Appendix F. Water Supply Assessment

CITY OF REDLANDS

Redlands Transit Village

WATER SUPPLY ASSESSMENT

SAN BERNARDINO COUNTY, CALIFORNIA

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ACRONYMS & ABBREVIATIONS

AF	Acre-Feet
AFY	Acre-Feet per Year
BTAC	Basin Technical Advisory Committee
CDR	Center for Demographic Research
CEQA	California Environmental Quality Act
City	City of Redlands
CUWCC	California Urban Water Conservation Council
DRA	Drought Risk assessment
DU	Dwelling Unit
GPCD	Gallons per Capita per Day
gpd	gallons per day
IRUWMP	Integrated Regional Urban Water Management Plan
MG	Million Gallons
RTV	Redlands Transit Village
SANDAG	San Diego Association of Governments
SAR	Santa Ana River
SB	Senate Bill
SBB	San Bernardino Basin
SBVMWD	San Bernardino Valley Municipal Water District
SCAG	Southern California Association of Governments
SF	Square Feet
SWP	State Water Project
TAZ	traffic analysis zones
TVSP	Redlands Transit Villages Specific Plan
UWMP	Urban Water Management Plan
Valley District	San Bernardino Valley Municipal Water District
WBIC	Weather Based Irrigation Controllers
WSA	Water Supply Assessment
WSCP	Water Shortage Contingency Plan
WWTP	Wastewater treatment plant

1. WSA PURPOSE AND BACKGROUND

This Water Supply Assessment (WSA) was prepared for EPD Solutions as the project sponsor/applicant, and the City of Redlands ("City" or "Redlands") as the lead agency under the California Environmental Quality Act (CEQA), by Fuscoe Engineering, Inc. (Fuscoe), as the consultant, regarding the Redlands Transit Village Project ("Redlands Transit Village" or "Project"). This study is a requirement of California law, specifically Senate Bill 610 (referred to as SB 610). SB 610 is an act that amended Section 21151.9 of the Public Resources Code, and Sections 10631, 10656, 10910, 10911, 10912, and 10915 of the Water Code. SB 610 repealed Section 10913, and added and repealed Section 10657 of the Water Code. SB 610 was approved by the Governor and filed with the Secretary of State on October 9, 2001, and became effective January 1, 2002.

Under SB 610, WSAs must be furnished to local governments for inclusion in environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to CEQA. Due to increased population, land use changes and water demands, this water bill seeks to improve the link between information on water availability and certain land use decisions made by cities and counties. SB 610 takes a significant step toward managing the demand of California's water supply as it provides regulations and incentives to preserve and protect future water needs. The intent of this bill is to coordinate local water supply and land use decisions to help provide California's cities, farms, and industrial developments with adequate water supplies.

With the introduction of SB 610, any project under CEQA shall provide a WSA if the project meets the definition of the Water Code Section 10912. "Project'' means any of the following:

- A proposed residential development of more than 500 dwelling units.
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- A proposed hotel or motel, or both, having more than 500 rooms.
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- A mixed-use project that includes one or more of the projects specified in this subdivision.
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.
- If a public water system has fewer than 5,000 service connections, then ''project'' means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

After review of Water Code Section 10912, the Redlands Transit Village Project is deemed a "Project" because it proposes a residential development of more than 500 dwelling units.

In addition, it is also necessary to include the passing (September 24, 2016) of Senate Bill

1262 (Chapter 594) which acts to amend Section 66473.7 of the Government Code, and to amend Section 10910 of the Water Code, relating to land use[1] and the Sustainable Groundwater Management Act (SGMA) that was passed by California's Governor on September 16, 2014. Pursuant to SB 1262, as of January 1, 2017, WSAs are now required to include certain SGMA-related information if water supply for a proposed project includes groundwater. Specifically, if a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

- A description of any groundwater basin or basins from which the proposed project will be supplied.
- For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree.
- For a basin that has not been adjudicated that is a basin designated as high- or medium-priority pursuant to Section 10722.4, information regarding the following:
    - Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924.
    - If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan.
- For a basin that has not been adjudicated that is a basin designated as low- or very low priority pursuant to Section 10722.4, 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, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

As described in more detail throughout this WSA, the proposed Project will utilize water from the local groundwater from the San Bernardino Basin (SBB) and surface water supplies from Mill Creek and the Santa Ana River (SAR). Supplemental water is purchased from the State Water Project for direct deliveries only when the local sources cannot provide it or is needed for water quality. Therefore, additional information regarding groundwater supply and management will be included in this WSA to satisfy the requirements of SB 1262.

[1] Senate Bill No. 1262, CHAPTER 594, found here:
http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1262

2. INTRODUCTION

2.1 PROJECT DESCRIPTION

The entire Redlands Transit Village Project area, which covers approximately 947 acres (approximately 1.5 square miles), is generally bounded to the west by Kansas Street, Redlands Boulevard, Alabama Street, and Tennessee Street; to the north by the I-10, Colton Avenue, and Sylvan Boulevard; to the east by Judson Street; and to the south by Citrus Avenue, Central Avenue, Redlands Boulevard, Olive Avenue, Brookside Avenue, Ash Street, Pine Avenue, Tennessee Street, and State Street. The Project area also includes the parcels along both sides of Orange Street between Colton Avenue and Lugonia Avenue. The Project area is divided into three planning areas referred to as transit villages, which generally surround each of the three Arrow stations. The New York Street/Esri Transit Village area is generally west of Texas Street and Center Street. The Downtown Transit Village area is generally bounded to the east by Church Street, and to the west by Texas Street, and includes the parcels along both sides of Orange Street between Colton Avenue and Lugonia Avenue. The University Street Transit Village area is located east of Church Street and west of Judson Street. See Figure 1 for a vicinity map of the proposed Project.

The proposed Project site currently includes many different residential and non-residential uses. The New York Street/Esri Transit Village area consists of industrial, commercial, and single-family residential land uses. The Downtown Transit Village area consists of industrial, commercial, open space/park, and vacant land uses. The University Street Transit Village area consists of single family residential, multifamily residential, and vacant land uses.

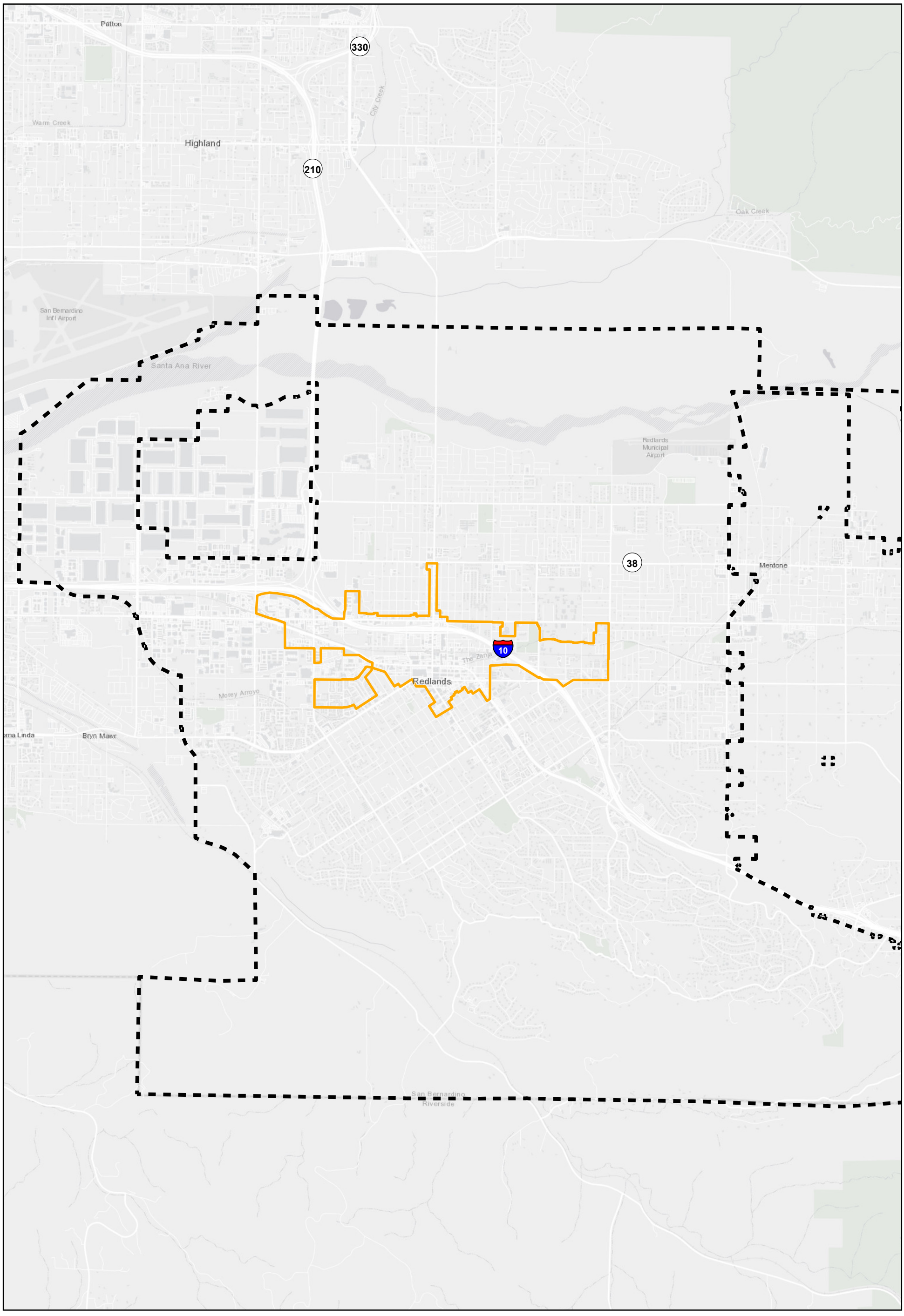
The Project includes a development consisting of 2,400 dwelling units. In addition, 265,000 sf of retail commercial space, 238,000 sf of office space, a 220-room hotel, and 280,000 sf of open space and parks will be included as part of the Project. The Project's 2,400 dwelling units will be split evenly of studios, 1-bedroom spaces, 2-bedroom spaces, and 3-bedroom spaces, each making up approximately 25%. Table 1 below shows the TVSP proposed detailed buildout of what is going to occupy the space of the proposed Project.

Table 1 - TVSP Proposed Buildout

Residential			
Type of Dwelling Unit *(estimate only)*	Number of Units (and %) *(estimate only)*	Avg. Floor Area per Dwelling Unit *(estimate only)*	Gross building square footage *(estimate only)*
Studio	600 (25%)	650	390,000
1 bedroom	600 (25%)	750	450,000
2 bedrooms	600 (25%)	1,000	600,000
3 bedrooms	600 (25%)	1,300	780,000
Residential Total	2,400 (100%)	925 avg.	2,220,000
Retail Commercial	--	--	265,000
Office	--	--	238,000
Hotel	220	--	110,000
Open Space and Parks	--	--	280,000

As mentioned, the purpose of this WSA is to provide information to confirm that the City of Redlands has sufficient water supply to provide for the proposed Project in addition to other

service area demands now and into the future. This WSA compares the existing water demand of the Project site to the proposed water demand of the Project and to the City of Redlands regional water supplies and demands through 2045.



Transit Village Specific Plan Water Supply Assessment

Figure 1

Vicinity Map

Redlands, CA

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full circle thinking

City of Redlands Boundary
Transit Village Specific Plan Boundary

N

1 inch = 4,000 feet

12/22/2021

0 4,000 8,000 Feet

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2.1.1 Existing Water Use

The City of Redlands provides potable water for domestic use, as well as non-potable groundwater and recycled water to customers in its service area for irrigation, industrial, and other non-potable uses.

The total existing Project residential water uses include estimates of both indoor and outdoor water demands below. There are currently 2,318 multifamily residential units, which represents about 40% of the existing projects water demand, about 6.5 million square feet of commercial (or non-residential) area which represents about 27% of the water demand, and about 5.7 million square feet of landscaped areas, which represents about 33% of the water demand. Table 2 summarizes the existing annual total water use, which is approximately 1,357 AFY.

Table 2 - Existing Water Demands

Land Use Type	Project DU or acreage [1]	Unit Water Demand [2]	Daily Water Usage (gpd)	Annual Water Usage (AFY)
Existing				
Residential – Multifamily	2318 DUs	210 gpd / DU	486,780	545.26
Retail Commercial	150.36 acres	2178 gpd / acre	327,484	366.83
Landscaped Areas	130.29 acres	3050 gpd / acre	397,384	445.13
TOTAL PROJECT WATER DEMAND			1,211,648	1,357

Notes:
1. Provided by City of Redlands Staff on 11/9/2021
2. Transit Villages Specific Plan: Redlands, California; Chapter 8: Infrastructure (based on the City of Redlands "Water and Sewer Demands Spreadsheet" (May 8, 2019)).

See Figure 2 for an aerial image of the existing land uses at the proposed Project site.

An estimated annual difference between existing water demands and proposed water demands resulting from the proposed Project are calculated and shown in Section 2.1.2 below

Basemap Aerial (World Imagery)

Transit Village Specific Plan Water Supply Assessment

Redlands, CA

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full circle thinking

Transit Village Specific Plan Boundary

Figure 2

Project Aerial

12/23/2021

N

1 inch = 1,000 feet

0 1,000 2,000 Feet

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2.1.2 Proposed Water Use

Proposed water demands are estimated below. See below for Figure 3, the proposed site plan for the Project.

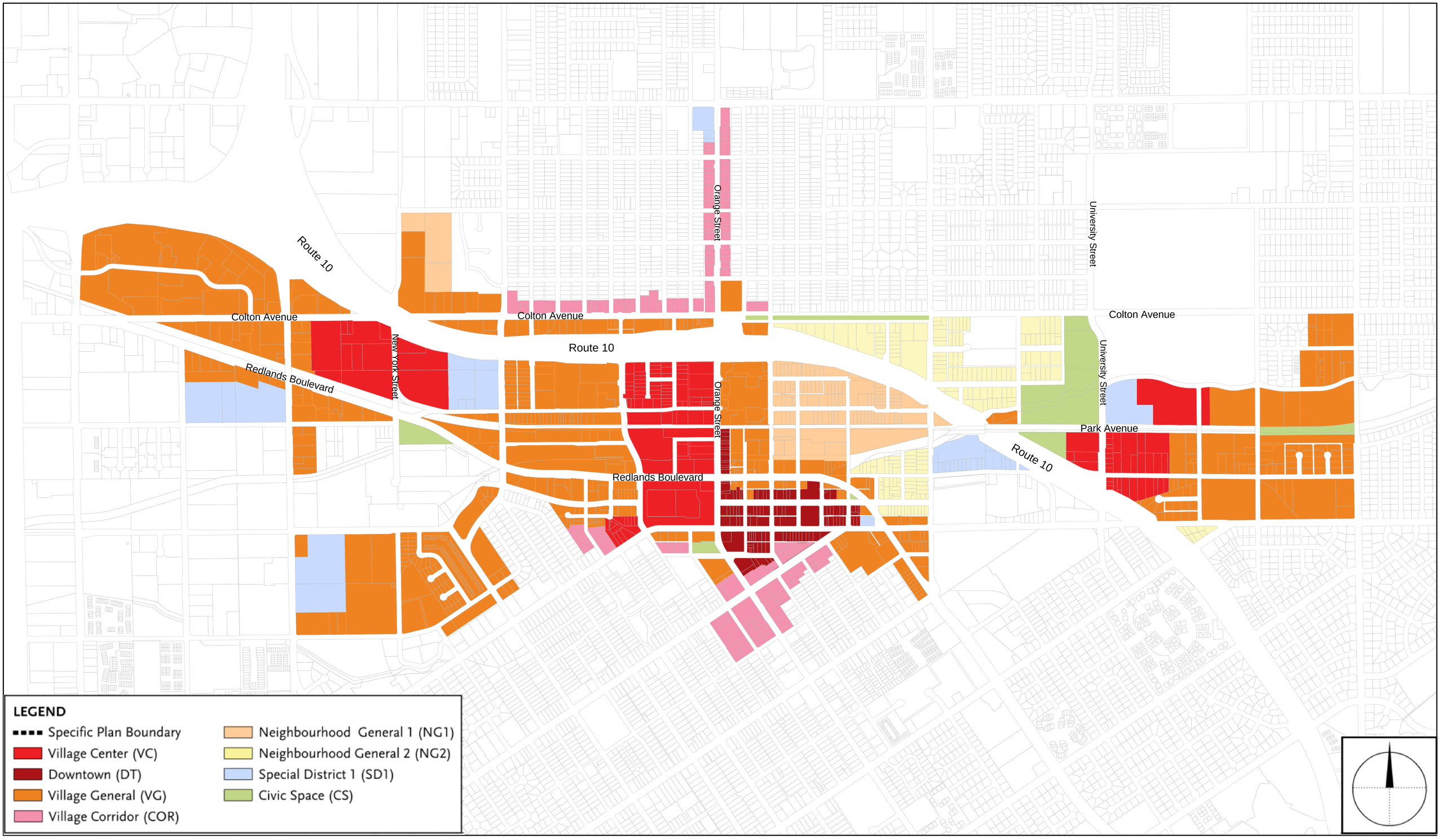
Total Project residential water demands include estimates of both indoor and outdoor water demands. Indoor water demands include toilet-flushing, showers, baths, dishwashers, washing machines, faucets, and leakage. Outdoor water demands include landscape irrigation estimates. See Table 3 for the proposed water demands from the Project.

Table 3 - Proposed Water Demands

Land Use Type	Project DU or acreage	Unit Water Demand	Daily Water Usage (gpd)	Annual Water Usage (AFY)
Proposed				
Residential – Multifamily	2,400 DUs	210 gpd/DU	504,000	564.55
Retail Commercial	6.08 acres	2,178 gpd/acre	13,242	14.83
Office	5.46 acres	2,178 gpd/acre	11,892	13.32
Hotel	220 DUs	100 gpd/DU	22,000	24.64
Open Space & Parks	6.43 acres	3,050 gpd/acre	19,612	21.97
ADDITIONAL PROJECT WATER DEMAND			570,746	639
EXISTING PROJECT WATER DEMAND			1,211,648	1,357
TOTAL PROJECT WATER DEMAND			1,782,395	1,996

Notes:
Source: Transit Villages Specific Plan: Redlands, California; Chapter 8: Infrastructure (Based on City of Redlands "Water and Sewer Demands Spreadsheet" (May 8, 2019)).

As shown, the proposed Project will have an annual water demand of approximately 1,996 AFY. This is an increase of approximately 639 AFY as compared to the existing water demands at the Project site. The following sections evaluates the ability for the City to meet the proposed increase in water demands.



Regulating Plan

1"=500'

Redlands Transit Villages Specific Plan
Redlands, CA
24 January 2022

Moule & Polyzoides
Architects and Urbanists

3. REGIONAL WATER SUPPLIES AND DEMANDS

3.1 CITY WATER SUPPLIES

The City of Redlands water supply is comprised primarily of surface water from the Santa Ana River (SAR) and Mill Creek and supplemented by groundwater extracted from the Bunker Hill Basin (part of the San Bernardino Basin) and Yucaipa Basin. In addition, a small amount of imported water is utilized when needed. These resources and their management is described in the sections below.

3.1.1 Purchased or Imported Water

Imported water from the State Water Project (SWP) is available for the City to purchase from Valley District when needed. The City has purchased supplemental SWP water only in years when surface water flows have not been able to meet demands and on occasion when surface water supplies are turbid and require blending or for other operational purposes. The City will continue to request SWP water in these situations; however, during SWP outages or extended dry periods the City will prioritize use from other sources. If SWP water is not available in a future year, the City will shift to increase groundwater production and may implement conservation measures to reduce demands if needed. The City contributes to regional efforts to recharge the Bunker Hill groundwater basin with SWP water and local surface water in wet years when available so that storage is available for use in dry years when other supplies may be limited.

3.1.2 Groundwater

Redlands extracts groundwater from the Bunker Hill Subbasin of the San Bernardino Basin (SBB) and Yucaipa Subbasin. The City's historical production for the past five years is shown in Table 4. Extractions shown include both potable and non-potable water. The high increase in the Yucaipa basin from 2018 to 2019 may have been due to increased drought conditions. Redlands can produce additional groundwater to meet increases in demand in drier years as described in more detail in Section 4.

Table 4 – Groundwater Volume Pumped (AF)

Type	Basin	2016	2017	2018	2019	2020
Alluvial Basin	Bunker Hill (part of SBB)	11,442	13,512	14,466	11,434	13,619
Alluvial Basin	Yucaipa	59	16	20	246	297
TOTAL		11,501	13,528	14,486	11,680	13,916

Notes:
Source: Table 4-8, City of Redlands chapter of the IRUWMP (July 2021).

The Sustainable Groundwater Management Act (SGMA) was established in 2014 and requires local agencies to create groundwater sustainability agencies (GSAs) and groundwater

sustainable plans (GSPs) for medium and high priority groundwater basins. There are multiple components that go into categorizing a priority level for the basins such as; current population and projected growth overlying the basin, number of public and private wells that draw from the basin, the irrigated acreage overlying the basin, the degree to which individuals rely on the groundwater as their primary source in the basin, and any external impacts on the basin. The San Bernardino Basin in the Upper Santa Ana Valley Area has 0 priority points making it very low on the priority level. The priority points were based on the urban, agricultural, and total groundwater use calculations, which equaled less than or equal to 9,500-acre feet per year. As discussed in the previous sections, the City of Redlands uses water from the Bunker Hill Basin and Yucaipa Basin. Approximately 1.2 of the 5 million acre-feet of storage of the Bunker Hill Basin is accessible for water demand. The Yucaipa Basin is approximately 22,000 acre-feet and 75% of the basin water (approximately 16,600 AF) is used for water demand [2].

3.1.3 Surface Water

The City receives its surface water from the Mill Creek Watershed and the Santa Ana River Watershed. Surface water is treated at the Henry Tate Surface Water Treatment Plant (SWTP) and the Horace P. Hinckley SWTP. The City has ownership in private and mutual water companies to supply water to the City's SWTPs. For decades the City has increased its ownership in these companies in an effort to increase its access to a reliable local source of water. Average surface water totals approximately 38 percent of the City's annual water production for the last several years. The City of Redlands sometimes supplements surface water supplies with SWP water, which is treated at the SWTP and distributed for potable use.

3.1.4 Stormwater

Redlands is participating in regional project planning efforts to capture additional stormwater for purposes of groundwater recharge to increase sustainability of the basins the City relies upon.

3.1.5 Wastewater and Recycled Water

The City is a sewering agency that treats approximately 5.9 million gallons of wastewater daily. The City's Wastewater Treatment Plant (WWTP) has the total capacity to treat 9.0 million gallons per day (MGD), up to 7.2 MGD of which can be treated to the tertiary level for Title 22 compliance. Treated wastewater distributed to City customers is tertiary effluent treated to Title 22 compliance. The City's recycled water customers include Southern California Edison (SCE) Company, a landfill and recycled/non-potable water customers. SCE uses recycled water as cooling water at its Mountain View Power Plant and recycled/non-potable water customers use recycled water for irrigation when supply is available. All remaining wastewater is treated to a secondary level and released into spreading basins located east of the WWTP for recharge back into Bunker Hill basin. In 2020, approximately 1.6 MGD of treated wastewater was used as recycled water supply for customers, and 3.4 MGD was used for recharge.

[2] Source : https://groundwaterexchange.org/basin/upper-santa-ana-valley-3/

3.1.6 Exchanges, Transfers and Interties

Redlands exchanges water with Valley District and other local water agencies through various agreements. The City operates two interconnections – one with Western Heights Water Company and the other with the City of Loma Linda. In addition, Redland's water utility is in the process of updating its Water and Recycled Water Master Plans to identify needed distribution system upgrades as well as increase the reliability of its current water supplies.

3.1.7 Projected Water Supplies

The water supplies are utilized in the City to satisfy water demands. In 2020, the volume of water supplies was 28,098 AFY. Table 5 below shows projected supply sources for the City of Redlands.

Table 5 - Projected Water Supplies (AFY)

Water Supply	Additional Detail on Water Supply	Projected Water Supply				
		2025	2030	2035	2040	2045
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Groundwater (not desalinated)	Bunker Hill (part of SBB)	12,973	13,922	14,861	15,677	16,484
Groundwater (not desalinated)	Bunker Hill (part of SBB)	3,766	4,015	4,275	4,513	4,760
Groundwater (not desalinated)	Yucaipa	1,000	1,000	1,000	1,000	1,000
Surface water (not desalinated)	Santa Ana River (part of SBB)	5,000	5,000	5,000	5,000	5,000
Surface water (not desalinated)	Mill Creek (part of SBB)	5,500	5,500	5,500	5,500	5,500
Purchased or Imported Water	SWP - Direct Deliveries	700	700	700	700	700
Recycled Water	Recycled Water - Direct	2,100	2,100	2,100	2,100	2,100
TOTAL		**31,039**	**32,237**	**33,436**	**34,490**	**35,544**

Notes:
Source: Table 4-12, City of Redlands Chapter of the IRUWMP (July 2021).

3.2 CITY WATER DEMANDS

The City categorizes its water demands into six categories for potable deliveries: Single Family, Multi-Family, Commercial/Institutional, Landscape, Agricultural Irrigation, and Other, which includes fire suppression, construction water, and bulk water sales. Redlands also makes deliveries of non-potable water to three customer categories: Commercial/Institutional, Landscape, and Agricultural/Landscape Irrigation, and delivers recycled water to Mountain View Power Plant and a landfill from the City of Redlands Wastewater Treatment Plant (WWTP).

Recycled water that is not discharged or used by those two customers is mixed with non-potable water from wells and is delivered to customers served by the City's non-potable system. This water is billed as "raw water" in the City's billing system. Bear Valley Mutual Water Company delivers wholesale raw water to Redlands and Redlands delivers non-potable water to Bear Valley Mutual Water Company through multiple agreements. Additionally, Redlands delivers wholesale potable water to Rocky Comfort Mutual Water Company. The number of active connections in each category from 2016 to 2020 are shown in Table 6.

Table 6 - City of Redlands 2016-2020 Connections by Customer Class (AF)

Land Use Type	2016	2017	2018	2019	2020
Single Family	19,515	19,526	19,532	19,473	19,922
Multi-Family	966	962	961	952	980
Commercial / Institutional	1,357	1,357	1,353	1,363	1,397
Landscape	527	521	525	528	533
Agricultural Irrigation	34	35	30	32	17
Other	633	650	658	672	696
Commercial / Institutional - Raw	8	9	10	10	11
Landscape - Raw	111	121	124	124	135
Agricultural Irrigation - Raw	13	9	10	5	3
Total Potable and Raw	*23,164*	*23,190*	*23,203*	*23,159*	*23,694*
Recycled Water	2	2	2	2	2
Total	**23,166**	**23,192**	**23,205**	**23,161**	**23,696**

Notes:
Source: 2020 City of Redlands IRUWMP (Part 2, Chapter 4)

Southern California's urban water demand has reduced significantly on a per-capita basis largely due to the mandates from the Water Conservation Act, and 2014 and 2015 water reduction proclamations. These laws required all of California's retail urban water suppliers serving more than 3,000 acre-feet per year (AFY) or 3,000 service connections to achieve between 20 and 35 percent per-capita reduction from 2013 water consumption levels. Redlands has participated in the San Bernardino Valley Municipal Water District (SBVMWD) water use reduction programs through the former California Urban Water Conservation Council (CUWCC) and is continuing those efforts through the State Water Board. Redlands met their target goals and is in good standing for maintaining eligibility for State programs that offer grants and loans for critical water projects.

Water demand within the Redlands service area is dependent on many factors such as local climate conditions and the evolving hydrology of the region. Demographics, land use characteristics, and economics are also key factors affecting the City's water demands. In addition to local factors, the watersheds of California's imported water supply continue to experience drought conditions which may continue to be a significant impact on future water supplies.

Potential effects of global climate change is a factor and concern for water managers and planners for California's future water supplies. To confirm water supplies can meet demands, demands are tracked by assessing demographics, conservative practices and projecting demands into the future as described in more detail below.

3.2.1 Demographics

Southern California Association of Governments (SCAG) developed a population forecast called the 2020 Connect SoCal Regional Transportation Plan and has estimated the population, households, and employment in 2020, 2035, and 2045 inside each of the approximately 11,300 traffic analysis zones (TAZs) that cover the SCAG region. Estimated 2020 and future year population for the City of Redlands is shown in Table 7.

Table 7 - Current and Projected Population

Population Served	2020	2025	2030	2035	2040	2045
TOTAL	78,052	81,367	84,822	88,424	91,727	95,153

Notes:
Source: Table 4-1, City of Redlands chapter of the IRUWMP (July 2021).

3.2.2 SBX7-7 Baseline and Targets

The Water Conservation Act of 2009 required the State of California to reduce urban per capita water use by 20 percent by 2020. Each water agency was required to establish per-capita water use targets for 2015 and 2020. The City's baseline and 2020 target were calculated in the 2015 Regional Urban Water Management Plan and was not changed for the 2020 plan. The City's calculated water use target for 2020 is 285 GPCD. Through the implementation of its active water conservation program, Redlands met this target as shown in Table 8. To maintain this level of water use, Redlands intends to continue its current level of outreach and water use efficiency programs for the foreseeable future.

Table 8 - SBX 7-7 2020 Compliance

2020 Water Use Target GPCD	Actual 2020 GPCD	Supplier Achieved Target Reduction for 2020?
285	279	Yes

Notes:
Source: Table 4-7, City of Redlands chapter of the IRUWMP (July 2021).

3.2.3 Projected Water Use

The demand factors for each customer class were based on connection and demand data from calendar year 2020, which was reviewed against demand factors from other years and determined to be a reasonable representation of average demands. The number of future new connections for each customer category was estimated for each 5-year period through 2045 based on the projected SCAG population growth rate for years 2020-2035 and 2035-2045.

To estimate future water use for each customer category, the demand factor is multiplied by the number of estimated new connections and added to the 2020 use of existing customers in that category. This process is applied to each customer type for a breakdown of the estimated future water use. Redlands anticipates that future commercial/institutional connections will be dual plumbed with both a potable service for indoor demands and non-potable service for outdoor demands. Both potable and raw commercial/institutional demands were adjusted to reflect this. Additionally, recycled water demand at the Mountain View Power Plant and landfill were assumed to be equal to their average annual consumption from 2016 to 2020. Projected water demands by customer class are summarized in Table 9 is taken from the Redlands 2020 UWMP.

Table 9 - Redlands Projected Water Demands (AFY)

Land Use Type	2025	2030	2035	2040	2045
Single Family	12,943	13,470	13,997	14,461	14,925
Multi-Family	3,036	3,160	3,284	3,393	3,501
Commercial / Institutional	3,081	3,145	3,209	3,265	3,321
Landscape	2,292	2,385	2,478	2,560	2,643
Agricultural Irrigation	206	206	206	206	206
Other	206	214	223	230	238
Commercial / Institutional - Raw	248	319	391	454	517
Landscape - Raw	1,451	1,510	1,569	1,621	1,673
Agricultural Irrigation - Raw	9	9	9	9	9
Water Losses	2,347	2,442	2,537	2,620	2,703
Subtotal Potable and Raw	*25,819*	*26,860*	*27,903*	*28,819*	*29,736*
Recycled Water Demand	1,173	1,173	1,173	1,173	1,173
Total	**26,992**	**28,033**	**29,076**	**29,992**	**30,909**

Notes:
Source: Table 4-5 and 4-6, City of Redlands chapter of the IRUWMP (July 2021).

The City's demand is projected to increase about 13% from 2020 to 2045. Redlands can produce additional groundwater to meet increases in demand in dry years. These water supply and demand projections summarized in Sections 3.1 and 3.2 can be utilized to confirm there is adequate supply to satisfy the City's water demands, in addition to the proposed Project now and into the future. This is described in more detail in Section 4 below.

4. REGIONAL WATER SUPPLY RELIABILITY

It is important to project water supplies to meet demands into the future to ensure the proposed Project may be supported. The City's IRUWMP uses population, current and projected water supply and source data, water demand and source data, and factors that affect demands, to perform these projections.

The 2020 Integrated Regional Urban Water Management Plan (IRUWMP) was finalized in May 2021 and has been prepared in compliance with Water Code Sections 10608.20(e) of SB X7-7 and Sections 10608 through 10645 of the Urban Water Management Planning Act (Act). The information included in the 2020 IRUWMP represents the most current and available planning projections of supply capability and demand developed through a collaborative process with the member agencies, including the City of Redlands. The Act requires reporting agencies to describe their water reliability under a single dry-year, multiple dry-year, and average year conditions, with projected information in five-year increments for 20 years.

Supply analysis includes the surface water from Santa Ana River and Mill Creek and local groundwater from the Bunker Hill Basin (part of the San Bernardino Basin) and Yucaipa Basin and small amount of imported water from SWP. If the SWP water is not available, the City will shift to increase groundwater production by recharging the Bunker Hill Basin during the wet years to provide for the dry years.

The findings of the 2020 IRUWMP highlight that the City has supply capabilities that would be sufficient to meet expected demands from 2020 through 2045 under the normal, single dry-year and multiple dry-year conditions. The City also has proposed programs in place to ensure against water shortages in the future. These programs include projects such as the Water Shortage Contingency Plan (WSCP), as mentioned above. The WSCP provides a method of supply and demand and steps to respond to drought conditions. In all climate scenarios, the City estimates potential surpluses in water supply through 2045.

The supply reliability assessment identifies the factors from the IRUWMP that could potentially limit the expected quantity of water available from the City's current source of supply through 2045, under normal years, single-dry years, and multiple dry years up to five consecutive years.

The normal year supply and demand comparison is outlined below in Table 10. The normal year represents the water supplies a supplier considers available during normal conditions. This could be a single year or averaged range of years that most closely represents the average water supply available. Under single dry and extended multiple drought year (5 years) conditions for the 2020 UWMP, the water supply reliability assessment assumes that demands will increase by as much as 10 percent due to increased outdoor water use. A single-dry year is defined as a single year of no to minimal rainfall within a period that average precipitation is expected to occur. An extended multiple drought year (5 years) is defined as the driest five-year historical sequence, which may be the lowest average water supply available for five years in a row. Although water use may decrease in the later years of a multiple year drought due to implementation of conservation measures and drought messaging, the assessment is based on a 10 percent increase throughout the 5-year drought to be conservative.

The City's demands in single dry years are assumed to increase by 10 percent above normal year demands. The local groundwater basins Redlands produces water from have storage for use in dry years allowing Redlands to produce the volume of water needed to meet all of its demands in single dry years. The IRUWMP recognizes that groundwater is no less vulnerable to seasonal and climatic changes than surface water (i.e., local and imported) supplies. The Western-San Bernardino Watermaster, in collaboration with the Basin Technical Advisory Committee (BTAC), monitor groundwater levels and implement supplemental recharge to maintain long term sustainability of local groundwater sources.

Table 10 – Single Dry Year and Normal Year Supply verse Demand Comparison

	2025	2030	2035	2040	2045
Supply Totals	31,039	32,238	33,436	34,490	35,544
Demand Totals	26,991	28,033	29,075	29,991	30,908
Surplus	4,048	4,205	4,361	4,499	4,636
RTV Demand	639	639	639	639	639
Additional Available Capacity	3,409	3,566	3,722	3,860	3,997

Notes:
Source: Table 4-15, City of Redlands chapter of the IRUWMP (July 2021).

The City's demands in multiple dry years are also assumed to increase by 10 percent above normal year demands. The local groundwater basins in Redlands produce water from storage for use in dry years, giving Redlands the ability to produce the volume of water needed to meet all of its net demands in single dry years. The City's supplies are 100 percent reliable during multiple dry years. The projected supply and demand during five consecutive dry years are shown in Table 11.

Table 11 - Multiple Dry Years Supply and Demand Comparison (AFY)

		2025	2030	2035	2040	2045
First Year – Fifth Year	Supply Totals	34,143	35,461	36,780	37,939	39,098
	Demand Totals	29,690	30,836	31,982	32,990	33,998
	Surplus	4,453	4,625	4,797	4,949	5,100
	RTV Demand	*639*	*639*	*639*	*639*	*639*

Notes:
Source: Table 4-16, City of Redlands chapter of the IRUWMP (July 2021).

One factor that effects supply and demand is drought conditions. But since the region uses the local groundwater basins to simulate a large reservoir for long term storage, the effects of a local drought are not immediately recognized. If surface water flows and SWP supplies are reduced in dry years, the City will shift to increase groundwater production in Bunker Hill and increase conservation measures to reduce demands if needed. The City contributes to regional efforts to recharge the Bunker Hill groundwater basin with SWP water and local surface water in wet years when available so that storage is available for use in dry years. As a result, the City's total supplies are not reduced in dry years so 2020 is considered the base year for all

year types. A Drought Risk Assessment (DRA) was performed for the 2020 UWMP, with a focus on the five-year consecutive drought scenario beginning in 2021. Because Redlands has access to groundwater basins with significant storage, total available supplies do not vary on a monthly or seasonal basis, therefore the analysis was conducted on an annual basis. Based on the analysis, the City does not anticipate any shortage due to single or consecutive dry years. Even though localized drought conditions should not affect supply, the City participates in several ongoing water conservation measures and regional recharge projects to optimize and enhance the use and reliability of regional water resources.

The City implements a water shortage contingency plan (WSCP) to put into action as appropriate to reduce the demand during critical drought years or other supply emergencies. The WSCP is a strategic plan that Redlands uses to prepare for and respond to foreseeable and unforeseeable water shortages. A water shortage occurs when water supply available is insufficient to meet the normally expected customer water use at a given point in time. A shortage may occur due to water quality changes, climate change, drought, regional power outage, and catastrophic events (e.g., earthquake). Additionally, the State may declare a statewide drought emergency and mandate that water suppliers reduce demands, as occurred in 2014. The WSCP serves as the operating manual that Redlands will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The WSCP provides a process for an annual water supply and demand assessment and structured steps designed to respond to actual conditions. The level of detailed planning and preparation provide accountability and predictability and will help the City maintain reliable supplies and reduce the impacts of any supply shortages and/or interruptions.

4.1 CITY OF REDLANDS LOCAL WATER SUPPLY RELIABILITY

The City of Redlands is required to assess the reliability of their water service to its customers under normal, single-dry and multiple-dry water years. As mentioned above, the City depends on a combination of surface water from SAR and Mill Creek and local groundwater supplies from Bunker Hill Basin to meet its water demands. The City has taken numerous steps to ensure it has adequate supplies to provide for growing demands.

The City has several water demand management measures and resources that further decrease water demands and assist to ensure sustainable water supply for future generations. Some of the main requirements are summarized below [3]:

- Residential
    - Outdoor watering is restricted to only certain days of the week for certain address's (even addresses verse odd addresses) and no watering on Wednesdays completely.
    - No watering is permitted between the hours of 12:00 p.m. and 8:00 p.m.
    - Controllable leaks must be repaired immediately.
    - No washing down sidewalks, driveways, parking areas, patios, tennis courts, and other paved areas is prohibited.

[3] Source: https://www.cityofredlands.org/post/watering-restrictions

  - No washing vehicles with a hose, unless the hose is fitted with a shut-off nozzle and is completed on the assigned address day of the week not during the hours of 12:00 p.m. and 8:00 p.m.
  - No operating a fountain or decorative water feature, unless the water is part of a recirculating system.
  - No outdoor watering during and 48 hours following measurable rainfall.
  - Refilling or adding of water to swimming/wading pools or spas is allowed only on designated irrigation days and prohibited between 12:00 p.m. and 8:00 p.m.

- Businesses
  - Restaurants, cafes and bars can only serve water to customers on request.
  - Hotels and motels must prominently display a notice providing guests with the option of choosing not to have towels and linens laundered daily.
  - Use of water from fire hydrants is limited to firefighting and other activities necessary to maintain the health, safety, and welfare of the citizens of Redlands

In addition, landscape policies have also been modified to allow drought tolerate landscape throughout the City. Approximately 70% of water use in Redlands is attributed to outdoor irrigation. Programs in the Water Efficiency Rebate Program such as; Weather Based Irrigation Controllers (WBIC's) and Drought Tolerant Lawn Conversions, have been successful in reducing water demands throughout the City's service area.

5. CONCLUSION

The proposed RTV project includes changes to the land use of the commercial retail, landscaped areas (open space and parks), and residential and hotel areas. The change in land use results in a net annual increase of 570,746 gallons per day, or 639 AFY. The total demand of the project site will be 1,996 AFY.

The City of Redlands obtains the vast majority of its supplies from local sources. Redlands receives its water from local surface and groundwater, treated wastewater, raw water, and purchased (imported) water. Supplemental sources are called upon from the State Water Project, SWP, only when needed. Recycled water will be supplied by the City to the Project for outdoor irrigation and other non-potable uses.

Even with the addition of the water demand from the RTV project, the City will have surplus water supplies available over the next 25 years. The WSA includes an analysis of reliability of the City's water supplies and concludes with a sufficiency analysis of water supply during normal, single-dry, and multiple dry years.

The WSA identifies programs and activities that the City is managing to enforce lowering water demand and assist with sustainable water supply for the future. The City, inclusive of the proposed RTV project, will have an adequate supply of water now and 25 years into the future.

6. REFERENCES

2020 City of Redlands Urban Water Management Plan. Found here:

https://www.cityofredlands.org/sites/main/files/file-attachments/part_2_chapter_4_redlands_2020_uwmp.pdf?1622145365

Regional Transportation Plan and Sustainable Communities Strategy. Found here:

https://scag.ca.gov/read-plan-adopted-final-plan

Senate Bill No. 1262, CHAPTER 594, found here:
http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1262

SGMA Groundwater Information Center Interactive Map Application, found here:
https://gis.water.ca.gov/app/gicima/

Transit Villages Specific Plan, Redlands, California, found here:

https://redlandstransitvillages.org/resources/

7. TECHNICAL APPENDICES

Appendix A – Proposed Project Water Demand Calculations

APPENDIX A

PROPOSED PROJECT WATER DEMAND CALCULATIONS

Proposed Project Water Demand Calculations for Redlands Transit Village

Proposed Buildout:

Residential				
Type of Dwelling Unit ***(estimate only)***	**Number of Units (and %)** ***(estimate only)***	**Avg. Floor Area per Dwelling Unit** ***(estimate only)***	**Gross building square footage** ***(estimate only)***	**Gross building Acreage** ***(estimate only)***
Studio	600 (25%)	650	390,000	
1 bedroom	600 (25%)	750	450,000	
2 bedrooms	600 (25%)	1,000	600,000	
3 bedrooms	600 (25%)	1,300	780,000	
Residential Total	2,400 (100%)	925 avg.	2,220,000	
Retail Commercial	--	--	265,000	6.08
Office	--	--	238,000	5.46
Hotel	220	--	110,000	
Open Space and Parks	--	--	280,000	6.43

Unit Water Demands (Based on the City of Redlands "Water and Sewer Demands Spreadsheet" (May 8, 2019)):

Table 8-1. Water Demands		
Land Use Type	**Water Demand**	
	gpd/du	**gpd/acre**
Apartments	210	
Housing (single family)	280	
Hotel (100 gpd/room)	100	
Civic (0.10 gpd/sf)		4536
Commercial (0.05 gpd/sf)		2178
Parks (0.07 gpd/sf)		3050

Calculations:

1. Residential Total: Residential Total dwelling units x Apartments water demand
    a. *2400 DUs x 210 GPD/DU = 504,000 GPD*
2. Commercial Totals Retail: Retail gross building footage x commerical water demand
    a. 6.08 acres x 2178 GPD/acre = 13,242 GPD

3. Commercial Totals Office: Office gross building footage x commerical water demand
    a. *5.46 acres x 2178 GPD/acre = 11,892 GPD*
4. Hotel Total: Hotel Total dwelling units x Hotel water demand
    a. *220 DUs x 100 GPD/DU = 22,000 GPD*
5. Parks Total : Open Space and Parks gross building footage x Parks water demand
    a. *6.43 acres x 3050 GPD/acre = 19,612 GPD*
6. The proposed water demand summed all together for the different land uses:
    a. *504,000 + 13,242 + 11,892 + 22,000 + 19,612 = 570,746 GPD*
    b. *570,746 GPD / 892 GPD / 1 AFY = 639 AFY*

Summary:

apartments water demand	commercial water demand		hotel water demand	parks water demand	TOTALS	
residential total	retail commercial	office	hotel	open space and park	Grand Total (GPD)	Grand Total (AFY)
504,000	13,242	11,892	22,000	19,612	**570,746**	**639**