year) represents the increment of non-residential water demand projected by the City.

Based upon the population projections, the City estimates 638 additional residential service connections over the next twenty years.[10] The City also projects that "most new residential growth, with the exception of minor in-fill, over the 20-year horizon" will be within the Project area.[11] So, if 80% of the 20-year growth is within the Project area, the Project will account for 510 of the 638 new water service connections over the time period. At .76 a-f per year, the 20-year additional water demand for the City will be 484 a-f/year with about 387 a-f/year attributable to the Project and 97 a-f/year attributable to other growth.

Also, based upon the City's growth projections, the City does not believe the Project will build-out in twenty years. However, the WSA must account for full water supply for the entire Project over the twenty years. Consequently, the balance of the Project's growth – 20% of Project's 748 dwelling units, or 248 dwelling units - must be included in the twenty year projection. These are included at the .58 a-f/year estimated in the Project's hydrogeologic study. The Project's water supply thus is accounted for in two separate line items in the following tables. The line item entitled "Future City (Including 510 Project DUs)" accounts for 80% of the Project's 788 DUs that is addressed in the City's twenty year growth projection. The line item labeled "Balance of Project (248 DUs)" accounts for 20% of the Project's 788 DUs and address them within the twenty year timeframe as required by the statute (despite the projection by the City that the Project will not build-out over twenty years.) Together, these two line items include the Project's 440 a-f/year of water demand estimated by the Project's hydrogeologic study.

In addition to the water demand addressed above, the City also desired to account for re-use of a now vacant industrial site within the City limits. The city estimates if the former Beatrice Food Site were redeveloped with an industrial use, up to 200 a-f/year of water demand could arise. So, to account for growth projections with and without this additional single water user at the former Beatrice Foods plant, we have calculated two scenarios for future water demand in the City. Scenario 1 in **Table 4** does not include the potential industrial large water user. Scenario 2 in **Table 5** does include the potential industrial larger water user.

Table 4

Water Demand Totals for Existing City Uses, Planned City Uses and Project (AF-Y) – Scenario 1

Category of Demand	2010	2015	2017	2022	2027	2032	2037
Existing City as of 2017	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Future City (Including 510 Project DUs)	0	0	0	200	300	400	484
Balance of Project (248 DUs)	0	0	0	0	0	144	144
Total Water Demand:	**1,300**	**1,300**	**1,300**	**1,500**	**1,600**	**1,844**	**1,928**

[10] Osner 2017
[11] Osner 2017

Table 5
Water Demand Totals for Existing City Uses, Planned City Uses and Project (AF-Y) – Scenario 2 (Add One Large Industrial Water User)

Category of Demand	2010	2015	2017	2022	2027	2032	2037
Existing City as of 2017	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Future City (Including 510 Project DUs)	0	0	0	200	300	400	484
Future City One Large Water User	0	0	0	0	200	200	200
Balance of Project (248 DUs)	0	0	0	0	0	144	144
Total Water Demand:	**1,300**	**1,300**	**1,300**	**1,500**	**1,800**	**2,044**	**2,128**

Demand in Dry-Year(s).

During drought conditions, water demand often declines with the imposition of drought measures and customer conservation. For example, Schmidt 2017 noted a 17% decrease in water pumping by the City during the most recent drought.[12] Thus, one could project less water demand in Multiple-Dry years as usage declines. However, for a Single-Dry year, a conservative approach anticipates that the demand in a single-dry year would mirror a normal year. The dry years analysis for the two growth scenarios provided by the City are shown in **Table 6** for the first scenario and **Table 7** for the second scenario. The row in each table labeled "Total Water Demand" in each table is the estimate of that water demand in Normal and Single-Dry years. The row labeled "Adjusted for Multiple Dry-Years" assumes a 10% reduction in demand should the projected year fall within a series of multiple-dry years. This 10% reduction is less than the 17% reported by Schmidt 2017 in the most recent drought. However, to ensure conservative estimates, the sufficiency calculations in the WSA do not utilize this possible 10% reduction in demand during Multiple-Dry years but instead assume no decrease in demand during a series of Multiple Dry Years. These estimates are shown in the last rows of each table.

Table 6
Dry-Years Analysis for Water Demand Totals for Existing City Uses, Planned City Uses, and Project (AF-Y) – Scenario 1

Category of Demand	2010	2015	2017	2022	2027	2032	2037
Existing City as of 2017	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Future City (Including 510 Project DUs)	0	0	0	200	300	400	484
Balance of Project (248 DUs)	0	0	0	0	0	144	144
Total Water Demand:	**1,300**	**1,300**	**1,300**	**1,500**	**1,600**	**1,844**	**1,928**
Adjusted for Multiple Dry-Years:	**n/a**	**n/a**	**1,170**	**1,350**	**1,440**	**1,660**	**1,736**
Adjusted for Multiple Dry-Years if No Decrease in Demand:	**n/a**	**n/a**	**1,300**	**1,500**	**1,600**	**1,844**	**1,928**

[12] Schmidt 2017, p.21.

Table 7
Dry-Years Analysis for Water Demand Totals for Existing City Uses, Planned City Uses, and Project (AF-Y) – Scenario 2 (Add One Large Industrial Water User)

Category of Demand	2010	2015	2017	2022	2027	2032	2037
Existing City as of 2017	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Future City (Including 510 Project DUs)	0	0	0	200	300	400	484
Balance of Project (248 DUs)	0	0	0	0	0	144	144
Future City One Large Water User	0	0	0	0	200	200	200
Total Water Demand:	**1,300**	**1,300**	**1,300**	**1,500**	**1,800**	**2,044**	**2,128**
Adjusted for Multiple Dry-Years:	**n/a**	**n/a**	**1,170**	**1,350**	**1,620**	**1,840**	**1,915**
Adjusted for Multiple Dry-Years if No Decrease in Demand:	**n/a**	**n/a**	**1,300**	**1,500**	**1,800**	**2,044**	**2,128**

Gustine's Groundwater Water Supply [Section 10910(f)]

Since groundwater is the City's source of water supply, specific groundwater information must be included in the assessment pursuant to the statute as follows:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project. [Section 10910(f)(1)]

As noted above, the City has not adopted an Urban Water Management Plan ("UWMP") so there is no such UWMP information to review for this WSA.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition. [Section 10910 (f)(2)]

Description of Basin

The local groundwater basin is referred to as the Delta-Mendota Groundwater Basin. According to Bulletin No. 118 of the California Department of Water Resources (DWR), the Delta-Mendota Groundwater Basin (groundwater sub basin number: 5-22.07) is a sub basin of the San Joaquin Valley Groundwater Basin. According to the Bulletin, the boundaries of the Delta-Mendota basin are generally described as:

> …bounded on the west by the Tertiary and older marine sediments of the Coast Ranges, and on the north by the Stanislaus/San Joaquin county line. The eastern boundary follows the San Joaquin River to Township 11 S,

> where it jogs eastward and follows the eastern boundary of Columbia Canal Company to the San Joaquin River, then follows the Chowchilla Bypass and the eastern border of Farmer's Water District. It then trends southerly through Township 14S Range 15E on the eastern side of Fresno Slough, then follows the Tranquility ID boundary to its southern extremity. Heading northward, it follows the eastern, northern, and northwestern boundary of San Joaquin Valley – Westside Groundwater Subbasin (corresponding with Westlands Water District boundaries).

The Bulletin notes that average annual rainfall in the basin is nine to eleven inches.

The water bearing formations of the Delta-Mendota Basin are described in Bulletin 118:

> The geologic units that comprise the ground water reservoir in the Delta-Mendota subbasin consist of the Tulare Formation, terrace deposits, alluvium, and flood-basin deposits. The Tulare Formation is composed of beds, lenses, and tongues of clay, sand, and gravel that have been alternately deposited in oxidizing and reducing environments (Hotchkiss 1971). The Corcoran Clay Member of the formation underlies the basin at depths ranging about 100 to 500 feet and acts as a confining bed (DWR 1981).
>
> Terrace deposits of Pleistocene age lie up to several feet higher than present streambeds. They are composed of yellow, tan, and light-to-dark brown silt, sand, and gravel with a matrix that varies from sand to clay (Hotchkiss 1971). The water table generally lies below the bottom of the terrace deposits. However, the relatively large grain size of the terrace deposits suggests their value as possible recharge sites.
>
> Alluvium is composed of interbedded, poorly to well-sorted clay, silt, sand, and gravel and is divided based on its degree of dissection and soil formation. The flood-basin deposits are generally composed of light-to-dark brown and gray clay, silt, sand, and organic materials with locally high concentrations of salts and alkali. Stream channel deposits of coarse sand and gravel are also included.
>
> Groundwater in the Delta-Mendota subbasin occurs in three water-bearing zones. These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits, and a shallow zone which contains unconfined water within about 25 feet of the land surface (Davis 1959).
>
> The estimated specific yield of this subbasin is 11.8 percent (based on DWR San Joaquin District internal data and Davis 1959). Land subsidence up to about 16 feet has occurred in the southern portion of the basin due to artesian head decline (Ireland 1964).

According to the Bulletin, no restrictive structures to groundwater flow:

> Groundwater flow was historically northwestward parallel to the San Joaquin River (Hotchkiss 1971). Recent data (DWR 2000) show flow to the north and eastward, toward the San Joaquin River. Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin.

Groundwater levels in the Basin lower and recover in a robust manner:

> Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by quarter township and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has increased by 2.2 feet from 1970 through 2000. The period from 1970 through 1985 showed a general increase, topping out in 1985 at 7.5 feet above the 1970 water level. The nine-year period from 1985 to 1994 saw general declines in groundwater levels, reaching back down to the 1970 groundwater level in 1994. Groundwater levels rose in 1995 to about 2.2 feet above the 1970 groundwater level. Water levels fluctuated around this value until 2000.

The Basin constitutes a very large reservoir of fresh water:

> Estimations of the total storage capacity of the subbasin and the amount of water in storage as of 1995 were calculated using an estimated specific yield of 11.8 percent and water levels collected by DWR and cooperators. According to these calculations, the total storage capacity of this subbasin is estimated to be 30,400,000 af to a depth of 300 feet and 81,800,000 af to the base of fresh groundwater. These same calculations give an estimate of 26,600,000 af of groundwater to a depth of 300 feet stored in this subbasin as of 1995 (DWR 1995). According to published literature, the amount of stored groundwater in this subbasin as of 1961 is 51,000,000 af to a depth of < 1,000 feet (Williamson 1989).

Some information on a groundwater budget were provided in the Bulletin:

> Although a detailed budget was not available for this subbasin, an estimate of groundwater demand was calculated based on the 1990 normalized year and data on land and water use. A subsequent analysis was done by a DWR water budget spreadsheet to estimate overall applied water demands, agricultural groundwater pumpage, urban pumping demand and other extraction data.
>
> Natural recharge is estimated to be 8,000 af. Artificial recharge and subsurface inflow are not determined. Applied water recharge is approximately 74,000 af. Annual urban and agricultural extractions

> estimated to be 17,000 af and 491,000 af, respectively. Other extractions are approximately 3,000 af, and subsurface outflow is not determined.

Status of Adjudication and Overdraft Condition

Neither the Delta-Mendota Subbasin nor the San Joaquin Valley Basin of which the subbasin is a part have been adjudicated. The Delta-Mendota Subbasin was identified as in critical overdraft by the Department of Water Resources in January 2016.[13] **Table 8** shows the Department of Water Resources list of critically overdrafted basins as of 2016. **Figure 3** depicts the Delta-Mendota Subbasin, Basin No. 5.22.07 as critically overdrafted as are all but 2 subbasins in the San Joaquin Valley. As shown in **Table 9**, the Delta-Mendota Subbasin is the largest subbasin by geographic size in the San Joaquin River Hydrologic Region comprising 747,000 acres. So, despite this critical overdraft designation, the enormous size of the subbasin creates different groundwater conditions in different locations of the subbasin. For example, a 2015 study analyzing the Delta-Mendota Subbasin analyzed in detail twelve sub-areas.[14] While two of the twelve sub-areas showed some indications of an overdraft condition, ten did not.[15] The two potentially overdrafted sub-areas were not near the Gustine vicinity sub-area (Sub-Area B.) And the "small amounts of overdraft" (in these two remote sub-areas) "has been counter-balanced by water-level rises in other parts" of the sub-basin.[16] Groundwater flows in both the upper and lower aquifers have greatly exceeded groundwater inflows… (which) is indicative of hydrologically balanced area, not a critically overdrafted area."[17] Finally, "…a thorough examination of long-term water-level trends over several hydrologic periods indicates no net water-level decline."[18]

A specific review by this study of Gustine's Sub-Area B in two hydrologic periods showed no groundwater declines. In the first period studied,

> Hydrographs for 36 wells indicated no long-term water-level changes or rising water levels. Hydrographs for only two wells indicated long-term declines. These declines were more than balanced by the 11 wells that had long-term water-level rises.[19]

In the second hydrologic period covering the years 1963-2013 only two of 28 wells showed long-term decline. The other 26 wells "indicated long-term either stable water levels or water-level rises."[20] This second time period is considered to be a conservative analysis because the "base period is somewhat biased because of the dry areas near the end of it." However, the period was included to provide updated information as of 2015.[21] In any case, Gustine's Sub-Area B did not show any overdraft condition. This

[13] Bulletin 118, Interim Update 2016, California Department of Water Resources, December 22, 2016, pp. 11-12.
[14] Schmidt 2015, pp. 6-9, 11-23.
[15] Schmidt 2015, pp. 10, 24.
[16] Schmidt 2015, p. 25
[17] Schmidt 2015, p. 31
[18] Schmidt 2015, p. 31
[19] Schmidt 2015, p. 12
[20] Schmidt 2015, p. 14
[21] Schmidt 2015, p.13, 24.

Table 8
Critically Overdrafted Basins (1/2016)

Source: DWR, 2016

Groundwater Basins Subject to Critical Conditions of Overdraft– January 2016

Basin Number[a]	Basin/Subbasin Name[a]
3-1	Soquel Valley
3-2	Pajaro Valley
3-4.01	180/400-Foot Aquifer
3-4.06	Paso Robles Area
3-8	Los Osos Valley
3-13	Cuyama Valley
4-4.02	Oxnard
4-6	Pleasant Valley
5-22.01	Eastern San Joaquin
5-22.04	Merced
5-22.05	Chowchilla
5-22.06	Madera
5-22.07	Delta-Mendota
5-22.08	Kings
5-22.09	Westside
5-22.11	Kaweah
5-22.12	Tulare Lake
5-22.13	Tule
5-22.14	Kern County
6-54	Indian Wells Valley
7-24	Borrego Valley

a As identified and delineated in Bulletin 118, *California's Groundwater,* Update 2003.

Figure 3
Critically Overdrafted Groundwater Basins – January 2016 – North Central and South Central Regions

Source: DWR January 1, 2016

Table 9
Acreage Totals of Groundwater Subbasins in the San Joaquin Hydrologic Region

Source: DWR 2003b, p. 173

Table 30 San Joaquin River Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
5-22	SAN JOAQUIN VALLEY									
5-22.01	EASTERN SAN JOAQUIN	707,000	A	1,500	-	345	69	540	310	30 - 1,632
5-22.02	MODESTO	247,000	B	4,500	1000-2000	230	15	209	60-500	200-8300
5-22.03	TURLOCK	347,000	B	4,500	1000-2000	307	0	163	200-500	100-8300
5-22.04	MERCED	491,000	B	4,450	1500-1900	378	0	142	200-400	100-3600
5-22.05	CHOWCHILLA	159,000	B	4,750	750-2000	203	0	28	200-500	120-6400
5-22.06	MADERA	394,000	B	4,750	750-2000	378	0	127	200-400	100-6400
5-22.07	DELTA-MENDOTA	747,000	B	5,000	800-2000	816	0	120	770	210-86,000
5-22.15	TRACY	345,000	C	3,000	500-3,000	18	14	183	1,190	210-7,800
5-22.16	COSUMNES	281,000	A	1,500	-	75	13	72	218	140-438
5-69	YOSEMITE VALLEY	7,500	C	1,200	900	0	0	3	54	43-73
5-70	LOS BANOS CREEK VALLEY	4,840	C	-	-	0	0	0	-	-

gpm - gallons per minute
mg/L - milligram per liter
TDS -total dissolved solids

conclusion was confirmed in the current hydrogeologic study for the Project. This study summarized the lack of overdraft as follows:

> Groundwater beneath and in the vicinity of Gustine is not in a state of overdraft. Rather, water levels are shallow and the surrounding area is considered an agricultural drainage problem area.[22]

The hydrogeologic study detailed the condition of the Delta-Mendota Subbasin in the Gustine vicinity as follows:

> The City is in the Delta-Mendota Sub-basin (Basin 5-2207). Studies prepared for the CCID and San Joaquin River Exchange Contractors (SJREC) Water Authority indicate that their service areas west of the San Joaquin River are not in a state of groundwater overdraft. KDSA (2015) documented the situation in a report on groundwater overdraft in the Delta-Mendota Sub-basin. Instead, there are several agricultural drainage problem areas present, including in the Gustine Drainage District, which generally surrounds the City of Gustine. Water logging of shallow soils has required drainage well pumpage and the installation of tile drains to mitigate this. The California Department of Water Resources (DWR) subsequently determined that the sub-basin was in a critical state of overdraft. However, that determination doesn't influence groundwater conditions beneath and near Gustine. There is no evidence of groundwater overdraft in the CCID service area, the Gustine Drainage District, or the City of Gustine.[23]

These results compare with historical experience in the vicinity of the City where groundwater levels have been high. For example, the city limits of Gustine are within the boundaries of the Gustine Drainage District. This special district was formed in 1937 to collect, control and discharge groundwater within its boundaries.[24] High groundwater levels have been a persistent feature in the City and its vicinity.

<u>Current Groundwater Management Efforts in the Subbasin and Under New State Law.</u>

The Delta-Mendota Subbasin has been subject to various groundwater management efforts. The City has cooperated in some of these efforts, especially those conducted by the Central California Irrigation District. However, the City has not been an official participant in these efforts. These groundwater management efforts are summarized in Appendix 3 to the Schmidt 2017 report attached to this WSA.

While the groundwater conditions in the City's locale indicate relatively abundant groundwater supplies, the designation of the larger Delta-Mendota Subbasin as in critical overdraft means that the subbasin is a priority for implementation of the Sustainable Groundwater Management Act of 2014 ("SGMA.") Consequently, groundwater sustainability agencies must be established for the Delta-Mendota Subbasin by June 30, 2017 and a groundwater sustainability plan, or its equivalent, must be in place by January 31, 2020. Under SGMA, the city formed a groundwater sustainability agency ("GSA") at its March 21, 2017 City Council meeting. The

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[22] Schmidt 2017, p.v.
[23] Schmidt 2017, pp.36-37.
[24] EPS 2009, pp. 11-13.

City's GSA is responsible for developing the groundwater sustainability plans which will be in place by 2020. So, despite the City's small size which has never triggered an UWMP, the new SGMA regime will allow the City to have a groundwater sustainability plan in place within three years.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system for the past five years from any groundwater basin from which the proposed project will be supplied. [Section 10910 (f)(3)]

The Project will be supplied from the Delta-Mendota Subbasin. The City's historical groundwater production from the Delta-Mendota Subbasin for the previous five years is summarized in **Table 10** below.

Table10[25]
Amount of Groundwater Pumped by City Last 5 Years (AF-Y)

Basin Name	2012	2013	2014	2015	2016
Delta-Mendota Subbasin	1,260	1,271	1,149	1,054	1,203
Percent of total supply	100	100	100	100	100

The groundwater pumped by the City is from City Wells No. 4B, 5, 6, and 7. The location of the wells shown on **Figure 4**.

The source capacity for the wells is detailed in **Table 11**.

Table 11[26]
Source Capacity of City Water Supply Wells

Well No.	Source Capacity (gpm)
4B	500
5	2,200
6	900
7	650

The City historically has relied on the Delta-Mendota Subbasin to meet its water needs.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system from any basin from which the proposed project will be supplied. [Section 10910(f)(4)]

The Project water demands of approximately 440 acre-feet annually at build-out will be met using groundwater. The City currently exercises and will continue to exercise its rights as a groundwater appropriator to extract groundwater from the groundwater basin underlying the City for delivery to the Project and its other existing and future customers. While the Project may not build-out over twenty years

[25] Data provided by City of Gustine Department of Public Works.
[26] Water Permit 2014, see p. 2 of Engineering Report ; Schmidt 2017, p.10.

according to City growth projections, the City would pump sufficient additional amounts of groundwater from 2022 to 2037 if the Project did build-out over this period. Such potential future groundwater pumping is summarized in **Table 12** below for the Project.

Table 12
Future Groundwater Pumping for Project (AF-Y)

Basin Name	2022	2027	2032	2037
Delta-Mendota Subbasin	210	320	440	440
Percent of total supply	100	100	100	100

In addition to the four active City wells locations of which are shown in **Figure 4,** another well will be developed in the Project site generally in the location of the Project's park as shown in **Figure 5**. A second new well may be needed for the twenty-year growth estimate utilized in this WSA and would be provided and located pursuant to the City's Water Master Plan. Thus, the precise location of a second future well is unknown other than the generalized location advice provided in City studies.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. [Section 10910 (f)(5)]

The projected water demand associated with build-out of the Project by year 2037 plus existing City uses and planned future City uses over that time period will be met by groundwater from the Delta-Mendota Subbasin. This groundwater supply will be sufficient for this increased demand as detailed in this section.

The City provided two growth scenarios to estimate water demand from the Project, the existing City, and planned future City users over 20 years other than the Project.

For the first growth scenario detailed above, the City projects to pump the amounts of groundwater from 2022 to 2037 for a combination of the Project, existing City uses, and future City uses not included in the Project as is shown in **Table 13** below. This projection assumes buildout of the Project by 2037 and additional City growth outside the Project area corresponding to the projected City growth rate.

Table 13
Future Groundwater Pumping for Project, Existing City Uses and Future City Uses Other than Project (AF-Y) – Scenario 1

Basin Name	2022	2027	2032	2037
Delta-Mendota Subbasin	1,500	1,600	1,700	1,928
Percent of total supply	100	100	100	100

Figure 4
Location of Existing City Wells

Source: Schmidt 2017, p. 2

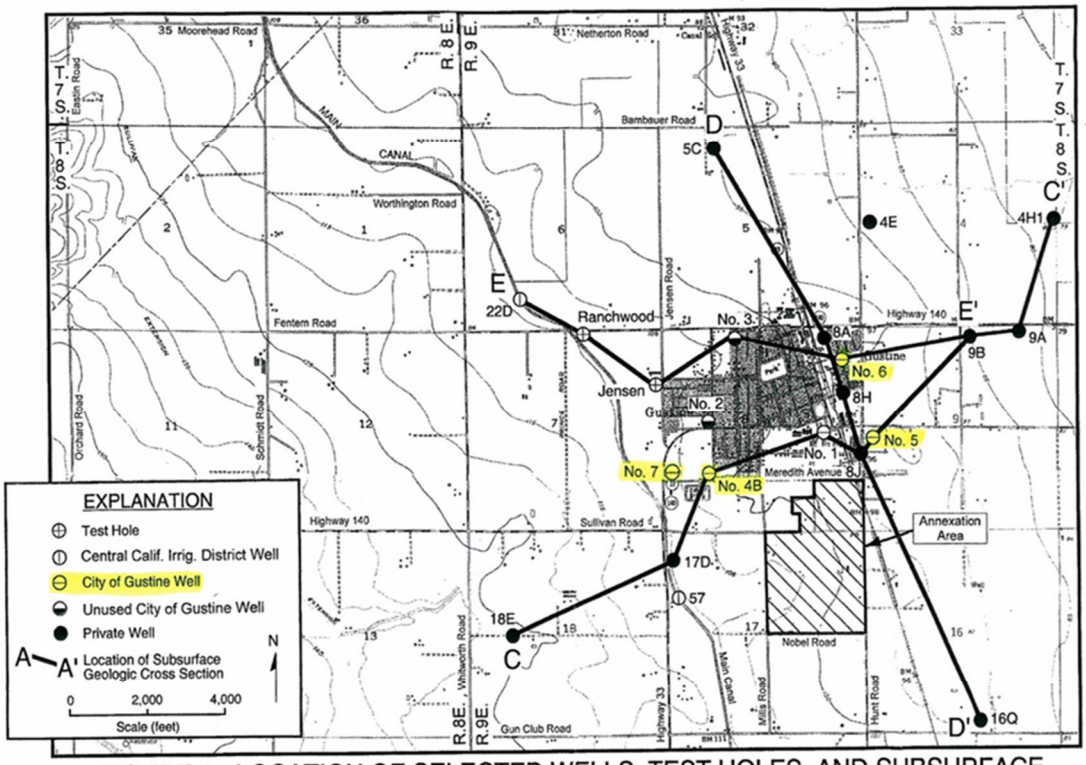
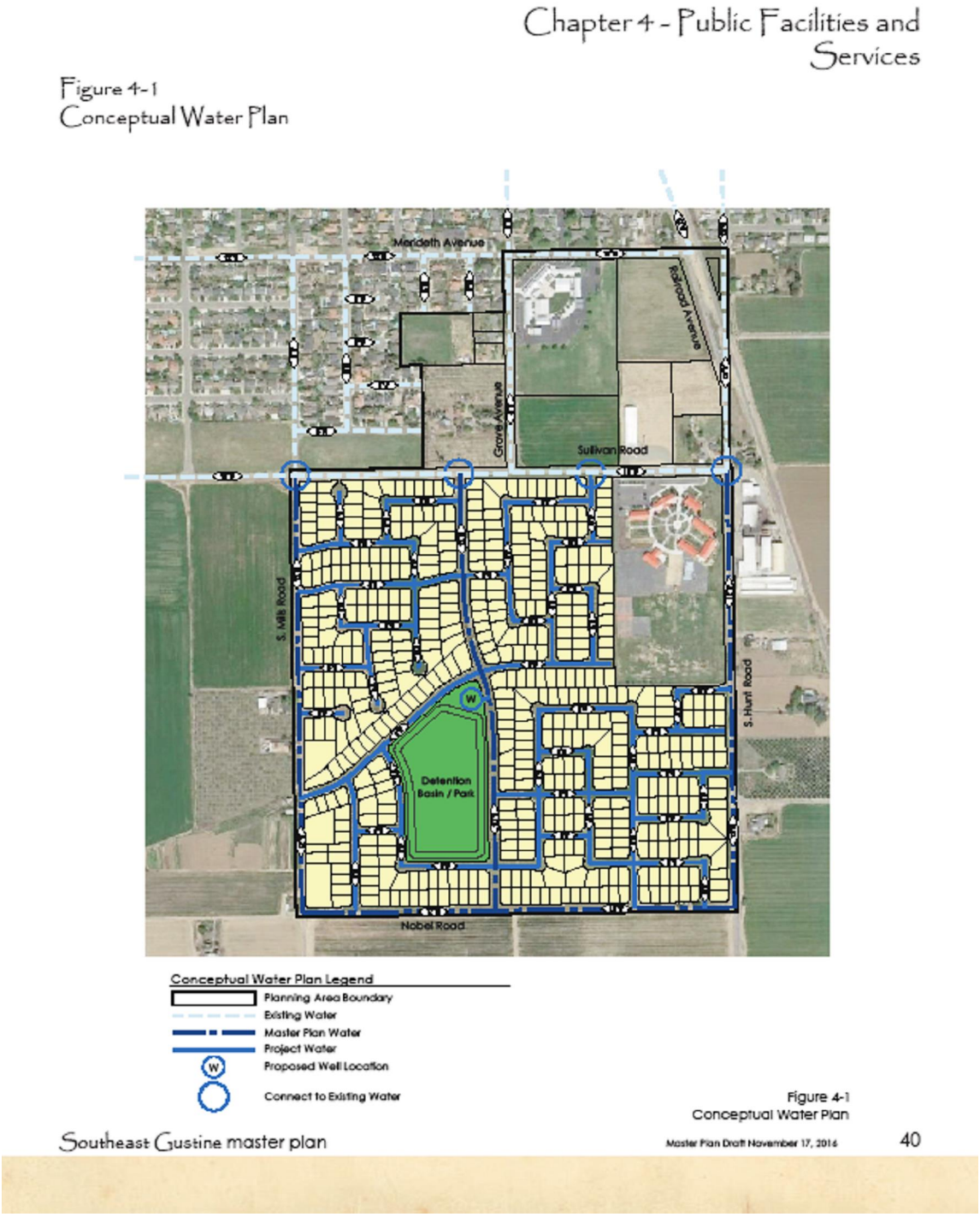


FIGURE 1 - LOCATION OF SELECTED WELLS, TEST HOLES, AND SUBSURFACE GEOLOGIC CROSS-SECTIONS

Figure 5
Proposed Location of New City Well to be Installed by Project

Source: Draft Southeast Gustine Master Plan, October 24, 2017, p. 40 (Figure 4-1)



For the second growth scenario described above, the City projects to pump the amounts of groundwater from 2022 to 2037 for a combination of the Project, existing City uses and future City uses not included in the Project as is shown in **Table 14** below. This projection assumes buildout of the Project by 2037 but included additional City growth higher than that anticipated in the first growth scenario in the form of an additional large industrial water user reutilizing the former Beatrice Foods site.

Table 14
Future Groundwater Pumping for Project, Existing City Uses and Future City Uses Other than Project (AF-Y) – Scenario 2 (Add One Large Industrial Water User)

Basin Name	2022	2027	2032	2037
Delta-Mendota Subbasin	1,500	1,800	1,900	2,128
Percent of total supply	100	100	100	100

The City's 2002 Water Master Plan identified 2,400 afy as the available groundwater supply for the City. The City can continue to provide potable water to future development up to this amount. This requires the drilling of at least one and perhaps two more wells in order to meet water demands. Also required is expanding the existing conveyance infrastructure to deliver water to future project areas and anticipated in the Master Plan. Beyond that amount, the Master Plan recommended pursuing additional supplies such as surface water. However, the 2,400 afy of groundwater is sufficient for the City's existing uses and 20-year planned development of the City both from the buildout of the Project and additional projected growth of the City under both growth scenarios analyzed.

The sufficiency of this groundwater supply over a longer-period of time than was anticipated in the City's 2002 master plan appears to be partially due to the reduction of growth rates in the City caused by the real estate recession of 2007 to 2009 and its aftermath.[27] From 2000 to 2010 the City's population growth averaged about 1.97%. From 2010 to 2017 this rate fell to an average of about 0.9%, or about half the 2000-2010 rate. Further, in 2001, the City extracted 1,371 af of groundwater for use in its water system. Despite the City population increasing from 4,609 persons in 2000 to 5,761 in 2015 (an increase of about 25%), the groundwater extracted by the City in each year between 2011 to 2016 was less than the 1,371 af of 2001, reflecting a reduction in the gross per-capita rate of use.

As noted above, the hydrogeologic study for the Project concludes that the groundwater levels in the vicinity of the City are robust. As that study indicated:

> Overall, there is no indication of groundwater overdraft in or near Gustine. In fact, the shallow groundwater levels are considered a problem in the surrounding irrigated areas. The evidence for this is the existence and ongoing activities of the Gustine Drainage District, which was developed to address this problem.[28]

[27] See National Bureau of Economic Research, Inc., U.S. Business Cycle Expansions and Contractions, accessed May 2, 2017 at www.nber.com/cyclesmain.html.
[28] Schmidt 2017, p. 18.

Consequently, despite the Project resulting in moderately lower groundwater levels in the vicinity of the Project, the hydrogeologic study for the Project concludes that the Project would be beneficial as to water supply resources for the City:

> Overall, development of the annexation area as proposed would result in lower groundwater levels, which is considered beneficial, because of shallow groundwater levels in the area. The Project would result in less consumptive use in the Delta-Mendota Groundwater Basin, which would also be beneficial.[29]

The groundwater from the basin is sufficient to meet the water demand from the Project, the existing City and other growth in the City over the next 20 years. Further confirmation is detailed in the next section of this WSA.

DETERMINATION OF SUFFICIENCY [Section 109109(c)(3)]

As has been noted, the City does not have an urban water management plan. Consequently to determine the sufficiency of water supply, this WSA discusses whether the City's total projected water supplies available during a normal year, a single-dry year, and multiple-dry years during the 20 years between today and 2037 will meet the projected water demand associated with:

> (1) the Project; in addition to: (2) the City's existing uses, and (3) the City's planned future uses for the 20-year time period.

As has been shown, the City's water supply is 2,400 acre-feet per year of groundwater that is accessible to the City through expansion of its existing water supply system. **Table 15** shows the comparison in a normal year between this supply and the increasing projected demands that have been estimated in this WSA. In summary, demand does not outstrip supply in the years from 2022 to 2037.

Table 15
Water Supply and Demand Comparison (AF-Y)
Normal Year

Item	**2010** (ac-ft/yr)	**2015** (ac-ft/yr)	**2017** (ac-ft/yr)	**2022** (ac-ft/yr)	**2027** (ac-ft/yr)	**2032** (ac-ft/yr)	**2037** (ac-ft/yr)
Supply totals	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Demand totals	1,300	1,300	1,300	1,500	1,800	1,900	2,128
Difference (supply minus demand)	1,100	1,100	1,100	900	600	500	272
Difference as a percent of supply	46%	46%	46%	38%	25%	21%	11%
Difference as a percent of demand	85%	85%	85%	60%	33%	26%	13%

Likewise, supply keeps up with demand in any projected single dry year from 2022 to 2037. Since the City has a sole source of water and since no discernable difference is anticipated in single-dry year demand

[29] Schmidt 2017, p.v.

versus normal year dry-year demand, the information provided in **Table 16** is the same as **Table 17**.

Table 16
Water Supply and Demand Comparison (AF-Y)
Single Dry Year

Item	2010 (ac-ft/yr)	2015 (ac-ft/yr)	2017 (ac-ft/yr)	2022 (ac-ft/yr)	2027 (ac-ft/yr)	2032 (ac-ft/yr)	2037 (ac-ft/yr)
Supply totals	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Demand totals	1,300	1,300	1,300	1,500	1,800	1,900	2,128
Difference (supply minus	1,100	1,100	1,100	900	600	500	272
demand)	46%	46%	46%	38%	25%	21%	11%
Difference as a percent of supply	85%	85%	85%	60%	33%	26%	13%
Difference as a percent of demand							

For multiple-dry years, two different estimates are shown. Both estimates are shown for the last years of the 20-year projections to test the availability of water in the out-years since those years have the highest projected demand over the twenty-year horizon. The first set of estimates in **Table 17** assume a 10% reduction in demand associated with drought-like conditions in multiple-dry years. As shown in an earlier section of the WSA, this assumption is supported by the most recent drought experience in the City.

Table 17
Water Supply and Demand Comparison (AF-Y)
Multiple Dry Years (Period Ending in 2037)

Item	2033 (ac-ft/yr)	2034 (ac-ft/yr)	2035 (ac-ft/yr)	2036 (ac-ft/yr)	2037 (ac-ft/yr)
Supply totals	2,400	2,400	2,400	2,400	2,400
Demand totals	1,755	1,800	1,845	1,890	1,915
Difference (supply minus demand)	645	600	555	510	485
Difference as a percent of supply	27%	25%	23%	21%	20%
Difference as a percent of demand	37%	33%	30%	27%	25%

To test a worst-case scenario, this WSA will not assume any demand reductions in multiple-dry years as was estimated in **Table 17**. Instead, **Table 18** utilizes unadjusted multiple-year water demands for 2032 through 2037 unadjusted for any reduced demand due to drought. Instead, it assumes the higher normal year demands. Even with these demands, water supply remains sufficient through the multiple dry years.

Table 18
Water Supply and Demand Comparison (AF-Y)
Multiple Dry Years (Period Ending in 2037)

Item	2033 (ac-ft/yr)	2034 (ac-ft/yr)	2035 (ac-ft/yr)	2036 (ac-ft/yr)	2037 (ac-ft/yr)
Supply totals	2,400	2,400	2,400	2,400	2,400
Demand totals	1,950	2,000	2,050	2,100	2,128
Difference (supply minus demand)	450	400	350	300	272
Difference as a percent of supply	19%	17%	15%	13%	11%
Difference as a percent of demand	23%	20%	17%	14%	13%

The City's groundwater supply is determined to be sufficient in all three scenarios required to be analyzed in the WSA for the Project, plus the City's existing uses and its planned future uses over the 20-year time horizon. The steadiness of the City's water supply is due to the resilience of the groundwater supply in the Gustine locale. Although groundwater levels do decline at a greater rate during drought periods, the annual quantity of groundwater available does not significantly vary up or down in relation to wet or dry years. The reliability generally does not change due to seasonal or climatic shortages when groundwater is a water source in a locale such as Gustine.

The estimated year 2037 water supply available in average, single, dry, and multiple dry years is presented in **Table 18**. As shown in **Table 19**, the sustainable water supply is adequate to meet projected demands during multiple dry years.

Table 19
Water Supply Reliability for 2037

	Normal year (ac-ft/yr)	**Single dry year** (ac-ft/yr)	**Multiple-dry years**		
			Year 1 (ac-ft/yr)	**Year 2** (ac-ft/yr)	**Year 3** (ac-ft/yr)
Groundwater	2,400	2,400	2,400	2,400	2,400
Total	2,400	2,400	2,400	2,400	2,400
Percent of normal year supply	100%	100%	100%	100%	100%

The City's total projected water supplies available during normal, single dry and multiple dry water years during a 20-year projection will meet the projected water demand associated with the Project in addition to existing and planned future uses. Based upon the analysis undertaken by the City in this WSA, the City has concluded that it can provide potable water to future development of the Project plus existing and other planned development in the City over the 20-year period. In light of this determination, the City is not required to develop plans for acquiring additional supplies pursuant to Water Code section 10911.

In addition to this showing of reliability over the 20-year time horizon, the Project's hydrogeologic study discusses additional benefits of the Project to groundwater supply. First, the consumptive use of the Project (150 AC-Y) is less than the current agricultural uses in the Project area (285 AC-Y). "The total consumptive use for the residential use and park would be 155 acre-feet, or 130 acre-feet per year less than for the pre-project."[30] Second, the irrigation water provided currently by the Central California Irrigation District (CCID) would be put to use in other portions of the subbasin since the CCID requires de-annexation from the district when land is annexed to the City.[31] In 2016, CCID delivered 320 AF to the Project area.[32] "In terms of the present CCID service area, the Project would be beneficial in that the consumptive use would be less than the existing (condition)."[33]

The hydrogeologic study confirms the continuing viability of the groundwater for the Project.

[30] Schmidt 2017, pp. 31, 33, 35.
[31] Schmidt 2017, p. 30.
[32] Schmidt 2017, p. 32.
[33] Schmidt 2017, p. 39.

Over the long-term, the City pumpage for the Project will be sustainable. A multiple dry year situation occurred through 2016, and is considered the most severe of record. City pumpage was readily maintained. The water demand was lower due to the state mandated conservation measures, which are likely to be re-instated during future drought periods. There is no evidence of long-term water-level declines for the upper or lower aquifer at Gustine. Because of the shallow groundwater levels and substantial recharge in the area, the pumpage for the proposed project will be sustainable, even during a prolonged, multi-year drought.

FINAL ASSESSMENT ACTIONS FOR LEAD AGENCY [Section 10911(b), (c)]

The City shall include this WSA in the Project's EIR. This WSA concludes that the City's water supplies will be sufficient for the Project in addition to other existing and planned City uses for a twenty-year period through 2037. The City shall review and make a final assessment and determination of this matter in its role as lead agency for the Project.

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