APPENDIX C

WATER SUPPLY ASSESSMENT

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City of Clovis

Water Supply Assessment

Tract 6343

Northwest Sphere of Influence Expansion Area

December 2022

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City of Clovis

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Abbreviations

AF ..... acre-feet
AFY ..... acre-feet per year
City ..... City of Clovis
County ..... Fresno County
CVP ..... Central Valley Project
CWC ..... California Water Code
FID ..... Fresno Irrigation District
GP ..... General Plan
GWD ..... Garfield Water District
IWD ..... International Water District
KRWA ..... Kings River Water Association
MDR ..... Medium Density Residential
MGD ..... million gallons per day
MHDR ..... Medium High Density Residential
NKGSP ..... North Kings Groundwater Sustainability Plan
RWRF ..... Regional Water Reclamation Facility
SOI ..... sphere of influence
SRF ..... Single-Family Residential
SWTP ..... City of Clovis Surface Water Treatment Plant
USBR ..... US Bureau of Reclamation
UWMP ..... City of Clovis Urban Water Management Plan
WDF ..... Water Demand Factors
WMP ..... City of Clovis, Draft Water Master Plan Update, Phase III
WRF ..... City of Clovis Sewage Treatment/Water Reuse Facility
WSA ..... Water Supply Assessment
WSCP ..... Water Shortage Contingency Plan

1 Introduction

1.1 Purpose and Need for the Water Supply Assessment

California Water Code (CWC) §10912(a) requires preparation of a Water Supply Assessment (WSA) meeting the requirements of CWC §10910 et seq for projects within cities and counties that meet one of several water demand triggers, or the equivalent. These triggers include construction of 500 or more residential units, construction of a shopping center or business establishment having 500,000 square feet of floor space, construction of a commercial office building having more than 250,000 square feet, a proposed hotel or motel having more than 500 rooms, or another project having a water demand equivalent to or greater than the 500-unit development.

This WSA evaluates the adequacy of available water supplies for the proposed Tentative Tract Map No. 6343 (Tract 6343), located in the City of Clovis, Fresno County, California. The Project would entail the development of 590 single-family residential lots, which is greater than the "500 residential units" trigger; therefore, a WSA is required. The City of Clovis operates the water system to which the Project proposes to connect. This water system meets the standards for a "Public Water System" as set forth in CWC §10912(c); the City is therefore responsible for preparation of the required WSA in accordance with CWC §10910(b).

This WSA discusses the estimated water demands and water supply for the proposed Project. The Project is located in Fresno County (County), adjacent to the City of Clovis (City) limits; the area will be annexed as part of the Project's progress and the entire Project will be supplied water from the City.

1.2 Reliance on a Related Urban Water Management Plan

If the Project falls within the boundaries of a current Urban Water Management Plan (UWMP) prepared by the water purveyor, CWC §10910(c)(1) requires that the WSA determine whether projected water demand associated with the Project is included as part of that duly adopted UWMP.

The 2020 Clovis UWMP covers the SOI for the City. This Project lies within the area north of Shepherd, west of Sunnyside Avenue, within the City's SOI (Provost & Pritchard Consulting Group, 2021). Thus, in accordance with the CWC, the preparers have relied on information from the UWMP wherever possible in preparing the various elements of this Assessment.

1.3 Document Organization

This WSA is organized as follows:

- *Section 2 describes the Project and its location.*
- *Section 3 describes the Project's potable and non-potable water demands in addition to those of other existing and planned uses, and how these vary from the numbers used in the UWMP.*
- *Section 4 provides an overview of the City's primary water supplies.*

- *Section 5 discusses the adequacy of water supplies during normal years.*
- *Section 6 discusses the adequacy of water supplies during single-dry and multiple-dry years.*
- *Section 7 discusses operational reliability on a daily basis.*
- *Section 8 concludes whether supplies would be adequate during normal, dry-year, and multiple-dry years during a 20-year projection.*
- *Section 9 lists references cited in this WSA.*

2 Project Description

2.1 Project Location and Setting

The City limits currently encompasses 25.9 square miles. The City's Sphere of Influence (SOI) covers 34.9 square miles, while the City's General Plan (GP) encompasses approximately 74.3 square miles. The City's General Plan (Placeworks, 2014) identified three Urban Centers to focus growth, including Loma Vista, the Northwest area, and the Northeast area; this Project lies within the Northwest area. **Figure 2-1** identifies the location of the Project in relation to the surrounding Clovis/Fresno region.

The Project would entail development of 590 single-family residential lots on approximately 71.5 gross acres in the Northwest Village. The Project is a proposed Medium High Density Residential (MHDR) development with associated neighborhood green space. The Project site includes 71.5 gross acres bounded by Perrin Avenue and the Enterprise Canal to the south, Behymer Avenue to the north, the Enterprise Canal to the west, and Baron Avenue to the east. The Project site encompasses two parcels, entirely (APNs 556-040-07 and 556-040-08) as well as a portion of parcel 556-030-14. Located just outside the city limits, the area north of the Project is planned to develop to primarily medium density residential, the area east of the Project is developing to very low and medium density residential, the area directly west of the Project is bounded by the Enterprise Canal but directly west of the canal is planned for park facilities, and the area to the south is mainly medium density residential with small areas of park facilities and general commercial.

The Project area is currently designated, in the City's General Plan, as Medium Density Residential and current land uses are rural residential, open fields, and agricultural fields with miscellaneous field crops.

2.2 Water Supply and Distribution

The Project will receive water supply from the City's water distribution system, which relies on both groundwater and surface water supplies. Built in 2004, the City's Surface Water Treatment Plan (SWTP) has a current treatment capacity of 22.5 million gallons per day (MGD); expansion to 45 MGD is planned. In addition to the supply from the SWTP, the City has more than 30 groundwater wells located throughout the City, with the nearest wells being approximately one and a half miles southeast of the Project. While the City's system is divided into two pressure zones, there are interconnections between the two to balance supply and demands throughout the year in various water demand scenarios.

The Project area is entirely within the water system's Pressure Zone 2. Water will be delivered to the Project via the City's existing and planned distribution system. The water distribution system is shown in full in the Water Master Plan Update, Phase III (WMP) (Provost & Pritchard Consulting Group, 2018), and in detail for this area on **Figure 2-2**. Through other projects in the area being undertaken by others, the master-planned infrastructure is being constructed to the south and east of the Project and is assumed it will be complete prior to the water demands associated with this Project being realized. Additionally, the master-planned distribution mains in Shepherd Avenue, between Clovis and Fowler Avenues, and further south and east towards the SWTP exist.

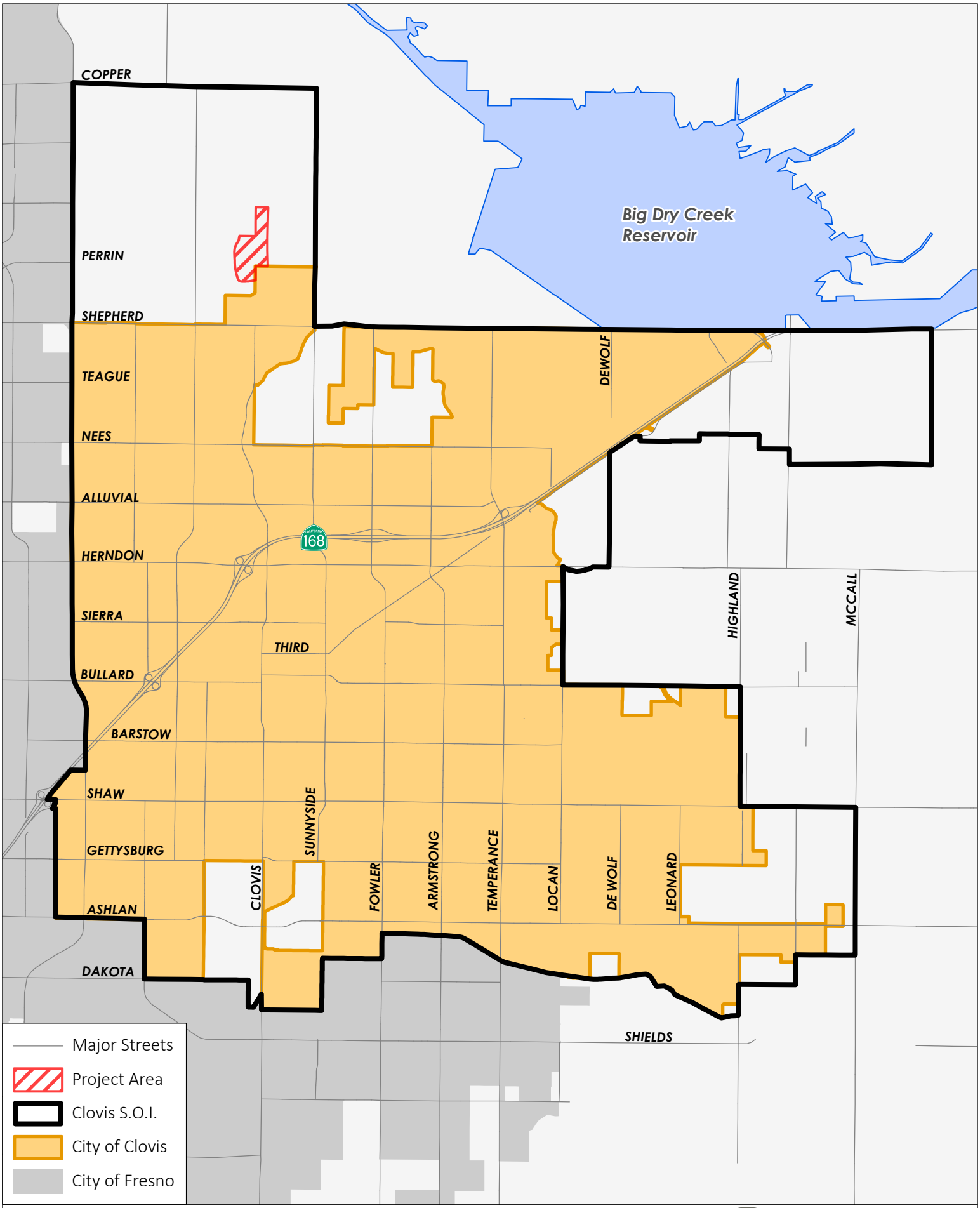

Figure 2-1: Project Location

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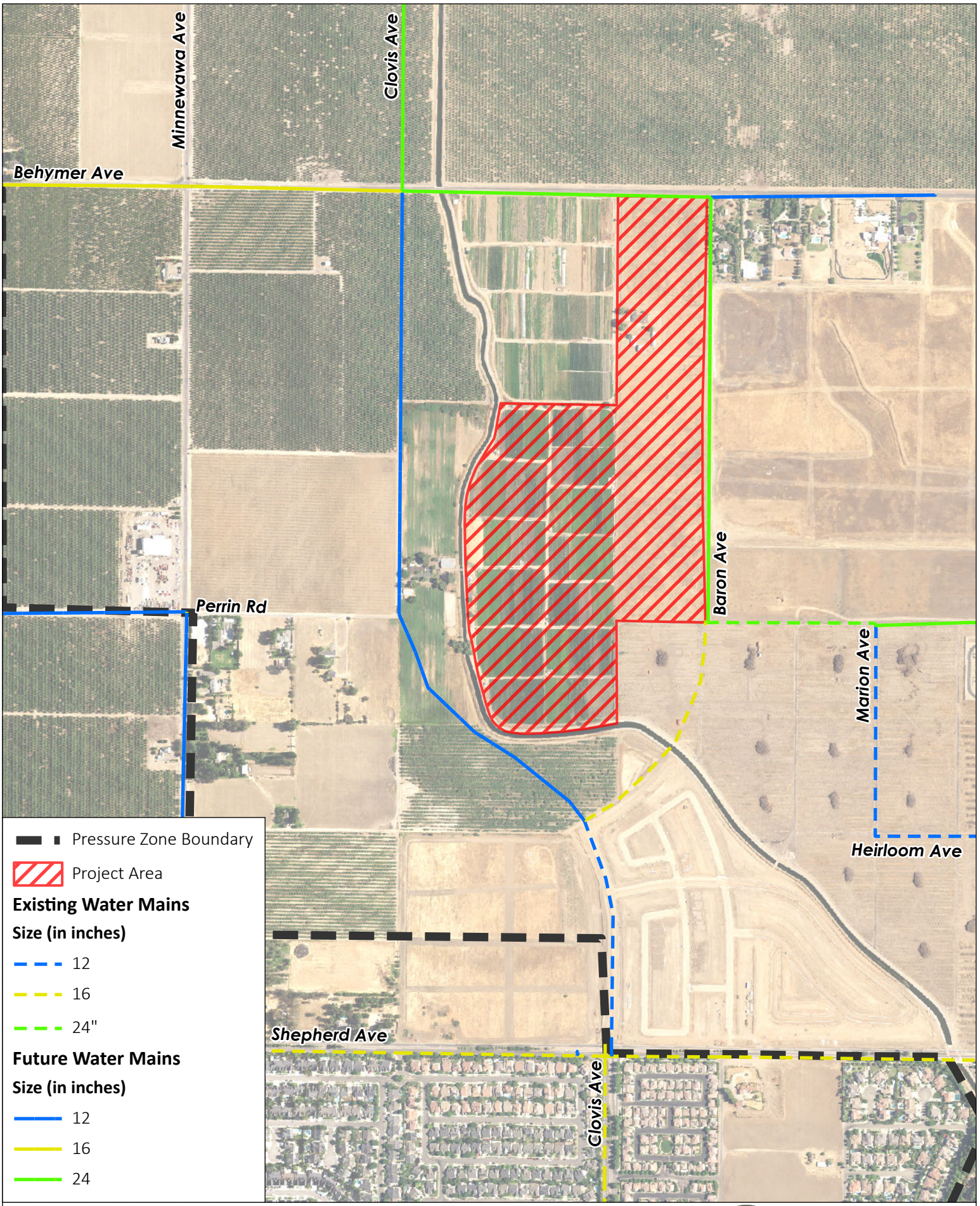

Figure 2-2: Potable Water Infrastructure

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3 Water Demands

This section summarizes projected water demands of the Project, assuming full buildout of the Project by 2030. Water demands associated with development of the Project area were included in the UWMP and were based on Land Use-based Water Demand Factors (WDFs) applied to land uses shown in the City's adopted General Plan. Proposed Project water demands have been estimated based on the proposed land uses and the WDFs shown in the adopted WMP. This section compares water demand estimates developed as part of this study with the City's earlier plans.

3.1 Project Demands

Based on the adopted WDFs stated in the WMP and the existing GP land use (shown in **Figure 3-1**) designations, the planned water demands, shown in acre-feet per year (AFY), for the Project area are shown in **Table 3-1**.

Table 3-1. Planned Demand Estimates

Planned Land Use Designation	Unit Factor (AFY/acre)	Acreage	Demand (AFY)
Medium Density Residential	2.2	71.5	157.3
Totals:		**71.5**	**157.3**

The proposed water demand estimates for this Project are summarized in **Table 3-2**, based on the proposed land uses and WDF.

Table 3-2. Proposed Demand Estimates

Proposed Land Use Designation	Unit Factor (AFY/acre)	Acreage	Demand (AFY)
Medium High Density Residential	3.3	71.5	236.0
Total:		**71.5**	**236.0**

While the proposed land use is residential, the intensity of the residential development is greater than the GP land uses; therefore, the proposed water demand estimates are greater than the planned estimates. The increase in total water demand for the Project area is 78.7 AFY. This increase is attributable to the proposed MHDR designation having a higher WDF than that of the originally planned, MDR designation. Despite the increase in demands for the Project area, the proposed increase amounts to 0.46% of the excess supply for year 2030 the City has in a normal year as shown in Table 7-2 of the 2020 UWMP[1].

[1] The excess supply in a normal year in 2030 is shown in the UWMP as 16,113 AFY; the total demand planned for the area is 157.3 AFY while the proposed demand is 236.0 AFY, yielding an increased demand of 78.7 AFY or 0.49% of the excess supply (78.7/16113 = 0.49%).

Project water demands were calculated in 5-year increments, as shown in **Table 3-3**, assuming 25 percent of the development by 2025 and the balance by 2030[2].

Table 3-3. Proposed Water Demands in 5-Year Increments

	2025	2030	Total
Estimated Demand (AFY)	59.0	177.0	236.0

3.2 Demands of Other Existing and Planned Development

The UWMP report the planned demands for similar types of uses proposed with this Project within the City, referred to collectively as Single-Family Residential uses (SFR). These demands are summarized in UWMP Table 4-5, which is reproduced, in part, below.

Table 3-4. Planned Water Demands by Use Type

Use Type	UWMP Projected Demands in 2030 (AFY)	Proposed Project Demands in 2030	
		Project Demands (AFY)	% of UWMP SFR Demands
Single-Family Residential	18,558	236.0	1.3%
Totals	**18,558**	**236.0**	**1.3%**

Comparing the total proposed Project water demands in **Table 3-2** with the total water demand area analyzed in the UWMP and shown in **Table 3-4**, the Project makes up a very small portion of the overall water anticipated to be delivered by the City to similar types of uses; however, it is worth note the additional demand beyond the original planned land use (78.7 AFY) accounts for 0.4% of the SRF projected demands shown in the 2020 UWMP for year 2030.

[2] The anticipated demands timing is an estimate and development of the Project will be determined by the Project Applicant. This WSA does not govern the development timeline.

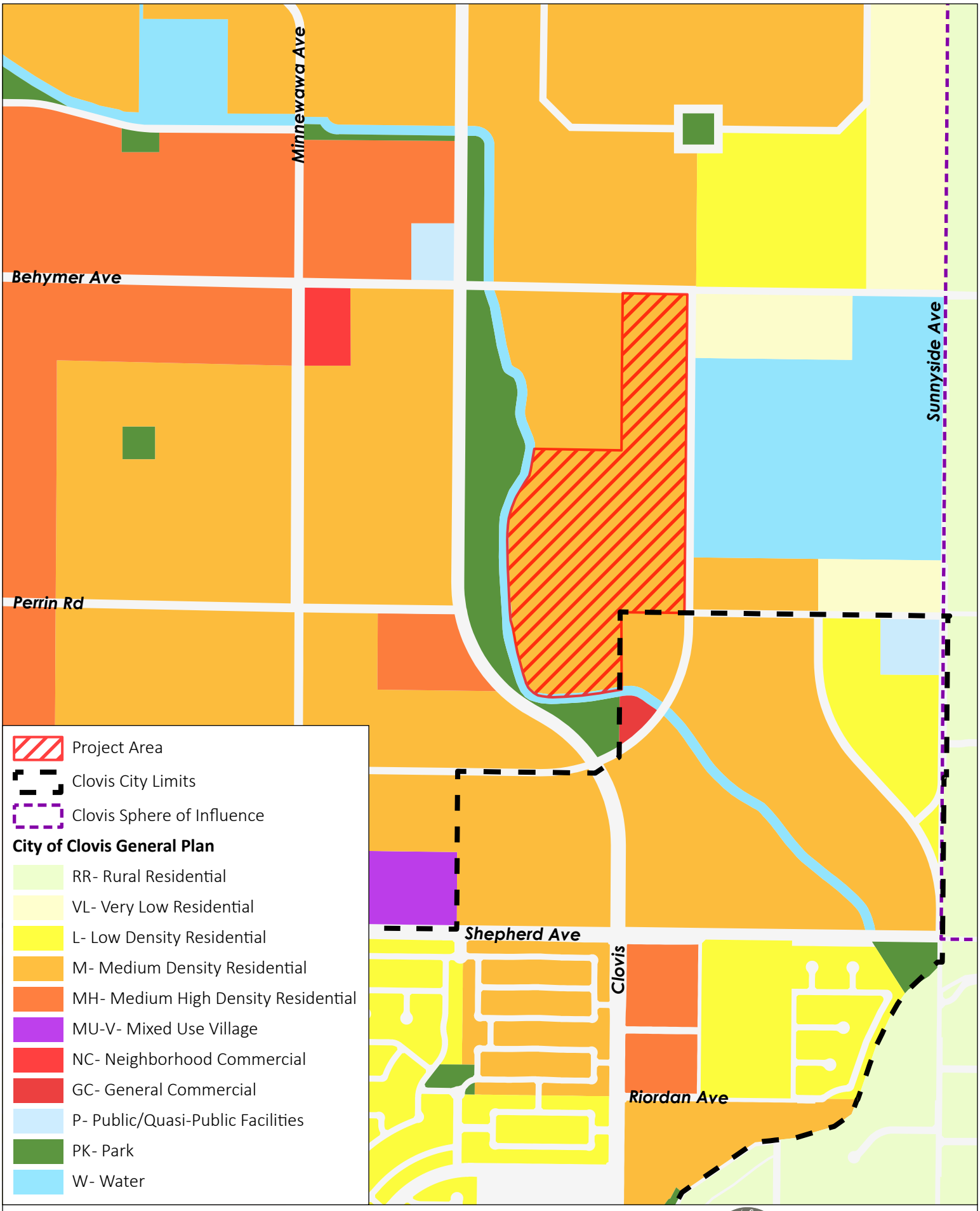

Figure 3-1: Land Use Plan in Project Area

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4 Overview of Water Supplies

CWC §10910(c)(2) allows reliance on the City's UWMP to determine overall water supply reliability if the Project's planned water demand was included in the UWMP. Although, the proposed Project demand is more than what was included in the calculations for the UWMP, the Project area itself was included at the originally planned land use intensity.

§10910(d) requires that a WSA identify any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed Project, including any such existing entitlements, rights, or contracts held by the public water system or city or county preparing the WSA. These descriptions appear in detail in Chapter 6 of the UWMP and are summarized below.

4.1 Surface Water

The City's surface water supply is provided through agreements with Fresno Irrigation District (FID), which allows the City to receive a share of FID's Kings River and Friant Central Valley Project (CVP) entitlements. Garfield Water District (GWD) and International Water District (IWD) are located within the City's General Plan boundaries. As the districts' service areas are urbanized over time, surface supplies available to the two districts will be added to the City's surface water supply. As those supplies are added to the City's water supply portfolio, they will be available throughout the City's service area as part of the general water supply. Currently, all surface water available to the City comes from the FID contract. The boundaries of each of the districts are shown on **Figure 4-1**.

4.1.1 Kings River

FID obtains much of its surface water from the Kings River. FID is a member of the Kings River Water Association, which holds water rights licenses for all the Kings River and storage rights licenses on Kings River reservoirs. FID is entitled to water based upon a prorated monthly schedule determined by the natural flow of the Kings River as it would occur without reservoir storage above the historic Piedra gauging station. FID is entitled to water from the Kings River at all flows, but the percentage is higher at relatively low Kings River flows. If the snowmelt is slow, the District receives a greater entitlement. FID's average gross annual entitlement is 452,541 AF. Within the last fifty years, the smallest entitlement received was 158,109 AF, which occurred in 2015.

The City's allocation from the Kings River is proportional to the total acreage of the City's included area to the total FID area receiving water; the total amounts available to the City are discussed in greater detail in Section 6.1.

4.1.2 Central Valley Project Water Allocation: Friant Division

The water obtained from the CVP comes from the diversion and storage of water from the San Joaquin River behind Friant Dam. The total available water on the San Joaquin River has been estimated at 2,200,000 acre-feet (AF). Of that, 800,000 AF have been designated as Class I supply (Bureau of Reclamation, 2005). Class I supply is considered to be dependable in most years with shortages only in

very dry years. Class II water is in excess of Class I and is therefore much less dependable. FID has a contract with the United States Bureau of Reclamation (USBR) for 75,000 AF of Class II water from this source (Bureau of Reclamation, 2005). The agreement between the City and FID requires the District to make available to the City the proportional share of all surface water available to the District although it does not allow the City to directly receive FID's CVP supplies. Therefore, FID is required to make a like amount of Kings River (or any other surface) water available to the City for its proportional share of Class II CVP supplies. FID's Class II contract has received an average 13,577 AFY with the actual number ranging from zero to the full 75,000 AF depending upon the nature of each water year over that period. **Table 4-1** lists the projected surface water volume through 2040.

4.1.3 Garfield Water District

GWD is located north of the City with a portion of the district in the City's SOI. The GWD holds a Class 1 CVP contract for 3,500 AFY. With half of GWD within the City's SOI, an estimated 1,750 AFY is expected to be added to the City's supply upon development. As noted in the UWMP, the first portion of GWD supplies is not anticipated to be available to the City until 2025, with the total 1,750 AFY not accounted for in the supply totals until 2040.

4.1.4 International Water District

IWD is located east of the City's SOI within the general plan's boundary. The IWD holds a Class 1 CVP contract for 1,200 AFY. The City's General Plan designates a portion of the District's area as industrial and residential use. At build-out it is estimated that the entire 1,200 AFY supply will be added to the City's supply. As noted in the UWMP, the first portion of GWD supplies is not anticipated to be available to the City until 2030, with the total 1,200 AFY not accounted for in the supply totals until 2040.

4.2 Supply from Storage

Since 2004, the City has been storing water in the aquifer to create a stable source of supply over the years. The City has been working with FID to recharge surface water, using the City's contracted shares of capacity in FID's Waldron Banking Facility and Boswell Groundwater Banking Facility, to build up credit in those facilities which allows for annual water withdrawals, on an as-needed or as-requested basis. The surface water banked includes portions of FID's Kings and CVP supplies and may in the future also include other surface water supplies that FID is able to secure on the spot market. Recharged water is purchased under separate agreements with FID and is not included in the surface water totals in the previous section, so this is truly a separate and additional water supply. This process is fully explained in the UWMP.

Two banking facilities, the Waldron Banking Facilities (Waldron) and Boswell Groundwater Banking Facility (Boswell), have been constructed in central Fresno County. The City entered into an agreement with the FID to participate in the financing of the construction of a dedicated water banking facility called the Waldron Banking Facilities. The City is entitled to receive up to ninety percent (9,000 AF) of the annual yield. The City and FID have entered into a similar agreement regarding the Boswell Groundwater Banking Facility whereby the City will have access up to 4,500 AFY of surface water. The

recharged water will be "banked" for future recovery during dry periods or to accommodate planned growth.

The City has created a recharge plan accounting for historic variations in surface water supplies that will allow it to withdraw an annual 13,500 AF, the maximum withdrawal allowed under the City's agreements with FID. This is considered a firm supply. The 13,500 AF maximum annual withdrawal is built into the water supply projections in the UWMP for each year over the planning horizon.

4.3 Groundwater

The City is located within the Kings Groundwater sub-basin, a part of the Tulare Lake Hydrogeologic Basin as described in the Department of Water Resources Bulletin 118 (Department of Water Resources, 2003). The groundwater basin is in overdraft and has been for many years. However, it has not been adjudicated.

Chapter 6 of the UWMP discusses a sustainable groundwater yield for the service area and concludes the sustainable yield to be 9,400 AFY, as discussed in greater detail in the WMP. While the North Kings Groundwater Sustainability Plan (NKGSP) has been written and adopted, it does not yet include a firmer approximation of sustainable yield, although development of one is anticipated. The sustainable yield from the UWMP and WMP has been used for this assessment.

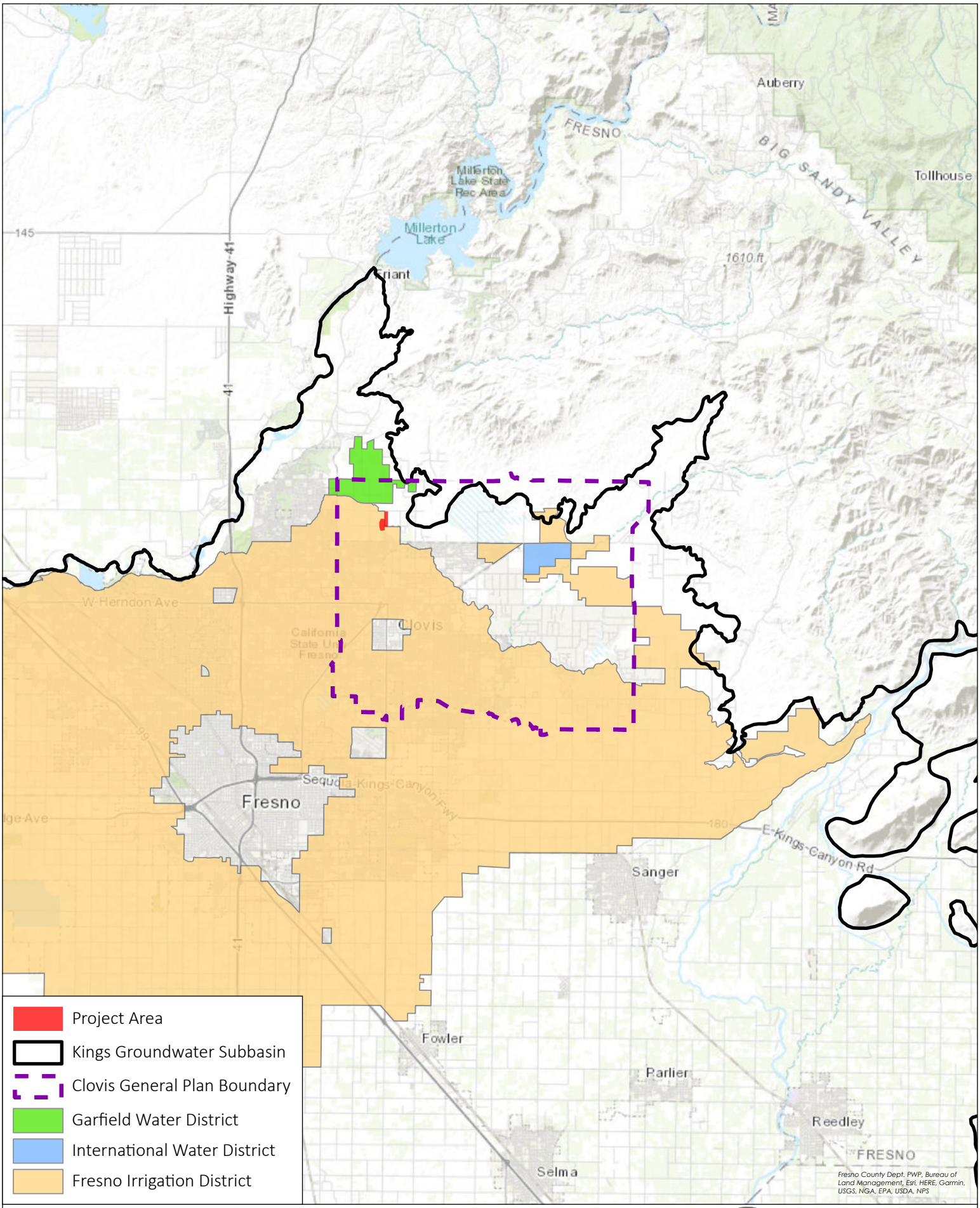

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Figure 4-2: Irrigation and Water Districts

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4.4 Recycled Water

Most of the City's wastewater flow is treated at the Regional Water Reclamation Facility (RWRF), located southwest of the City of Fresno on Jensen Avenue. In 2009, the City of Clovis completed a new Water Reclamation Facility (WRF). In 2020, the WRF produced approximately 2,496 AFY. Of that total, 28 percent was recycled for mostly landscape and agricultural irrigation, with the remainder being discharged to FID's Fancher Creek for agricultural irrigation.

Ultimately the WRF will be expanded to be able to treat 8.4 MGD, or 9,400 AF per year, and will make a substantial contribution to the City's overall water resources. According to the 2020 UWMP, recycled water is used for irrigation of public and private landscape within the service area. Areas receiving or planned to receive recycled water include the Freeway 168 corridor between Shepherd and Sierra Avenues, the existing Clovis Community Medical Center campus, and multiple City parks and landscape areas.

Landscape irrigation will continue to be the main use of recycled water in the future. All public landscape areas within three-quarters of a mile of the distribution system are considered potential recycled water use areas. Clovis Unified School District is evaluating the use of recycled water for its landscape areas. Caltrans has expanded their use of recycled water along State Route 168 from Armstrong Avenue west to Sierra Avenue. Concurrent with the Project's development, the City will expand its use of recycled water and broaden its range of beneficial uses to potentially include irrigating the public landscape space to be developed with the Project.

To affect that increase in use, the City now requires all new development of public landscape near recycled water transmission lines to use recycled water. Additional actions include extending the recycled water distribution system to discharge at groundwater recharge facilities and reducing the cost of recycled water. The UWMP indicates planned use of recycled water supply will be 9,400 AFY by 2040 (UWMP Table 6-13). With a planned[3] recycled water transmission main in Shepherd Avenue, it is possible this Project may use recycled water for landscape irrigation, but the City will make final determination of that at a later date.

4.5 Exchanges

Water exchanges, transfers, and water banking allow purveyors to manage demand and supply variability by ensuring water will be available for the near future. The majority of the City's wastewater is treated at the RWRF. Under an agreement with FID, the City of Fresno receives 0.92 AF of Kings River surface water in exchange for each two AF of reclaimed water produced by the RWRF (46 percent exchange). Clovis is in discussions with the City of Fresno and FID on documenting its pro-rata share of RWRF effluent and the most efficient recover and beneficial use of that effluent. This will require a new effluent exchange agreement with FID, and potentially the City Fresno, to appropriately allocate Clovis' pro-rata share of the treated water. This water is limited by agreement to being used for groundwater recharge activities.

[3] As noted in the City's 2018 Recycled Water Master Plan

4.6 Water Supply Summary

The five sources discussed above make up the City's water resources. These are tabulated overall for 2025 and for each subsequent 5-year period through 2040 in **Table 4-1**.

The City's overall water resources are projected to increase from 50,739 AF per year in 2025 to 74,650 AF per year in 2040. Nearly all this increase will come from increasing surface water resources from 18,039 AF per year in 2020 to 39,400 AF per year in 2040. The mix of water supplies the City plans to use to meet these demands is changing over time and, while the surface water supplies will be the primary source, a mixture of groundwater and supply from storage will be used to meet demands.

Table 4-1. Water Supplies – Normal Year (UWMP Tables 6-12 and 6-13)

Water Supply	Projected Water Supply (AF)			
	2025	2030	2035	2040
Groundwater [1]	11,429	10,753	10,076	9,400
Surface Water [2]	22,160	27,584	32,508	39,400
Supply from Storage (Waldron and Boswell facilities)	13,500	13,500	13,500	13,500
Recycled Water	3,100	5,500	6,300	9,400
Transfers (GWD and IWD)	550	1,600	2,650	2,950
Total	**50,739**	**58,937**	**65,034**	**74,650**

Notes:

[1] Reasonably available volume shows a steady reduction in reliance on groundwater supply, as planned, to the sustainable yield volume in 2040; discussed in greater detail in the UWMP.

[2] Surface water quantities shown in greater detail in the UWMP.

5 Normal Year Water Operations

This section evaluates the ability of the City to meet the overall water demands during normal water years. A normal year is a year, or averaged range of years, that most closely represents the average water supply available to the City. In this case, the normal year reflects the overall water supply summary discussed in Section 4.

This Chapter relies on information taken from Sections 6 and 7 of the UWMP. **Table 5-1** compares the City's water demands and compares them with the normal year water supplies (see **Table 4-1**) for the 5-year increments the Project is anticipated to be constructed, and through 2040, as shown in the UWMP. As shown, total supplies would exceed total demands. Adequate supplies are available to serve the City and its water customers in normal rainfall years such as those discussed in this section. The excess water supply is more than adequate to meet the estimated Project water demands.

Table 5-1. Comparison of Normal Year Supplies and Demands

Condition	Water Supply (AFY)			
	2025	2030	2035	2040
Water Demand	39,737	42,824	46,422	52,598
Water Supply	50,739	58,937	65,034	74,650
Excess/Shortage	**11,002**	**16,113**	**18,612**	**22,052**

6 Single-Dry and Multiple-Dry Year Water Supplies

This section evaluates the availability of City water supplies during single-dry and multiple-dry water years, based on Project buildout in 2030. Numerous factors will work to change the relative quantities of water the City receives from its several water sources. Since each of these has a different reliability in dry years, the overall water supply reliability will change over time. The following sections discuss how this will occur.

During a single-dry year, surface water allotments are anticipated to be reduced by as much as 66 percent for Kings River surface water supplies, and CVP Class II supplies are eliminated completely in dry years. In the future, as the City becomes more reliant on surface water supplies, the impact of surface water reductions in dry years will be more significant.

A multiple-dry year period represents the lowest average supply available to the Project for a consecutive five-year period. This analysis is referred to as a "multi-dry" condition in the UWMP. The WSA analysis is based on the five consecutive driest years of record for the Project's surface water supplies, which were water years 2011/12 through 2015/16.

6.1 Water Year Effects on Water Sources

6.1.1 Kings River Surface Water

Both the single-dry and multiple-dry analyses are most affected by the variations in Kings River entitlement in dry years. FID's entitlement does not vary directly in proportion to overall annual runoff; rather it favors FID versus all the other Kings River diverters. When river flows are low due to slow runoff, low annual precipitation or both, FID's proportional share of the daily river flow increases.

The effect of this is that FID's entitlement, as a percentage of its average entitlement, is higher than the overall water year percentage flow, for virtually any below-average water year. As noted in the UWMP, the anticipated share of Kings River water is shown as 32,100 AFY (UWMP Table 6-4) in 2040 for an average water year. As discussed in the UWMP, the City has recently executed a contract with FID for development of a new firm water supply starting at 1,000 AFY in 2020 and increasing to a maximum of 7,000 AFY by 2045 and thereafter. This new supply will not have the variability of the existing supply based on water year type.

6.1.2 Friant CVP Surface Water

Over the period of 1986 through 2016, the average Class II allocation has been 38 percent of contracted amount. However, Class II supplies are particularly subject to the water year type. However, these supplies are relatively small and would not have significant impact on the total supply.

While Class I entitlements do not currently affect the City's FID supplies, they will affect the future-year GWD and IWD entitlements. Class I allocations in the five multiple-dry years were 0 percent of the contracted amount for all five years.

6.1.3 Supply from Storage

The contract for the Waldron facility allows annual withdrawals of up to approximately 9,000 AFY, while the Boswell Facility allows up to 4,500 AFY. According to the UWMP, the combined withdrawal limit from the two facilities is 13,500 AFY. In any year where surface water deliveries are substantially limited, the City would want to use these resources to the limit.

A related matter is how contributions are made to supply storage. Whereas in normal years the City is making deposits to both facilities, in a drier year those contributions would be reduced or halted since the surface supplies necessary for the deposits would not be available. Since the deposits come from surface water resources not counted in the City's water balance, being acquired under separate FID agreements, the curtailment of deposits does not reduce the City's water demand.

6.1.4 Groundwater

As of the preparation of the 2020 UWMP, the City of Clovis obtains groundwater from more than 30 wells, located throughout the service area. The total well production is estimated at 37,290 gallons per minute (gpm).

According to the UWMP, the City aims to reduce its direct groundwater consumption whenever possible. Most the City's water demands will be met by a combination of surface water and supplies from storage, in water years when those two resources are sufficient to meet demands. In drier years, when surface water supplies are limited, the City will pump groundwater, potentially beyond the 9,400 AFY accounted for in a normal year, to make up the shortfall but not to an unsustainable level as discussed in the NKGSP. The City will also recharge surface waters when available to allow for additional groundwater pumping when needed.

Planning to make that objective possible is very important, as Chapter 6 of the UWMP states that the sustainable groundwater supply in the City service area is 9,400 AF per year, for normal, dry, and multi-dry years. For the time being, there is no restriction against pumping groundwater above the sustainable aquifer yield; however, the NKGSP indicates the City must sustainably use groundwater.

This WSA uses 9,400 AF per year as the sustainable groundwater pumping amount, as stated in the UWMP. Due to the very large size of the aquifer underlying the City, available groundwater is not quickly affected by the type of water year. Anticipating a mix of wet and dry years similar to what has been historically seen, this WSA does not reduce available groundwater in dry or multiple-dry years; however, the City will be prioritizing use of other supplies over groundwater when possible.

6.1.5 Recycled Water

Recycled water production, being tied directly to indoor water use, does not vary significantly with the water year type, and is not adjusted from normal for this analysis.

6.2 Changes in Water Source Reliability Over the Planning Horizon

In 2020, surface water made up 58 percent of the City's direct water supply. In 2030, the surface water supply is planned to be 53 percent of the total while the supply from storage will have increased to 18 percent in a normal year. Groundwater will remain an important component of the water supply in the near future.

This means the City's reliance on surface water supplies, either directly used or pumped from subsurface storage, will have increased to 71 percent of the total. While there is a margin of normal year supply available over planned demand over the entire planning horizon, some provision may have to be made for additional reliable storage to account for such a large portion of surface water being subject to water year variability. See the reliability analysis in Section 6.3 following.

6.3 Summary of Single-Dry and Multiple-Dry Year Reliability Over the Planning Horizon

Supply for dry years would be drawn from a combination of Kings River surface water, supply from storage, groundwater, and recycled water. As shown in the UWMP, it is anticipated that surface water supplies from the FID Firm Water Agreement would still be available during drought years. Other firm water supply sources are groundwater, banked water, and recycled water, all of which are considered resilient against drought compared to surface water supplies. Groundwater banking activities would decrease to accommodate the decreased surface water supplies while still being able to use previously banked groundwater supplies from the Waldron and Boswell facilities. Project demand was assumed to be constant across all water years.

The supplies that would be available during single-dry and multiple-dry years in 2030 (at assumed Project buildout) are summarized in **Table 6-1**. As shown, adequate supplies would be available to supply the City and along with the estimated Project demand of 236 AFY, under all studied conditions. Further, the excess demand associated with the Project (78.7 AFY), over the originally planned land use, accounts for 10.3 percent of the excess supply without conservation and 1.3 percent of excess supply with conservation in the most critical year analyzed – the Single Dry Year. The City has a Water Shortage Contingency Plan (WSCP) (Provost & Pritchard Consulting Group 2021) in place that could be partially or fully implemented if needed or mandated. The 'demand with conservation' values are reduced to reflect implementation of various stages of the WSCP, as discussed in the UWMP.

Table 6-1. Dry Year Supply and Demand Comparison in 2030 (UWMP Tables 7-2, 7-3, and 7-4)

Scenario	Single-Dry Year [1]	Multiple-Dry Year [2]				
		Year 1	Year 2	Year 3	Year 4	Year 5
Baseline demand	42,824	42,824	42,824	42,824	42,824	42,824
Demand with Conservation as shown in UWMP	37,359	39,422	36,962	33,969	30,474	40,757
Total Supply	43,587	54,607	52,576	48,310	43,586	57,992
Excess/<Deficit> in Supply	**763**	**11,783**	**9,752**	**5,486**	**762**	**15,168**
Excess/<Deficit> in Supply with Conservation	**6,228**	**15,185**	**15,614**	**14,341**	**13,112**	**17,235**

Note: Refer to the 2020 UWMP for details on how these values were calculated.

6.4 Climate-Based Reliability Factors

This WSA defers to the UWMP for consideration of the overall effects of climate change upon supply reliability. Climate change has been considered in the preparation of the UWMP.

7 Operational Reliability

The City's surface water entitlement does not accrue all at once during a given water year. Rather, the Kings River entitlement accrues daily throughout the year based on actual river runoff and the Kings River Water Association (KRWA) entitlement schedule. The daily nature of the Kings River supply is especially important early in the water year, which begins October 1. The very low river flows in October and November mean that supply is low, and the City must rely on other water supplies during those months. The relatively large supplies available from storage help mitigate the seasonal nature of the surface water supply, and these are further backed up by groundwater supplies equivalent to almost half the City's total annual demand.

The City has not had any issue with temporary water shortages to date. The City's WMP and UWMP indicates a need to increase their surface water and groundwater supplies to meet future demands and provides detail on how much of each supply is needed compared to the existing supplies. The WMP also includes a Capital Improvements Program identifying capital projects that are necessary to acquire and facilitate the movement of current and future water supplies throughout the City's system in a reliable manner. The City's adherence to their planning documents and consistent development of these water supplies and infrastructure is critical for the City's continued growth and development and will provide operational reliability into the future.

8 Conclusions

As summarized in **Table 8-1**, the City has adequate supplies to meet the needs of all the City's water customers including the Project, in normal water years, over the 20-year planning horizon.

In the buildout year, if demand is as projected, the City will have sufficient water to meet dry year demands of all dry year event types. Conservation measures, detailed in the Water Shortage Contingency Plan, have been developed that would mitigate possible shortfalls by reducing demand approximately 15 percent. Evidence from the 2013 to 2015 drought suggests that those results, and more, are achievable. Additionally, as the City has surplus water supplies in normal years, short-term additional groundwater extraction in the single-dry and multiple-dry years is also planned as part of their water portfolio.

As discussed in Section 7, the City has plans to continue to acquire water supplies and construct infrastructure to supply current and future water users. Therefore, we conclude the City of Clovis has adequate water supplies to meet the needs of the City including additional demands associated with this Project in normal, dry, and multi-dry years given the previously discussed potential demand reductions and supply augmentations.

8.1 Conclusions Including Additional WSAs

Since the 2020 UWMP was adopted, three WSAs have been prepared for the City, including this one. It is important to understand the cumulative impact of the additional demands associated with WSAs over and beyond the demands analyzed in the 2020 UWMP.

Table 8-1. Summary of Project Water Supplies and Demands including WSAs

2020 UWMP Supply and Demand Comparison Results	Normal Year (2030)	Single-Dry Year	Multiple-Dry Year				
			Year 1	Year 2	Year 3	Year 4	Year 5
Excess/<Deficit> in Supply	16,113	763	11,783	9,752	5,486	763	15,168
Excess/<Deficit> in Supply with Conservation	--	6,228	15,185	15,614	14,341	13,112	17,235
Additional Demands Associated with WSAs prepared since 2020 UWMP							
Home Place Master Plan (Approved March 2021)	No Additional Demands Associated with Home Place Master Plan WSA						
Tract 6205 SOI Expansion (Estimated Approval 2022)	256	256	256	256	256	256	256
Tract 6343 (Estimated Approval 2022)	79	79	79	79	79	79	79
Excess/<Deficit> in Supply including Additional Demands from WSAs	**15,779**	**429**	**11,449**	**9,418**	**5,152**	**428**	**14,834**
Excess/<Deficit> in Supply with Conservation including Additional Demands from WSAs	**--**	**5,944**	**14,901**	**15,330**	**14,057**	**12,828**	**16,950**

The demands in **Table 8-1** include those demands noted in the UWMP, the additional demands associated with the Project evaluated in this WSA (78.7 AFY), as discussed in Section 2.2, and the additional demands discussed in the previously prepared WSAs. Similarly, the noted Excess/Deficit reflects the difference between these summated demands and the total supply noted in the UWMP. This approach accounts for the additional demands associated with the proposed land use type above the demands associated with the originally planned land use type. There is still an excess of supply in all conditions, even with the additional demands.

As noted above, additional groundwater supplies may not be necessary in the critical year or multiple year drought depending on operational decisions regarding conservation; however, the City's UWMP notes additional groundwater supplies would be available on a short-term basis during a drought condition.

9 References

Provost & Pritchard Consulting Group (2021). *City of Clovis, 2020 Urban Water Management Plan Update.* Clovis.

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