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MEMORANDUM

To: Bruce Grove, Senior Planner
SHN Engineers and Geologists

Date: October 9, 2018

From: Greg Young, P.E.
Kris Olof

Subject: Water Supply Evaluation for the Dignity Health North State Pavilion Project

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The purpose of this memorandum is to detail the assessment of availability and sufficiency of potable water to serve the water demands of the proposed Dignity Health North State Pavilion Project ("Proposed Project") located in the City of Redding in Shasta ("County") California. Potable water will be provided by the City of Redding ("City") as part of the City's historic and continued retail water service to the surrounding area. This analysis, therefore, relies upon information available from the City, including but not limited to, the City of Redding's 2015 Urban Water Management Plan ("2015 UWMP"), dated June 2016.[1]

As the lead agency under the California Environmental Quality Act ("CEQA"), the City is assessing the potential environmental impacts associated with the Proposed Project. This memorandum has been prepared to support the CEQA analysis regarding the availability and use of the City's potable water resources for the Proposed Project.

1.1 Applicability of Water Code 10910

Section 10912 of the California Water Code ("Water Code") requires the preparation and approval of a Water Supply Assessment ("WSA") for certain development projects. Triggers requiring the preparation of a WSA include, residential developments of more than 500 dwelling units, shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space, commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space and projects that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.[2]

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[1] A copy of the 2015 UWMP is available at https://wuedata.water.ca.gov/uwmp_plans.asp.
[2] Water Code § 10912, subdivision (a).

As detailed later in this section, the Proposed Project does not meet the threshold for requiring a formal WSA. However, the CEQA analysis will need to evaluate the adequacy and potential impacts of water resources used to meet the Proposed Project's water needs. This memorandum provides a basis for the CEQA analysis in a manner that is similar to elements of a WSA.

This memorandum relies upon publicly available information published by the City along with specific Proposed Project information provided by the City and the applicant.

1.2 Water Supply Identification

Though this is not a formal WSA, the WSA statutes require that the lead agency (e.g. the City) identify any water system that is or may become, as a result of serving the Proposed Project, a "public water system"[3] that may serve the project. In this instance, the City is the public water system serving the Proposed Project within the meaning of the law, as its retail water service area includes the lands proposed for development.

As allowed under California Water Code ("Code") Section 10910:

> *"(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*
>
> *(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g)."*

Although the Proposed Project does not require a WSA, this memorandum documents an evaluation of the City's 2015 UWMP and other relevant published materials in a fashion similar to that allowed for a formal WSA as detailed in the Code sections above, which can be used to support the City's CEQA process.

As documented herein, the Proposed Project was found to be included within the demand forecasts of the City's 2015 UWMP, allowing the evaluation and conclusions of water supply availability and sufficiency in that document to represent an analysis of the water supply availability and sufficiency needed to meet demands of the Proposed Project.

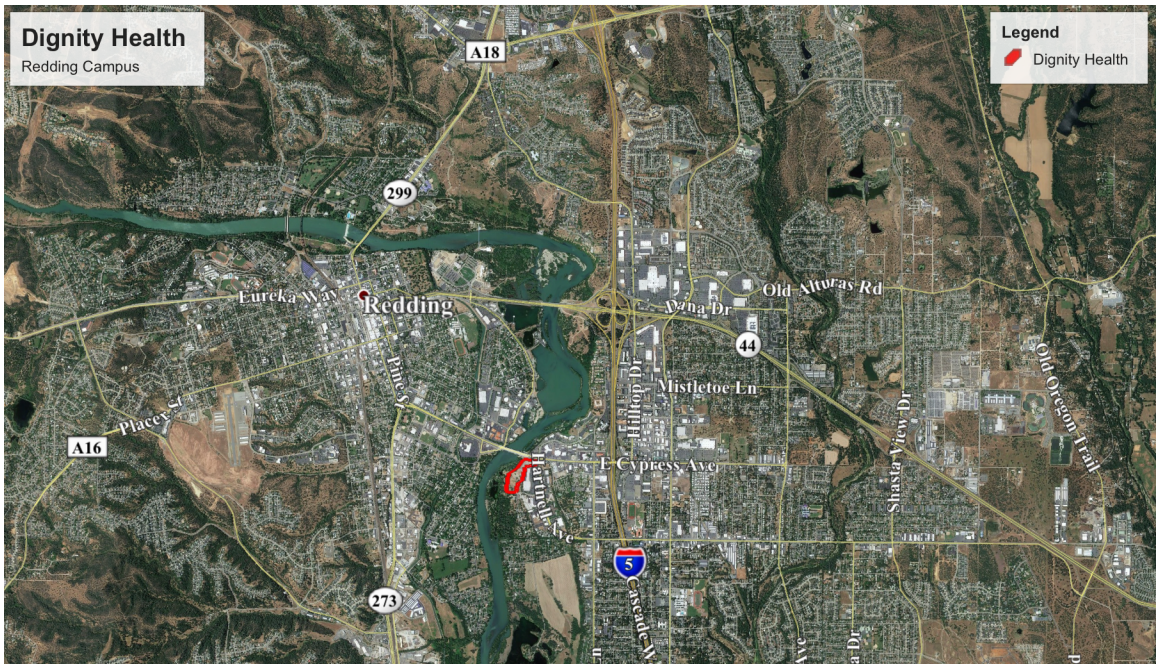
[3] A "public water system" is a system that provides water for human consumption that has 3,000 service connections.

1.3 Proposed Project Description

The Proposed Project is located on a 10.55-acre parcel located between the Sacramento River, Cypress Avenue, the vacant Raley's Shopping Center, and Cobblestone Shopping Center (see **Figure 1-1**). Historically a number of activities have occurred on the project site including a former bridge location, cement plant, gas station, commercial uses, and staging for the recent Cypress Bridge Replacement. Many of the structures from former uses have been removed from the project site but some are still visible. The proposed project site is today largely vacant and is intended to be converted into a medical campus to serve the surrounding City.

The currently vacant site will be developed into 3 separate buildings spread across the project site. Building "A" is intended to have 4 stories and a total of 80,000 square-feet (sf) of floor space. Building "B" is intended to have 3 stories and a total of 27,800 sf of floor space. Building "C" is intended to have a single story and a total of 21,800 sf of floor space. Surrounding the buildings will be approximately 2.11 acres of water efficient landscaping, and 549 parking spaces. **Figure 1-2** presents the draft site plan detailing approximate lot locations and layouts. **Table 1-1** summarizes the land uses.

Figure 1-1 – Proposed Project Site[4]



[4] Image from Proposed Project's DEIR Figure 3-2.

Figure 1-2 – Site Plan[5]

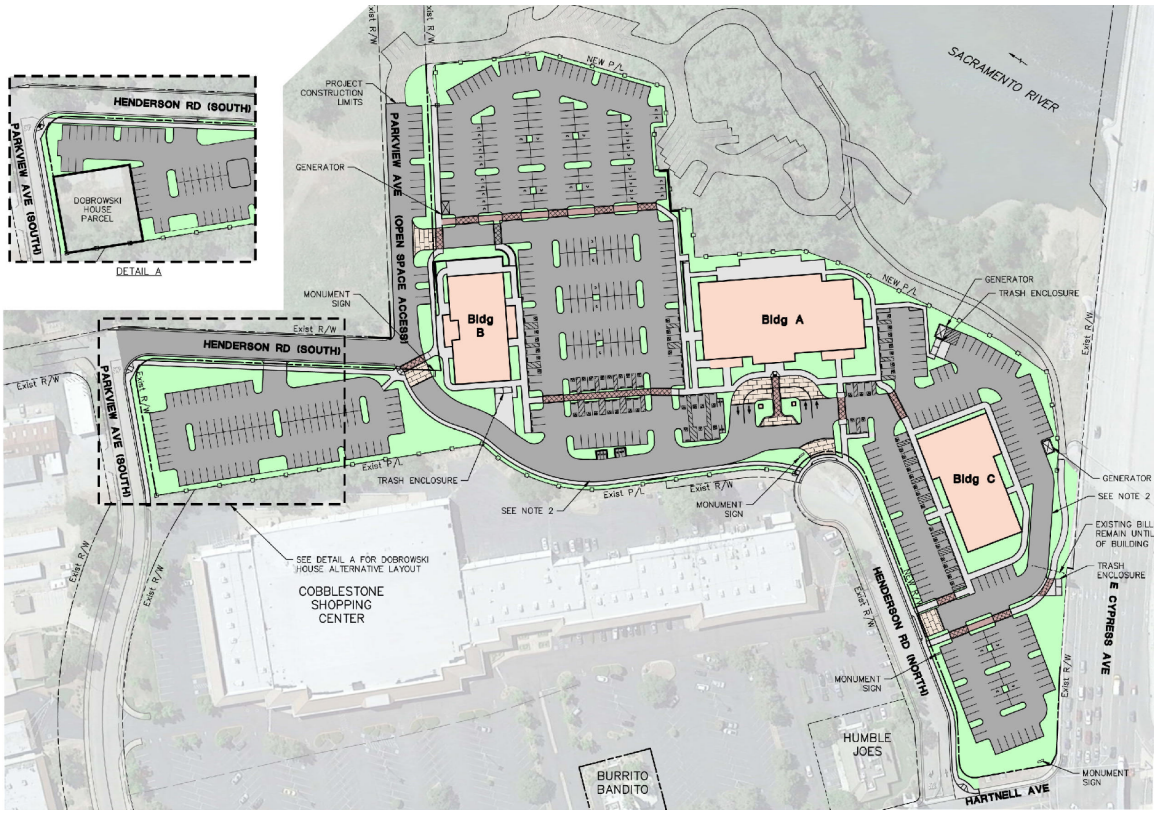


Table 1-1 – Land Use Areas

Land Use	Details
Building A	80,000 SF
Building B	27,800 SF
Building C	21,800 SF
Landscape Area	2.11 Acres
Hardscape Area	549 Parking Spaces
Total	**10.55 Acres**

[5] Image from Proposed Project's DEIR Exhibit 3

2. PROPOSED PROJECT WATER DEMANDS

This section describes the methodology, and provides the supporting evidence used to derive the Proposed Project's estimated annual water demand. This section includes a discussion of:

- Unique unit water demand factors for Proposed Project's indoor and outdoor uses
- Estimate of total Proposed Project water demand at build-out

For the purposes of calculating water demand, build-out is expected to occur within a year of starting construction.

2.1 Demand Factor Development

As detailed in **Section 1**, the Proposed Project is planned as a medical campus focused as a wellness center for ambulatory medical offices and clinics. Lacking an emergency room and other typical hospital features, this would be considered an "outpatient" facility. To understand the water needs of the entire Proposed Project, unique demand factors that correspond with each unique project element are necessary. This subsection presents the methodology for determining the unit water demand factors that become the basis of the Proposed Project water demand estimates.

Values developed for each distinct group are based on several sources of information as detailed in the following subsections.

2.1.1 Current and Future Mandates

There are several considerations that affect the development of unit water demand factors, ranging from state landscape mandates to changes in the plumbing and building codes. The most important factors for this analysis are described below.

2.1.1.1 Water Conservation Objectives

On November 10, 2009, Governor Arnold Schwarzenegger signed Senate Bill No. 7 (SBX7-7), which established a statewide goal of achieving a 20 percent reduction in urban per capita water use by 2020 for urban retail water suppliers.[6] Since the Proposed

[6] California Water Code § 10608.20

Project is yet to be built and it may only have limited use by 2020, its effect on the City's reduction goal will likely not be noticeable.[7]

The efforts undertaken by the City, the County, and throughout the State by other urban retail suppliers to comply with this statute, though not directly, will affect the Proposed Project's use of appliances, fixtures, landscapes and other water using features, through changes or additions to City and/or County ordinances as well as state law and/or through an emerging "conservation ethic" developing throughout the state.

2.1.1.2 Indoor Infrastructure Requirements

In January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (hereafter the "CAL Green Code") that requires the installation of water-efficient indoor infrastructure for all new projects beginning after January 1, 2011. CAL Green Code was incorporated as Part 11 into Title 24 of the California Code of Regulations. The Cal Green Code was revised in 2013 with the revisions taking effect on January 1 of 2014, however these revisions did not have substantial implications to the water use already contemplated by the 2010 Cal Green Code.[8] The CAL Green Code applies to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure. The Proposed Project must satisfy the indoor water use infrastructure standards necessary to meet the CAL Green Code.

The CAL Green Code requires nonresidential water efficiency and conservation measures for new buildings and structures that will reduce the overall potable water use inside the building by 20 percent. The Proposed Project will satisfy one of these two requirements through the use of appliances and fixtures such as high-efficiency toilets, faucet aerators, on-demand water heaters, or other fixtures as well as Energy Star and California Energy Commission-approved appliances appropriate for use in the medical services industry.

2.1.1.3 California Model Water Efficient Landscape Ordinance and County Ordinances

The Water Conservation in Landscaping Act was enacted in 2006, requiring the California Department of Water Resources (DWR) to update the Model Water Efficient Landscape Ordinance (MWELO).[9] In 2009, the Office of Administrative Law (OAL)

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[7] The Proposed Project is residential, so does contribute to the City's population. Yet, its demand will be factored into the future per-capita values for the City. Given the City's already sizeable annual demand in comparison to the Proposed Project, it is unlikely this project noticeably effects the reduction target either in a positive or negative manner.

[8] "The 2010 CAL Green Code was evaluated for updates during the 2012 Triennial Code Adoption Cycle. HCD evaluated stakeholder input, changes in technology, implementation of sustainable building goals in California, and changes in statutory requirements. As such, the scope of CAL Green was increased to include both low-rise and high-residential structures, additions and alterations." *Guide to the 2013 California Green Building Standards Code (Residential)*, California Department of Housing and Community Development, 2013.

[9] Gov. Code §§ 65591-65599

approved the updated MWELO, which required a retail water supplier or a county to adopt the provisions of the MWELO by January 1, 2010, or enact its own provisions equal to or more restrictive than the MWELO provisions.[10]

In response to the Governor's executive order dated April 1, 2015, (EO B-29-15), DWR updated the MWELO and the California Water Commission approved the adoption and incorporation of the updated State standards for MWELO on July 15, 2015.[11] The changes included a reduction to 45 percent for the maximum amount of water that may be applied to a landscape for non-residential projects, which effectively reduces the landscape area that can be planted with high water use plants. The MWELO applies to all types of new construction with a landscape area greater than 500 square feet (the prior MWELO applied to landscapes greater than 2,500 sf).[12] For non-residential projects, the coverage of high water use plants is reduced due to the new 45 percent water maximum and turf is limited. The City of Redding adopted a new landscaping ordinance in 2015 which complies with MWELO provision requires the planned projects submit landscaping plans.[13] For the purposes of this WSE it is assumed that the landscape ordinance will result in a maximum irrigation demand in line with MWELO as required by law.[14]

In addition to MWELO, the City also has water conservation measures it continually encourages to limit water waste and promote conservation, which will be updated to reflect the newly mandated state-wide prohibitions authorized under the Governor's Executive Order B-37-16.[15]

2.1.1.4 Metering, Volumetric Pricing, and Water Budgets

California Water Code §525 requires water purveyors to install meters on all new service connections after January 1, 1992. California Water Code §527 requires water purveyors to charge for water based upon the actual volume of water delivered if a meter has been installed. The City currently bills customers on a volumetric basis, though this action alone does not necessarily reduce water use, or such reductions have already occurred.

[10] California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 27, Sec. 492.4. The MWELO provides the local agency discretion to calculate the landscape water budget assuming a portion of landscape demand is met by precipitation, which would further reduce the outdoor water budget.
[11] These updated changes have been incorporated into California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 27, Sec. 490-495.
[12] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.
[13] City of Redding Municipal Code 16.70
[14] The City of Redding will be responsible for reviewing and approving the Proposed Project's landscape plan as part of its authorities authorized under the MWELO provisions and as a condition of service.
[15] Executive Order B-37-16 (issued in May 2016) includes a directive for the State Water Resources Control Board to permanently prohibit a defined set of practices that waste potable water.

2.2 Demand Factors

This subsection describes the methods used and the values estimated for unit water demand factors for the Proposed Project. Indoor demand factors are represented as the quantity of water in gallons per year per square foot (gpy/sf). Outdoor demand factors are represented as the quantity of water in acre-feet per acre (af/ac) per year.

The indoor and outdoor components are ultimately combined into a total project demand.

2.2.1 Indoor Demand Factors

This subsection discusses the indoor elements of the Proposed Project. The Proposed Project includes a number of medical demands characteristic of an outpatient care facility. These are addressed below.

- *Medical Related Office Space*: The Proposed Project anticipates a portion of the project to be office space. Water use data for office space is readily available and well defined, however there is a wide range of use numbers due to a long service life for commercial buildings. This WSE uses data from the more efficient side of the spectrum to reflect the impact of low and zero water use fixtures. Based upon national averages, office water demand for newer buildings is approximately 15 gpy/sf (gallons per year per square-foot).[16]

- *Outpatient Care Facilities*: The Proposed Project fits the descriptions of an outpatient care facility and some data exists providing some national averages for care facilities. This WSE uses data from the more efficient side of the spectrum to reflect the impact of low and zero water use fixtures. Based upon national averages, outpatient water demand for newer buildings is approximately 16 gpy/sf (gallons per year per square-foot).[17]

- *Historic Billing Data from Other Dignity Health Facilities*: The Proposed Project is similar to a number of other Dignity Health Facilities located within the state. The project Applicant has provided water billing information for similar facilities, which were also analyzed. A Dignity Health Facility located in Elk Grove appears most similar to the Proposed Project, with a water usage of approximately 17 gpy/sf.

[16] US Energy Information Administration Commercial Buildings Energy Consumption Survey www.eia.gov/consumption/commercial/data
[17] US Energy Information Administration Commercial Buildings Energy Consumption Survey www.eia.gov/consumption/commercial/data

Since the water use data for an existing, similar facility is consistent with national averages, this WSE assumes a demand of 17 gpy/sf for all the indoor area. This provides a slightly more conservative value, and allows for flexibility in actual uses.

2.2.2 Outdoor Landscape Area

The Proposed Project's landscape elements include the following assumed type and areas of landscaping that transition from a typical commercial style to the more natural landscape towards the Sacramento River:

- *High Water Use Turf Areas:* This landscape area is located adjacent to the public entrances to Building A and adjacent to the existing landscaping on Hartnell Avenue. This turf area totals approximately 10% of the total landscape area.

- *Medium Water Use Landscape Areas:* This landscape area is located primarily around Building A and Building C to transition from the landscape style on Hartnell Avenue. This area totals approximately 30% of the total landscape area.

- *Low to Medium Water Use Landscape Areas:* This landscape area is located south of Building A and around Building B as well as in the larger parking area. This area totals approximately 30% of the total landscape area.

- *Low Water Use Landscape Areas:* This landscape is located around in the outlying parking areas and adjacent to the non-landscaped areas along the Sacramento River. This area totals approximately 30% of the total landscape area.

The actual water use of each landscape area will be determined by the specific plants used and spacing. Total water demands must be equal to or less than the MWELO Maximum Applied Water Allowance (MAWA) limit. The MAWA, determined as 45 percent of the reference evapotranspiration for the area, uses the following equation:

- MAWA = (ETo) (0.62) (0.45 x LA), *where ETo is the reference evapotranspiration in inches per year, LA is the landscape area, and 0.62 is a conversion factor. The resulting value is in "gallons per year."*

For the purposes of this WSE the proposed project is assumed to use the MAWA to meet landscape demands. Using the local ETo data of 54.7 inches per year, with a landscape area of 2.11 acres (converted to square feet), the total demand for irrigation was found to be approximately 4.3 AF/year.[18]

[18] MAWA formula = 54.7 inches X 0.62 X 0.45 X 43,560 sf = 664,782 gallons = 2.04 acre-feet/acre/year

2.3 Other Water Demands

This section describes the other incidental water demands which accompany a project such as the one described in this WSE

2.3.1 Construction Water Demands

Initiation of the Proposed Project will include site grading and infrastructure installation. These and other construction elements will require dust suppression and other incidental water uses. These are estimated to be nominal, and do not continue beyond the construction phases of the Project. For purposes of identifying incremental water demands, construction water is assumed to be 1 acre-foot per year. The Proposed Project is anticipated to be constructed and operating within a year of breaking ground.

2.3.2 Non-Revenue Water Demands

The Proposed Project demand presented previously represents the demand for water at the project location. To fully represent the Proposed Project's demand on the water purveyor, distribution system losses must also be included. Often, distribution system losses represent water that is lost due to system leaks, fire protection, construction water, unauthorized connections, and inaccurate meters. Essentially, this is the water produced by the City that is not delivered to customers – representing either a real loss or an apparent loss (e.g. such as may result when a customer meter underreports actual use). In most instances, the predominant source of distribution system losses is from leaks that inevitably exist throughout the many miles of pipes and fitting that bring water to the City's customers.

The City reported a 5.9 percent loss factor to be representative of non-revenue water based on its historical data in the 2015 UWMP.[19] This value represents the additional water the City must treat, convey and deliver water to assure the Proposed Project's demand are satisfied. As shown in **Table 2-1** non-revenue demand is estimated to be approximately 0.65 acre-feet per year.

2.5 Water Demand Projection

Using the indoor and outdoor demands developed in the prior subsections, the overall Proposed Project demand is represented in **Table 2-1** with a total consumptive water demand of 11.7 acre-feet per year following the completion of the project. For purposes of this WSE, this estimate is rounded to 12 acre-feet per year, reflecting a normal condition demand for the Proposed Project at build-out.

[19] City of Redding 2015 Urban Water Management Plan (June 2016), p. 19.

Table 2-1 – Estimated Water Demand

	Unit Count or SF						Demand Factor	Demand (af/yr)					
Category	Current	2020	2025	2030	2035	2040	(gpy/sf or gpy each)	Current	2020	2025	2030	2035	2040
Indoor													
Office Space	0	129,600	129,600	129,600	129,600	129,600	17.00	0	6.8	6.8	6.8	6.8	6.8
Outdoor													
Landscaping	0	2.1	2.1	2.1	2.1	2.1	2.04	0	4.3	4.3	4.3	4.3	4.3
Other Miscellaneous Uses													
Construction Water	0	1	0	0	0	0	1	0	1	0	0	0	0
							Outdoor Subtotal	0	1	0	0	0	0
							Indoor Total	0	6.8	6.8	6.8	6.8	6.8
							Outdoor Total	0	5.3	4.3	4.3	4.3	4.3
							Total	0	12	11	11	11	11.07
							Outdoor Non-revenue water 5.9%	0	0.3	0.3	0.3	0.3	0.3
							Indoor Non-revenue water 5.9%	0	0.4	0.4	0.4	0.4	0.4
							Total Indoor	0	7.2	7.2	7.2	7.2	7.2
							Total Outdoor	0	5.6	4.6	4.6	4.6	4.6
							Total Proposed Project Demand	**0**	**12.8**	**11.7**	**11.7**	**11.7**	**11.7**

3. WATER SUPPLY AND RELIABILITY

The forecast water supplies presented in the prior section are expected to be fully met by potable water supplies provided by the City. Therefore, to fully assess the reliability of the City's supplies to serve the Proposed Project, a review and assessment of the City's overall supply and demand characterization is necessary. This section includes discussions of the City's forecast demands, characterizations of its supplies, and discussions of water supply shortages under dry conditions.

3.1 City of Redding Forecast Water Demand

The overall water demand for the City is developed and presented within the 2015 UWMP, adopted by the City in June 2016. In that document, the City provides in-depth discussion regarding its customer types and determinations of overall demand based on historic trends and projected growth. A summary of the demands calculated by the City in the 2015 UWMP is provided in **Table 3-1**. The Proposed Project, considering its location within the City Limits, is assumed to be represented within the 2015 UWMP's projected growth. Given the Proposed Project's demand estimate of 12 acre-feet, it is assumed to represent the equivalent of about 0.06% of the total City demand.[20]

This is based upon the following representation by the City used to calculate its future demands:

1. "*Growth in the Redding urban area from 2015 to 2035 will vary between 0.2 percent and 0.45 percent per year, resulting in a population of approximately 98,000 in 2035*." (2015 UWMP, p. 10)
2. "*Future water demand by sector is estimated based on the assumption that the historically constant mix of service connection types within the City will continue to exist at 2015 proportions*." (2015 UWMP, p. 11)
3. "*For projected water deliveries in 2025 and 2030, average daily use was assumed to hold steady at 224 GPCD. Total water deliveries were calculated as the product of 224 GPCD and the projected population (Table 4) minus unaccounted for system losses (5.9%, see Table 18).*" (2015 UWMP, p. 21)

Thus, the Proposed Project's demand, which would be classified within the City's definition of "Commercial, Institutional/Governmental," is assumed to be part of the anticipated growth for all the sectors.

[20] Based on 2015 demands, City of Redding 2015 Urban Water Management Plan, Table 19, p. 24

Table 3-1: Projected Demand's from 2015 UWMP[21]

Water Use	Estimated Demand (af/yr)				
	2015	2020	2025	2030	2035
M & I Sales	19,057	23,264	23,679	24,183	24,688
Unaccounted For System Losses	2,269	2,775	2,825	2,885	2,945
Total Water Demand	**21,326**	**26,039**	**26,504**	**27,068**	**27,633**

3.2 City of Redding Water Supply

The City has two primary water supply sources and one additional new supply: surface water under two separate contracts with the U.S. Bureau of Reclamation (USBR), local groundwater pumped from City-owned and operated wells within the Redding groundwater basin, and a 40-year water transfer supply contract with Anderson Cottonwood Irrigation District.

3.2.1 Surface Water

The City's USBR contracts allow for supply from the Sacramento River (the Redding Contract) and Whiskeytown Reservoir (the Buckeye Contract) (see **Table 3-2**). Together the surface water supplies account for approximately 70% of the City's annual water production.

Table 3-2: Supply Projections[22]

Supply Source	Supply (af/yr)				
	2015	2020	2025	2030	2035
Redding Contract Supply	15,750	21,000	21,000	21,000	21,000
Buckeye Contract Supply	1,535	6,140	6,140	6,140	6,140
Groundwater Well Supply	7,785	7,000	8,000	9,000	9,000
ACID Supply	500	4,000	4,000	4,000	4,000
Total Water Supply	**25,570**	**38,140**	**39,140**	**40,140**	**40,140**

3.2.1.1 Sacramento River Surface Water

The City "Redding Contract" allows diversions from the Sacramento River.[23] Water is diverted upstream of Diestelhorst Bridge with 5 pumps to lift raw water to the Foothill Water Treatment Plant. The raw water pumps currently have a 30.6 MGD of capacity and the Foothill Water Treatment Plant has a current capacity of 24 MGD with the ability

[21] City of Redding 2015 Urban Water Management Plan, Table 19, p. 24
[22] City of Redding 2015 Urban Water Management Plan, Table 33, p. 40.
[23] Contract #14-06-200-2871A

to expand up to 42 MGD. The Redding Contract was extended for 40 years in 2005 and includes 17,850 AF of base supply and 3,150 AF of Project Supply.[24]

3.2.1.2 Whiskeytown Lake Surface Water

The City's "Buckeye Contract" allows diversions directly from the Whiskeytown Lake via the Spring Creek Conduit.[25] Water is gravity fed to the Buckeye Water Treatment Plant, capable of providing up to 14 MGD to the City of Redding. This contract was negotiated and extended for 40 years in 2005 to provide 6,140 AF of Project Supply.

3.2.2 Groundwater

The City has 16 wells located around the City, which it uses to meet approximately 30% of demands. The City is an active participant in the Redding Area Water Council who worked with the County of Shasta to prepare a Groundwater Management Plan for the Redding Groundwater Basin and is currently participating in efforts to form a regional Groundwater Sustainability Agency.

While the surface water is generally of better quality, the City maintains the wells for emergency operations and for supplementation in drought conditions. The groundwater basin is considered reliable for the purposes of this analysis.

3.2.3 Anderson Cottonwood Irrigation District Contract

The City has a 40-year water transfer supply contract with Anderson Cottonwood Irrigation District. Negotiated around the time the 2015 UWMP was prepared, this contract provides up to 4,000 AFY per year. In dry years, available supply would be reduced to a 3,000 AFY maximum. Actual water deliveries would be dependent on climate conditions and other factors detailed in the contract.

3.3 City of Redding Water Supply Sufficiency

To fully assess the City's water supply, the potential available supply must be considered under normal, dry year, and multi-dry year conditions. As presented in the 2015 UWMP, the City has ample supply to meet its projected demands in average, single, and multi-dry year conditions. The 2015 UWMP representations of supply sufficiency are represented in the following subsections.

[24] "Project Supply" defines the portion of the City's contract that is based upon USBR's water rights. The "base supply" represents the portion of the contract based upon the City's water rights that existed at the time Shasta Dam was originally constructed.
[25] Contract #14-06-200-5272A

3.3.1 Normal Year

During an average water year, when the City receives a normal supply, it is anticipated to have sufficient water to easily meet all future demands. As seen in **Table 3-3**, the City is shown to have sufficient supplies through 2035. Therefore, under normal supply conditions, the Proposed Project's demand of approximately 12 acre-feet annually would be met and would not have any negative impacts on the availability of supply for all the City's existing and other planned future customers.

Table 3-3: Normal Year Supply and Demand[26]

Normal Year Comparison	(af/yr)				
	2015	2020	2025	2030	2035
Supply	25,570	38,140	39,140	40,140	40,140
Demand	21,326	26,039	26,504	27,068	27,633
Surplus	**4,244**	**12,101**	**12,636**	**13,072**	**12,507**

3.3.2 Single Dry Year

During single dry year conditions, the City's surface supplies are subject to shortage conditions that will reduce supply availability as detailed in the USBR contracts. According to the 2015 UWMP, the USBR-imposed curtailment results in a reduction of approximately 4,500 acre-feet (see **Table 3-4**). However, due to the multiple sources and adequate contract quantities, adequate supplies are still available. Actual reductions to surface supplies are based on recent use during non-shortage years, thus actual values may vary from this table.

Table 3-4: Single Dry Year Supply and Demand[27]

Single Dry Year	(af/yr)			
	2020	**2025**	**2030**	**2035**
Supply Totals	34,448	35,448	36,448	36,448
Demand Totals	26,039	26,504	27,068	27,633
Surplus	**8,409**	**8,944**	**9,380**	**8,815**

3.3.3 Multi-Dry Year

Under multi-dry year dry conditions, the City's surface supplies are still subject to USBR-imposed shortages, with specific reductions similar to the single dry year for year one and year two and beyond. The resulting assumptions from the City are included in **Table 3-5**.

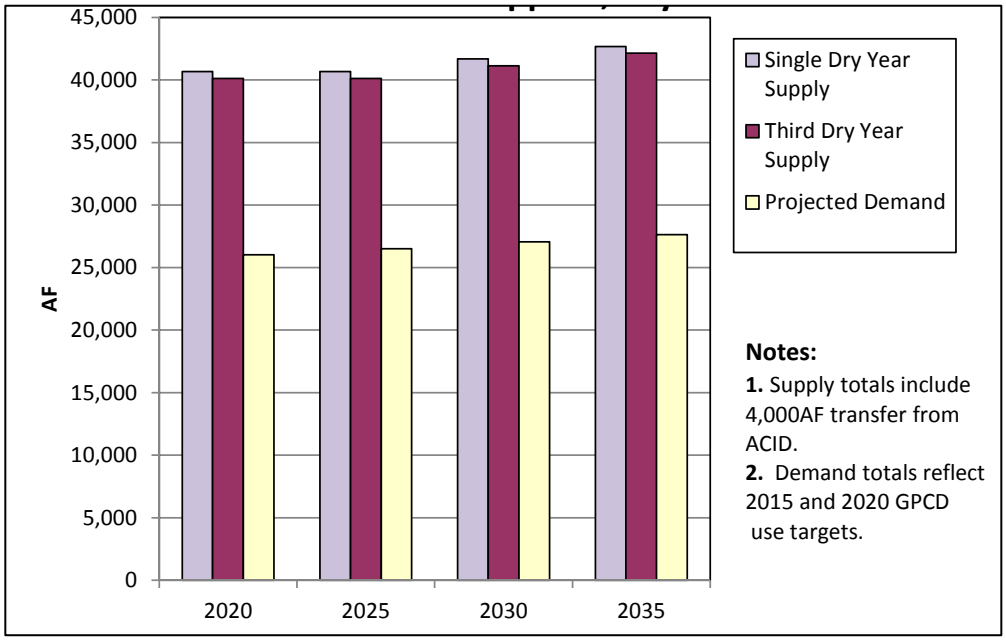
[26] Supply and Demand values obtained from the 2015 UWMP, Table 33, p. 40.
[27] Values obtained from the 2015 UWMP, Table 34, p. 41.

Table 3-5 demonstrates that during a multi-dry year period, the City would have sufficient supplies to meet demands. The groundwater basin could be pumped at a greater rate than historic levels, but expected to have no long-term impacts to the basin.

Table 3-5: Multi-Dry Year Supply and Demand[28]

Multi Dry Year		Water Supply (af/yr)			
		2020	2025	2030	2035
Year 1	Supply Totals	34,448	35,448	36,448	36,448
	Demand Totals	26,039	26,504	27,063	27,663
	Surplus	8,409	8,944	9,385	8,785
Year 2	Supply Totals	34,448	35,448	36,448	36,448
	Demand Totals	26,039	26,504	27,063	27,663
	Surplus	8,409	8,944	9,385	8,785
Year 3	Supply Totals	34,448	35,448	36,448	36,448
	Demand Totals	26,039	26,504	27,063	27,663
	Surplus	8,409	8,944	9,385	8,785

Figure 3-1: City Projected Water Demands and Supplies, Dry Years[29]



[28] Supply and Demand values obtained from the 2015 UWMP, Table 35, p. 42.
[29] Figure 3-1 is Figure 11 in the 2015 UWMP, p. 43

4. MITIGATING SUPPLY RELIABILITY

As presented in **Section 2**, this memorandum estimates water demands for the Proposed Project to be 12 acre-feet of water annually at build-out during normal conditions (inclusive of non-revenue water). For purposes of the analysis in this section, the annual demand of 12 acre-feet is expected to occur within a year of starting construction of all facilities.

As defined in Section 3, the City's USBR contracts have shortage provisions as defined in the individual USBR contracts. Under non-shortage conditions, when USBR declares 100 percent allocations to its contractors, the City has ample water supplies for all its existing and forecast future customers, including the Proposed Project. When Reclamation declares a shortage, the Shortage Policy sets forth an available volume for the City based upon the City's actual diverted volume during the prior three years when allocations were 100 percent (do not have to be consecutive years).[30] The shortage allocation is a percentage of the average of quantities delivered during those three years of 100 percent allocation.[31] The City's Redding Contract has it's reduction criteria that are based on a reduction of average use limited to the April to October period, while the Buckeye Contract is not conditioned to a shortened period of the delivery year.

Because the Proposed Project's demands are anticipated within one-year following the start of construction, the demands should be quickly become part of the baseline demand used for shortage determinations. During such time prior to fully incorporated into the basis for USBR shortages, the Proposed Project would be served with groundwater.

The conclusion that sufficient water is available to meet the Proposed Project water demands rests on the following assumptions, all of which are reasonable as explained above:

- The City successfully achieves its 20x2020 gpcd goals, resulting in the demand conditions estimated for 2035, which include the Proposed Project's demand.
- The City's supply availability under different conditions is consistent with its representation in the 2015 UWMP.
- The Proposed Project develops as represented in Section 1.

[30] Reclamation's Shortage Policy also provides Reclamation the greatest degree of flexibility in allocating available CVP supplies during shortage conditions, including provisions that Reclamation does not make any guarantees of supply, even for existing users.

[31] Note that while CVP allocations in 2016 ultimately were placed at 100% by Reclamation, on-going State mandated conservation requirements placed upon the City are constraining customer use. As such, the use of 2016 in any averaging under Reclamation's Shortage Policy will need to adjust for the inability for the City to allow 100% customer use.