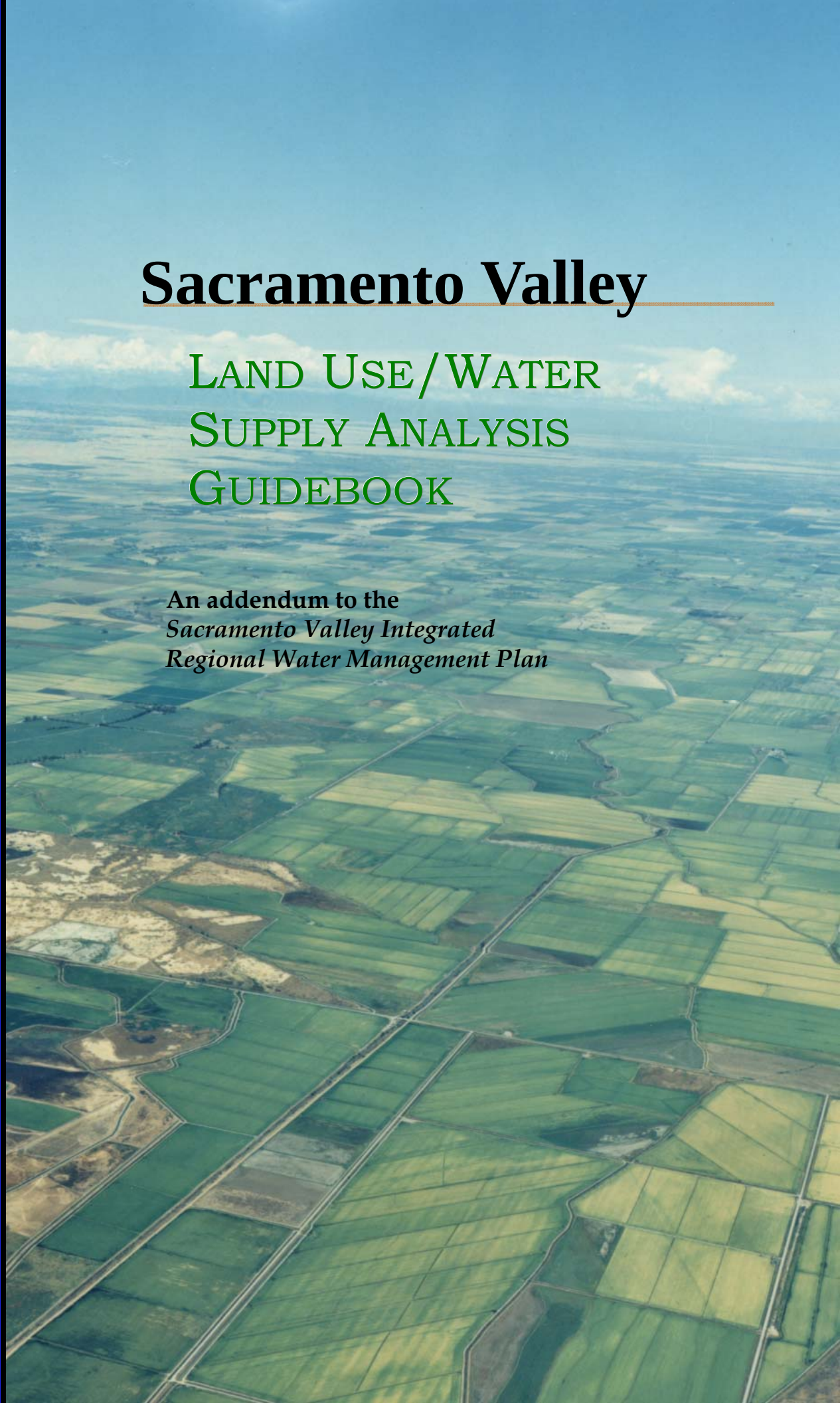
Sacramento Valley

Land Use/Water Supply Analysis Guidebook

An addendum to the
Sacramento Valley Integrated Regional Water Management Plan



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SECTION 1 – INTRODUCTION

1.1 INTRODUCTION

1.1.1. Objective

The primary objective of the Land Use/ Water Supply Guidebook (Guidebook) is to provide members of the Northern California Water Association (NCWA) with practical information to assist them with review or preparation of water supply and demand analyses as part of local land use planning processes. Through a broader understanding of the statutory requirements and relevant analytical methods, NCWA members can help ensure that Sacramento Valley land use planning efforts effectively consider water resources management issues.

The Guidebook builds upon the successful efforts of the participants in the Sacramento Valley Integrated Regional Water Management Plan (IRWMP), which recognize that rapidly changing water use patterns in the Sacramento Valley are impacting business decisions. At the center of this change in Sacramento Valley water use patterns are the changes in land use in a historically agricultural region, driven primarily by urban development that is relying almost exclusively upon groundwater resources to meet new demands. Additionally, changing cropping patterns and managed wetlands may require additional water supplies.

The Guidebook will highlight opportunities to maximize Sacramento Valley water resources and to avoid conflict by identifying the primary processes in California for linking water supply planning and land use planning at the local government level. The Guidebook focuses upon the water supply planning components in relevant land use planning documents, the assumptions used to develop the data and the conclusions, and considerations of the typical scope and depth of the required elements. By clearly identifying the range of reasonable assumptions, water managers, land use planners, special district board members, and local government staff and officials may effectively coordinate their efforts as part of the IRWMP and continue practicing integrated regional water management.

1.1.2. Guidebook Contents

1.1.2.1. Water Supply and Demand Fundamentals

Section 2 reviews land use based water supply and demand fundamentals, including commonly used methodologies to calculate demand. **Section 2** also addresses the nuances and assumptions associated with each identified methodology, and provides approaches to verify demand calculations to ensure the accuracy of the results.

1.1.2.2. The General Plan

Section 3 considers the General Plan elements and focuses on illustrating the issues and interactions between the overall planning process and specific water supply and demand aspects. Not only are water issues addressed with respect to the General Plan's policies, objectives and implementation strategies, but the Guidebook also recognizes that General Plan adoptions and updates are considered "projects" according to the California Environmental Quality Act (CEQA), and therefore an analysis of hydrologic and water quality impacts is a critical element. To this end, the Guidebook outlines a strategy for preparation of a reference document designed to provide supply and demand information sufficient to addressing CEQA issues related to water impacts.

1.1.2.3. The Urban Water Management Plan

Section 4 outlines the foundational water supply document for an urban water supplier – the Urban Water Management Plan (UWMP). **Section 4** also emphasizes the importance of a thorough analysis of all required elements, including a 20-year projection of water supply and demand availability. While a UWMP does not need to contain sufficiency conclusions, the substantive elements of a UWMP may be efficiently utilized to prepare SB 610 Water Supply Assessment (SB 610 WSA) and SB 221 Water Supply Verifications (SB 221 Verification). Therefore, the elements of a UWMP should be carefully prepared with the understanding that the data will likely be used for sufficiency analyses and subsequent documents will be assessed for consistency with prior planning documents.

1.1.2.4. The SB 610 Water Supply Assessment

Section 5 addresses the first of two development-specific water supply planning documents intended to closely link the demands of a set of proposed land uses contained in a proposed project with the water supplies available for that development. The standard for the certainty and reliability of water supplies sufficient to meet the demands of the proposed development is more exacting then that required for the UWMP. Ultimately, because the SB 610 WSA is a source document for an Environmental Impact Report (EIR) prepared for a proposed project pursuant to CEQA, it must provide substantial evidence showing that sufficient water will be available to meet water demands for the water purveyor's existing and planned land uses over a 20-year planning horizon.

1.1.2.5. The SB 221 Water Supply Verification

Similar to a SB 610 WSA, the heart of an SB 221 Verification is the "sufficiency analysis" by the public water system. **Section 6** outlines the information required in the SB 221 Verification may be gained from the SB 610 WSA or other water supply planning documents. Reliance on these documents for the SB 221 Verification, however, requires that these alternative documents meet the verification criteria or a finding that conditions have not changed since the other documents were adopted. Accordingly, preparing documents that are

consistent in analyses of water supply and demand conditions may prove helpful in completing the necessary SB 221 Verification analysis.

1.1.2.6. "Low Threshold" Projects

As discussed in **Section 7**, a "low threshold" project water supply analysis will almost exclusively be contained in the environmental assessment required pursuant to CEQA. Relative to environmental analyses for the other documents discussed in this Guidebook, refined planning stages must contain more detailed analyses of water supplies and the associated uncertainties of the supplies materializing, as well as a detailed analysis of alternatives and their associated environmental impacts.

1.1.2.7. Outreach and Coordination

Section 8 outlines the opportunities for both water purveyors and individuals to coordinate with local government representatives and staff based upon the scope and substance of the information developed in **Sections 3-7**. The outline clarifies roles and responsibilities of land use agencies and water purveyors and identifies opportunities for individuals and entities with both the expertise and a stake in the resource to coordinate efforts for sound regional water management.

The discussion is presented in order based generally upon the level of detail required in the land use planning and water supply and demand analyses. When considered in this fashion, the importance of consistency among water supply planning documents emerges as successive documents can reasonably build upon the assumptions in previous documents. Maintaining consistency, or at least explaining deviations, through each planning document – which can often be years apart - is a challenging but necessary endeavor to help ensure comprehensive and informed water supply and land use planning.

SECTION 2 – WATER SUPPLY AND DEMAND FUNDAMENTALS

2.1 INTRODUCTION

Accurately calculating water demands and assessing water supplies is a fundamental starting point for any water planning analysis – from a General Plan Update to a Senate Bill 610 Water Supply Assessment (SB 610 WSA) to a SB 221 Water Supply Verifications (SB 221 Verification). Although the level of detail required for each water supply planning document may vary depending upon the stage of planning and the quality of information available, the fundamental methodologies for assessing these water planning components remain the same. Accordingly, **Section 2** will describe the methodologies for calculating water demands and tactics for assessing water supplies necessary for comprehensive water planning.

Specifically, **Section 2.2** will:

- Introduce the commonly used methodologies to calculate demand.
- Discuss the nuances and assumptions associated with each identified methodology.
- Provide approaches to verify demand calculations to ensure the accuracy of the results.

Section 2.3 will:

- Provide an overview of California water rights law.
- Identify other factors that may shape water supply assessments.
- Assess dry year supply calculations in light of the regulatory environment.

2.2 WATER DEMAND FUNDAMENTALS

2.2.1 Introduction

One of the most important elements of any water supply analysis is the demand projection methodology. Choosing a methodology should be predicated on the land use plan that is being examined and the prevalence of relevant information. Each methodology has limitations and each final demand calculation is essentially a future prediction.

The two methodologies most commonly used to project water demands are described below – land use based and population based. The land use based methodology is generally superior because it has the flexibility to account for varying types of existing and future land uses. The quality of land use information will generally dictate the accuracy of demand

projections. The population-based methodology has useful application where population projections can be easily ascertained, but it lacks the flexibility in addressing variations in land use patterns. Where practicable, developing a comparative analysis using both methodologies is ideal, as this tends to minimize the effect of each method's inherent weaknesses.

2.2.2 Methodologies for Projecting Water Demands

2.2.2.1 Land Use Based Methodologies

Land use based water demand projections are derived by applying either a *per-acre* water demand factor or a *per-dwelling unit* water demand factor to either the number of acres slated for development or the number of dwelling units. The *per-acre* demand factor is expressed as a projected volume per acre of land with a specific land use classification and conservative density assumption. The *per-acre* method is intentionally broad because the final land use features are generally not certain, including lot sizes and building footprints, both which can have an impact on water demands. *Per-unit* demand factors can capture the unique characteristics of specific land use classifications and are generally going to be more valuable at later stages of the planning process.

Choosing the appropriate land use based methodology depends upon the level of land use information available and the level of analysis required by a particular document. General Plan documents often lack specific development projects and therefore use the *per-acre* method and documents that require more detailed analyses, including SB 610 WSAs, use the *per-dwelling unit* method. In some instances, both land use methodologies are warranted.

Both the *per-acre* and *per-dwelling unit* methods capture the unique water use characteristics of existing and proposed land uses in a specific geographic region such as the Sacramento Valley. The "water demand factor," discussed in more detail below, represents a quantification of a region's geographic characteristics that influence how and when water will be consumed. Land use based demand projections also provide an opportunity to estimate the potential non-potable demands associated with certain land uses. This estimate may be essential in situations where water is scarce or regulatory requirements mandate use of non-potable supplies like untreated surface water or recycled supplies.

Residential Demands or Per-Dwelling Unit Demand Calculations

Indoor and Outdoor Unit Demands Based Upon Land Classification: Unit demands are a land use based approach to determining residential water demands based upon the typical

nature of the housing unit in a given classification[1]. Residential classifications typically include:

- Very-low density/rural,
- Low-density,
- Medium-density, and
- High-density, mixed use.

Indoor demands typically vary only slightly between the different residential land use characteristics, even between low and high density housing units. The primary driver for indoor change is the number of persons per household. Outdoor use is the significant variable between the identified land use classifications. This variability is due to the substantial outdoor use in rural residential and low-density residential units as compared to the outdoor use in high density units. The distinction is fairly straightforward – there is generally less land to irrigate per unit within high density residential areas as compared to that of low density and rural residential areas.

Table 2-1
Residential Densities/Demand Factors Typical Ranges
California – Central Valley

Classification	Housing Type	Density Ranges (du/ac)	Demand Factors		
				(af/du/yr)	(gal./du/day)
Very-Low Density/Rural Residential	Single-family	1-3	Indoor:	0.20 – 0.30	180 – 270
			Outdoor:	0.50 – 0.80	445 – 715
			Total:	**0.70 – 1.10**	**625 – 980**
Low Density	Single-family	4-8	Indoor:	0.15 – 0.25	135 – 225
			Outdoor:	0.35 – 0.65	315 – 580
			Total:	**0.50 – 0.90**	**445 – 805**
Medium Density	Townhomes/ Condos	9-12	Indoor:	0.15 – 0.25	135 – 225
			Outdoor:	0.20 – 0.40	180 – 360
			Total:	**0.35 – 0.65**	**315 – 580**
High Density	Condos/ Apartments	13-25	Indoor:	0.15 – 0.25	135 – 225
			Outdoor:	0.10 – 0.20	90 – 180
			Total:	**0.25 – 0.45**	**225 – 405**

[1] Though this discussion is limited to residential land uses, the method is also applicable if detailed non-residential uses are known. Otherwise, non-residential demands are usually determined using per-acre unit demands. These are discussed later in this section.

Table 2-1 presents typical residential classifications found in the Sacramento Valley along with their associated density ranges and unit water demand factors.[2]

Density Ranges: Residential water demands may be estimated on a dwelling unit (du) per acre basis for each residential land use category. Dwelling unit estimates are typically derived from a jurisdiction's land use classifications. **Table 2-1** shows the density ranges for residential developments.

While density ranges for low density residential land uses do not vary significantly, water demands *per-dwelling unit* can differ depending on lot and building size. A larger lot with a small house footprint will typically use more water than a smaller lot with a larger house footprint because of the difference in amount of landscape irrigation. Separation of indoor and outdoor water demands is especially useful in accounting for these differences at the planning stages when more detail is known about the character of housing products within a new development.

The widest variations in density ranges are usually seen in the high-density residential land use classification. High density ranges in and around Sacramento County may be higher than 25 units per acre, whereas high-density in the Sacramento Valley are typically no greater than 20 units per acre and average around 16 units per acre. This variance is a key reason why determining demands on a *per-dwelling unit* basis rather than on a *per-acre* basis can provide a more representative projection of future demands. For example, a 10 acre project could have 250 units or 160 units, each resulting in different demand projections.

Demand Factors: Unit demand factors are unique to the geographic location of a proposed land use plan or development. In California's Central Valley, demand factor ranges for typical residential housing will vary based primarily on outdoor use. Variations in outdoor use may be attributable to geographic and environmental conditions associated with a development's location, lot sizes, and the age of housing stock. For instance, if a community is located in an area with sandy soils, less than average precipitation, and higher than average daytime temperatures, outdoor unit demands will be significantly higher than in places with clay soils, high precipitation, and cool daytime temperatures. This variation may be seen by comparing the Sacramento Valley with portions of the Bay Area. Accordingly, development of demand factors is a critical component to an accurate demand calculation.

One practical component of gaining a good understanding of the outdoor demand is assessing the water supplies that can be used to meet those demands. In short, by gaining an understanding of nature and extent of outdoor demands, a water plan can consider the

[2] Information in table 2-1 can provide a "rule-of-thumb" for estimating demands, but should not be a substitute for locally available and project-specific data.

benefits and costs of utilizing recycled water – or other non-potable supplies – for outdoor irrigation and other uses.

Water demands for landscape irrigation may be projected by considering the efficiency of the irrigation method, local precipitation, and local evapotranspiration rates[3]. However, this calculation is usually lower than actual water demands observed within low density residential land uses throughout California. Cross-referencing the California Irrigation Management Information System (CIMIS) data with actual meter or other available data for similar residential parcels can generate a reasonable estimate for outdoor demand factors.

Residential Water Demand Calculation: Below is a general step-by-step approach for calculating residential water demand and an example based on this approach:

1. Determine total acreage for each residential land use classification.

2. Multiply gross acreage by an average density for the category to obtain an estimated number of dwelling units.

3. Assign indoor and outdoor water demand factors to the estimated number of dwelling units in each land use classification.

4. Further refine unit demand factors by considering average lot size. Determine net acreage for each land use classification by multiplying total acreage by a reasonable factor to account for roads, sidewalks and other rights-of-way. For residential land uses, a factor of .8-.85 is reasonable. Divide by the number of dwelling units.

Example: Using the general approach above for a 50-acre parcel designated low-density residential results in an estimated 300 dwelling units at an average of 6 dwelling units per acre. A total water demand factor of 0.60 acre-feet *per-dwelling unit* per year consisting of an outdoor component of 0.35 acre-feet per year and an indoor component of 0.25 acre-feet per year results in a total projected water demand of 180 acre-feet per year (prior to losses associated with delivery of water, which is discussed later in this section).

Non-Residential Demands or Per-Acre Demand Calculations

Demand Classification: As with residential demand calculations, non-residential demand calculations start with land use classifications. Non-residential land use classifications typically include:

[3] Evapotranspiration rates may be obtained from the California Department of Water Resource's California Irrigation Management Information System (CIMIS) database. The database is available electronically at: http://wwwcimis.water.ca.gov/cimis/welcome.jsp.

- Moderate Intensity Office
- Light Industrial Office
- Community/Neighborhood Retail
- Regional Retail
- Light Industrial
- Heavy Industrial
- Parks
- Schools
- Agriculture

Similar to the residential classifications, non-residential classifications will vary by land use jurisdiction. Within each broad classification (e.g., office, retail, industrial, etc.), there are often unique sub-categories that reflect a distinct parcel within a given jurisdiction. These sub-categories will often be listed separately for purposes of consistency with the land use planning documents, even though indoor/outdoor coverages and unit water demands may be similar. However, in some instances, particular land uses, such as a hotel or golf course, will have unique water demands that require a condition-specific demand analysis.

Indoor and Outdoor Uses: Similar to residential unit water demand factors, non-residential water demands may be separated between indoor and outdoor land uses. Outdoor uses are further subdivided into hardscape (i.e., paved areas) and landscape (i.e., grass and shrubbery). Hardscapes are the outdoor portions of the footprint that are assumed to use no water, including roadways, parking lots, and walkways. Outdoor uses include irrigation and recreational uses – such as pools, fountains, etc. Indoor uses include all personal uses, such as drinking water and bathroom uses, "process uses" water for certain manufacturing and industrial uses, as well as "input uses" that may be essential to various products – such as the brewing of beer at Sierra Nevada brewery. Separating these uses is valuable to allow the use of more understandable demand factors (i.e. irrigation demands for outdoor areas) and to easily identify the portion of non-residential demand that can be met with recycled or other non-potable water supplies**.**

Table 2-2 provides typical indoor and outdoor coverage percentages for some common non-residential land uses. These should be considered as guidance since individual studies and projects will be driven by local conditions and assumptions and may vary from the values presented below.

Table 2-2
Typical Indoor/Outdoor Percentages for Non-Residential Land Uses

Classification	Use Type	% acreage	Demands (af/acre)
Moderate Intensity Office	Indoor	40	2
	Hardscape	50	n/a
	Landscape	10	4
Light Industrial Office	Indoor	60	2
	Hardscape	35	n/a
	Landscape	5	4
Community / Neighborhood Retail	Indoor	40	1
	Hardscape	55	n/a
	Landscape	5	4
Regional Retail	Indoor	35	1
	Hardscape	60	n/a
	Landscape	5	4
Light Industrial	Indoor	60	2
	Hardscape	35	n/a
	Landscape	5	4
Heavy Industrial	Indoor	45	3
	Hardscape	45	n/a
	Landscape	10	4
Parks	Indoor	5	.5
	Hardscape	20	n/a
	Landscape	75	4
Schools	Indoor	10	3
	Hardscape	40	n/a
	Landscape	50	4

Non-Residential Water Demand Calculation: Below is a general step-by-step approach for calculating non-residential water demand and an example based on this approach:

1. For each land use category, determine a percentage of coverage assigned to *indoor*, *hardscape* and *landscape* use types.

2. Multiply the total acreage for each land use category by the respective *indoor*, *hardscape* and *landscape* coverage percentage to obtain a total acreage for each use type in the class.

3. Multiply the acreage for each use type in the classification by the applicable unit demand factor to obtain an estimated water demand for each use type.

Add demands for each use type to project a total water demand for the land use classification.

Example: A neighborhood park consists of mostly grass and other landscaping with some hardscape features such as parking lots, basketball courts, tennis courts or play structures. Such a park generally contains few permanent structures. Therefore, if a neighborhood park site is 10 acres, 9.0 acres (90%) might be landscaped, and the remaining one acre might consist primarily of "hardscapes" and possibly a small fraction for an indoor uses such as restrooms. An outdoor water demand factor of 4.0 acre-feet per acre per year multiplied by 9.0 acres results in a total annual average water demand of 36.0 acre-feet per year for the 10.0-acre neighborhood park as the remaining 1.0 acre of hardscaped area has no water demand (with the exception of a possible restroom use).

Agricultural Water Use: With the transition of land from agricultural to urban water uses, irrigated agriculture demands may need to be considered in a demand analysis. To evaluate a water system's agricultural water demands and potential aquifer impacts, it is necessary to understand the quantity of applied water, deep percolation,[4] runoff, and evapotranspiration. To evaluate evapotranspiration of applied water, it is necessary to calculate or assume a consumption efficiency rate of applied water. While crop demands are highly sensitive to location and soil type, **Table 2-3** identifies applied water factors and evaportranspiration of applied water (ETAW) rates and consumption efficiency rates that represent a blended rate between those developed by the Irrigation and Training Research Center[5] (ITRC) and the California Department of Water Resources (DWR).[6] Unit demands are broadly grouped into the following categories: tree crops, row crops and irrigated pasture. The ITRC figures were developed assuming surface water irrigation and water deliveries on a per-acre basis, both of which are prevalent throughout the Sacramento Valley. The ITRC assumes 65% efficiency for all categories. The 2000 DWR demand factors were based upon figures for Colusa County and include applied water demands for surface and groundwater applications. DWR assumes application efficiencies as high as 80% from some crops, including tree crops, and 70-75% for others, including field crops and pasture. Thus, the blended rates are greater than those in the ITRC report, but less than the DWR Report.

[4] It is reasonable to assume that a portion of the applied water that does not transpire, evaporate or runoff, percolates back into aquifer.
[5] California Crop and Soil Evapotranspiration, Irrigation Training and Research Center, Report 03-001 (2003).
[6] Colusa County Annual Ag Water Use, Department of Water Resources, 2000.

Table 2-3 Water Demand Factors for Agricultural Land Uses			
Land Use Category	**Unit Water Demand (af/ac/year)**	**ETAW**	**Consumed Fraction**
Tree Crops	3.5	2.625	75%
Row/Field Crops	3.0	2.1	70%
Pasture	5.0	3.5	70%

Unaccounted Water Demands

The unit demand factors presented in **Tables 2-1** and **2-2** do not account for losses that occur during distribution to customers, or unaccounted water demands such as fire hydrant flushing and construction water use. Unaccounted water demand factors can vary for residential versus non-residential demands as a result of smaller pipe sizes and material type as well as the prevalence of fittings under high pressures in residential communities. To account for these factors in the overall demand requirements, the estimated demands should be multiplied by an "unaccounted water" demand factor, which is then added to the projected end-user demand to generate an overall demand estimate for treated water supplies. It is reasonable to assume that loss factors for newer, primarily residential developments should be lower than 10 percent, while unaccounted water may comprise as much as 20 to 25 percent of water demands in older communities. In many cases, unaccounted water demands are built into unit demands, but analysis of such losses as a distinct water demand is generally preferred as it provides a way to identify one potential conservation opportunity. In many communities, it is possible to calculate a rough unaccounted water demand factor by assessing end-user water demand compared to treatment plant production or storage tank releases.

Figure 2-1 illustrates how all of the land use based demand projection elements can be combined to provide a representation of demand projections over time, while also allowing for changes in demand factors and changes in the quantity of dwelling units.

Figure 2-1
Conceptual Water Demand Projection Model

Water demand factors are based on average water usage for each land-use category and can reflect changes in use over time as a result of conservation measures (both through regulation and through user-initiated changes). Any number of time increments can be represented.

Projected changes in land-use quantities, expressed either as numbers of dwelling units or acres, can be tracked over any increment of time for any period of development. This can help understand the timing of demand.

Land uses are separated into residential and non-residential categories and can include any number of variations depending upon the quality of available information. Each table can also represent a defined City or planning area.

		Residential Land-Uses	Use Class	DU/AC		Demand Factors 2005	Demand Factors 2015	Demand Factors 2030	Quantity (du) 2005	Quantity (du) 2015	Quantity (du) 2030	Demand (af/year) 2005	Demand (af/year) 2015	Demand (af/year) 2030
1	RL	Low Density Residential	Indoor	4 - 6										
			Outdoor											
			Total											
2	RM	Medium Density Residential	Indoor	7 - 12	--									
			Outdoor											
			Total											
3	RH	High Density Residential	Indoor	13 - 20	--									
			Outdoor											
			Total											
											Residential Demand =			

Current and projected water demands are separated into various components (i.e. indoor and outdoor) to facilitate using more representative demand factors, and to help identify the potential use of recycled water for landscape irrigation.

Any specific high water-using industry such as a hospitals or large manufacturing facilities can be specifically included in the demand projections.

		Non-Residential Land-Uses	Use Class	%dmd	%qty	Demand Factors 2005	Demand Factors 2015	Demand Factors 2030	Quantity (acres) 2005	Quantity (acres) 2015	Quantity (acres) 2030	Demand (af/year) 2005	Demand (af/year) 2015	Demand (af/year) 2030
4		Commercial	Indoor		40%									
			Hardscape		55%									
			Landscape		5%									
			Total											
5		Office	Indoor		40%									
			Hardscape		55%									
			Landscape		5%									
			Total											
6		General Industrial	Process/domestic		55%									
			Hardscape		43%									
			Landscape		2%									
			Total											
7		Parks	Indoor		5%									
			Hardscape		15%									
			Landscape		80%									
			Total											
8		Schools	Indoor		30%									
			Hardscape		20%									
			Landscape		50%									
			Total											
9		Lighting and Landscape	Landscape	--										
											Non-Residential Demand =			

Unaccounted for water (e.g. distribution losses, construction water) must be incorporated into demand projections and can vary by service area characteristics including age and land-use.

	2005	2025	2030
Unaccounted for Loss Factor (residential) =	10%	10%	10%
Unaccounted for Loss Factor (non-residential) =	10%	10%	10%

	2005	2015	2030
Total Demand =			
Unaccounted for Losses (residential) =			
Unaccounted for Losses (non-residential) =			
Total Demand (Treated) =			

Demands for raw water or recycled water can also be incorporated into the projection, allowing for ultimate flexibility in accounting for total potable water demand.

Demand Adjustments for Dry-year Conditions

Many of the water supply planning documents, including the Urban Water Management Plan, SB 610 WSA and SB 221 Verification, require a discussion of dry-year and multiple dry-year water supply planning. Planning documents that require this analysis should also include an analysis of potential increased water demands.

Some water planning documents include such a discussion, while others recognize this potential but merely state that demands would remain at normal-year levels through implementation of conservation ordinances and temporary demand reduction measures. Quantifying how these tools would reduce water demands is very important and can be difficult. Because extreme water shortages are relatively rare, water suppliers may not understand how far each of the various measures will actually reduce demands.

Additionally, demand management measures during a single dry hydrologic year may not be extremely effective because the dry-year condition is recognized too late in the calendar year to reduce water demands. For example, landscape irrigation may be increased between January and March because of a lack of precipitation. If the dry-year condition is not identified until March, the opportunity to conserve water during the past three months has been lost. However, continued implementation of these measures is often more effective in subsequent years as public awareness increases.

2.2.2.2 Population-Based Methodologies

Population-based water demand projections are derived by multiplying the number of people in a specific geographic area by a daily average per capita water demand. Per-capita water demands are generally on the order of 200 to 300 gallons per capita per day for the Sacramento Valley. While population-based projections are useful for some purposes like identifying water use trends and tracking historical water use, they may not reflect actual water demands because they do not take into account the various types of housing products. Low density residential land uses, for example, will often have lower population densities than will high density residential land uses. Also, some communities have experienced a higher than normal number of persons per household (according to Census data). If water demands are based on historic per-capita water use and new developments do not have the same balance of residential land uses and persons per household as existing areas, projected water demands are less likely to be accurate.

Population-based methods also may not reflect actual water use if the balance between residential and non-residential land uses – from which average per-capita figures are derived – does not remain constant throughout a city or county as development occurs. Residential land uses usually account for a majority of water use, and a larger proportion of residential land uses in new developments might have higher demands than existing land use mixes. Furthermore, population-based projections are not entirely useful when agricultural water

demands are a portion of total demands because there is generally going to be greater water use per person the more that irrigated agricultural lands comprise the land use mix in a given jurisdiction.

For population-based demand projections to be more useful, they should be linked with anticipated land uses. Applying per capita water demands to new developments should reflect population densities for different residential housing products. Estimating population growth without considering the amount and character of developable land could result in over-estimated water demands.

2.2.2.3 Verification of Demand Calculation

Verification of the demand calculation is one of the most important aspects of ensuring that the demand projection is accurate. In the best case scenario, unit demand factors are verified by historic meter data from the jurisdiction preparing the water plan. Proper reliance upon historic meter data for accurate planning, however, requires that water meter data be used with discretion. Only data from established land uses should be used. For residential land uses, this means that reliance upon data from newer homes is only proper after the homes have had adequate time to establish a stable pattern of use. Newly constructed homes may not be fully populated until some time after completion of all homes in the neighborhood. Further, backyard landscaping may not be installed in many homes soon after completion.

Wastewater treatment plant data is another useful source for validating water use as wastewater flows are essentially a measurement of indoor water use. Outdoor demands can then be derived indirectly by determining the difference between total demands and the wastewater flows.

For a small jurisdiction where water use is not metered or measured in an ascertainable fashion or that has not prepared specific water planning documents, it is useful to consider the demand projections of a few nearby jurisdictions. The more current documents – if prepared properly – will typically contain unit demand information and the assumptions that are imbedded in that information. For some documents, like an Urban Water Management Plan (discussed in **Section 4**), verification of calculations can be derived from information that is "reasonably available." (Water Code Section 10631(b)(4)). Therefore, reasonable verification can mean comparing the demand calculations of another jurisdiction located in the same general region. In other situations where verification of meter data or neighboring jurisdictions is impractical, a water plan may compare the results from the different methodologies described above. Any verification of the demand calculation may help prevent errant calculations and, as such, water planning reliance on, or reintroduction of, errant calculations in subsequent planning efforts.

2.3 WATER SUPPLY FUNDAMENTALS

2.3.1 Introduction

The purpose of this section is to provide an overview of California's water rights fundamentals because the rules impact the actual supply available to each water planning jurisdiction. When integrated with a demand analysis, a greater understanding of the risk and reliability of water supplies will provide an improved representation of an entity's ability to sufficiently meet future demands.

2.3.2 Water Rights Basics[7]

Water law in California is complex, incorporating aspects of century old mining customs, Roman law, English common law, judicial and administrative decisions, statutes, and local ordinances. Adding to the complexity, California recognizes several categories of water rights, each relating to various characteristics of land and water. Water rights in surface waters are generally classified as riparian, appropriative, or contract rights[8], while water rights for underground waters are generally classified as overlying or appropriative. The type of right that attaches to a water source is important, particularly in light of the regulatory structure linked to the different rights and the existing demands for agriculture, municipal industrial uses, and the environment.

All water rights in California are usufructuary rights, granting an individual or entity a right to the use of water but not an absolute right of ownership. The difference, although subtle, is important in that California law prevents an individual from exercising total dominion over the resource, reserving some authority to the state. All water rights are further limited by Article X, Section 2 of the California Constitution which requires that water be reasonably used for beneficial purposes.[9]

Several types of water rights – Riparian, Groundwater, and Area of Origin rights – lie dormant and can be activated or expanded under unpredictable conditions. The Endangered Species Act – although not a "water right" – is another regulatory mechanism that can implicate a jurisdiction's ability to use water under its rights and entitlements. This section explains in very broad terms the types of water rights in California, some of the limitations on these rights, and the pertinent ancillary issues associated with water rights.

[7] The information in this section provides a simplified overview of the most common water rights, but is by no means a comprehensive discussion of the myriad of anomalies and unique ambiguities that are imbedded in water law or the result of judgments or settlements.

[8] There are other surface water rights in California, such as Pueblo water rights, but these other forms are not relevant to this analysis.

[9] It is unclear whether the reasonableness of use of water refers only to wasteful use of water or may include some water use that is merely less than optimal. Where water is scarce, the reasonableness of a particular beneficial use may be compared against other beneficial uses.

2.3.2.1 Surface Water Rights

Riparian Rights

Riparian rights confer upon the owner of land contiguous to the watercourse the right to a reasonable and beneficial use of water on his land. The water right is considered part of the land itself and the water need not be used for the right to persist. A parcel of property must generally meet three criteria before a riparian right attaches to it: (1) the property must be contiguous to the watercourse; (2) the smallest tract held under one title leading to the present owner must be identified; and (3) riparian land must lie within the watershed of the watercourse.[10] Riparian landowners share the water supply in their watershed. No riparian has a priority right over another riparian water user. The correlative nature of the right requires all riparians to communally reduce their uses in times of scarcity in order to ensure some water use for all.

Appropriative Rights

The doctrine of prior appropriation is a system of allocation that confers rights according to the principle "first in time, first in right." By way of contrast to the riparian right, the appropriative right does not arise out of land ownership, but by the action of the appropriator in taking and applying water to a beneficial use. The water may be used on lands distant from the source and outside the watershed of origin. Also in contrast to the riparian right, a senior appropriator may require a junior appropriator to forgo his full allocation in times of shortage so that the senior appropriator may continue use.

There are generally two types of appropriative rights in California – those rights arising before 1914 and those rights arising after 1914. "Pre-1914 rights" are not subject to the jurisdiction of the State Water Resources Control Board (SWRCB). In other words, none of the SWRCB application and permitting requirements is applicable to pre-1914 water rights while post-1914 rights are subject to these requirements.[11] Pre-1914 rights are, however, subject to the jurisdiction of the courts.

The basis of the appropriative right is that the use of water for a beneficial purpose on specific parcels of land earns the right to permanently use that water, so long as the use is reasonable. Under a post-1914 right, the intent to appropriate is manifested by filing an application with the SWRCB. Under the former right, intent could be demonstrated by posting a sign at the point of diversion, simply diverting the water, or recording a document with the County. Under modern appropriative rights, the SWRCB issues a permit for

[10] These generalities are extremely simplified and should not be considered definitive rules for assessing a riparian water right. For example, a riparian right can be preserved on non-contiguous parcels of property after the land has been subdivided upon the express intent of the subdivider as provided for in documentation. Furthermore, assessing contiguity and the status of subdivided parcels is very complex.

[11] Some water rights created after 1900 but before 1914 are subject to the provisions of the Civil Code but those provisions generally mirror pre-1914 requirements for notice and intent.

construction of the diversion works and water use and, if the use is perfected, issues a license.

2.3.2.2 Federal and State Project Water

Federal and State Project water rights are derived from water supplies that developed from construction of the major federal and state water storage projects – the Central Valley Project (CVP) and State Water Project (SWP). The CVP and SWP hold appropriative water rights granted by the SWRCB and sign contracts with individuals for use of the permitted supplies. Thus, the "contractors" water "rights" are derived from their contracts with the SWP and CVP.

2.3.2.3 Groundwater

Groundwater Rights

Overlying Rights: In California, property owners with land overlying groundwater can drill wells and extract water for use on the overlying land. Overlying users have correlative rights requiring all overlying users to reduce their use in times of scarcity in order to ensure some water use for all. Under this doctrine, there are no junior or senior overlying users who gain priority by pumping first or pumping more.

Appropriative Rights: If there are groundwater supplies in a basin that are surplus to the needs of overlying owners, then this water is available for appropriation by non-overlying users for use on non-overlying lands. Most public water purveyors that use groundwater utilize the appropriative right. Here, the hydrology of the basin is the determining factor. If the appropriation of groundwater for the non-overlying use will not cause basin overdraft or injure other users of water, then an appropriation of groundwater for use on non-overlying property is allowed.

Overdraft: Groundwater overdraft is defined as the condition of a groundwater basin or subbasin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years, during which the water supply conditions approximate average conditions (DWR 1998). Overdraft can be characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years.[12] Thus, fluctuations in groundwater hydrology in the short term that impact pumping capacities and may appear to put a basin in a state of overdraft are insufficient for proving overdraft. Though overdraft conditions are not prevalent in the Sacramento Valley, increased reliance on groundwater for urban developments without proper management and planning could lead to overdraft. If overdraft continues for a number of years, significant adverse

[12] California's Groundwater – Bulletin 118, Update 2003. This is a complicated calculation and there has been significant litigation over this issue in groundwater cases.

impacts may occur, including increased extraction costs, costs of well deepening or replacement, land subsidence, water quality degradation, and environmental impacts.

Artificial Recharge: Theoretically, artificial groundwater recharge allows the "recharger" to extract the water input into the basin, minus calculated losses, so long as there is no injury to other users. The baseline condition of the groundwater basin used to calculate the amount of water remaining in the basin is usually the key point of contention as water recharged into the ground potentially migrates both vertically and horizontally in the underground aquifers, effectively reducing the total supply. Nevertheless, groundwater storage and extraction allows the user to extract water and use it.

2.3.2.4 Area of Origin

A whole body of water rights - area of origin, county of origin, watershed of origin, and Delta protection statutes – add another layer to an already complex system. These water rights were developed to retain the priority to subsequent appropriative uses within an area, county, or watershed, as against out-of-basin permitted appropriations. Specifically, they were enacted to protect local water users from out of basin appropriations by the CVP and SWP. Thus, area of origin rights consist of a priority right to satisfy present uses, as well as a priority right to satisfy future beneficial uses within a specifically identified geographic area. The legislature did not want the project exporters to inhibit the future growth of source water areas – drawing from examples such as that of Owen's Valley in the development of Los Angeles. These statutes, however, may counter the body of water law that allow for the export of water to other places under appropriation law.

2.3.3 Other Factors Shaping Water Supply Assessments

There are a number of other factors that may shape an analysis of the viability of a water supply. These factors include regulatory requirements associated with the Endangered Species Act, water quality rules, and local water supply and export rules, including local government ordinances regarding the use and export of groundwater. Other factors include compliance with the terms of contracts – whether they are project based contracts or not and assessing the viability of groundwater basins over a long period or the viability of water supplies compared against unexercised (or not fully exercised) water rights. Such factors should be considered when developing a comprehensive water plan since failure to do so could result in an overly optimistic representation of sufficiency or reliability.

2.3.4 Dry-Year Water Supply Planning

Many of the water supply planning documents, including the Urban Water Management Plan, SB 610 WSA and SB 221 Verification, require analysis of dry-year and multiple dry-year water supplies and development of strategies to address potential shortages. The critical elements of this analysis for planning purposes are gaining an understanding of the quantity

of supply reduction that is likely to occur, as well as the frequency with which such reductions occur.

While there is no standard method for evaluating reductions in water supplies, decreases are dependent upon the type of entitlement. Below are a just a few examples of how reductions differ depending on the water supply source and other factors:

- Pre-1914 water rights in dry years depend on the hydrologic characteristics of the applicable body of water as well as the seniority of the right.
- The Sacramento Water Forum Agreement is a negotiated agreement between water suppliers and environmental interests where water supplies are based on unimpaired inflow to Folsom Reservoir rather than seniority of water rights and reductions are tied to purveyor-specific negotiated agreements.
- CVP municipal and industrial (M&I) contractors receive water through contracts with the federal Bureau of Reclamation and can be subject to reductions based upon not only hydrology but geography or regulatory actions.
- Groundwater appropriators that supply water to municipal developments may be required to reduce pumping in dry years if overlying users are impacted.

SECTION 3 – THE GENERAL PLAN

3.1 INTRODUCTION

A General Plan is the blueprint for land use planning at the local government level. Both counties and cities prepare General Plans to ensure rational and orderly land use planning consistent with a community vision. A General Plan must contain a Land Use Element, which typically identifies the broad land use classifications and zoning designations on a land use map. Water resources management approaches are presented as sets of goals, policies and implementation strategies focusing primarily on conservation and preservation of the resource. Water resources are typically discussed in the context of the Conservation Element or Open Space Element, both of which are required. Some General Plans contain a stand-alone element on public utilities or water resources.[13] The scope of the water resources discussion in the General Plan is driven by the principle of "Internal Consistency," meaning that the text and data must be consistent among all of the General Plan elements.[14]

While water resources are often discussed within the General Plan elements themselves, the water supply and demand analysis is typically reserved for the assessment of hydrologic and water quality impacts under the California Environmental Quality Act (CEQA). The assessment of impacts under CEQA may be aided by an understanding of supplies and demands as presented in an Urban Water Management Plan (UWMP) or similar other supply and demand assessment that allows the entity preparing the EIR to assess impacts to groundwater and surface water supplies, as well as impacts to drainage and water quality.

In simplified terms, the translation of the General Plan as a "project" into the Project Description for the environmental assessment serves as the basis for an analysis of the direct and reasonably foreseeable indirect environmental impacts of the General Plan. The CEQA Guidelines identify hydrologic and water quality factors to consider in determining whether a project might have a "substantial" impact upon hydrologic resources, including groundwater aquifer depletion, supply expansion, supply sufficiency, and alteration in drainage or water quality. A local jurisdiction that is preparing a General Plan and neither has a UWMP available nor the ability to require a water purveyor to provide water supply and demand information should consider development of a Water Supply Evaluation (see **Section 3.1.3**). It is important to remember that a General Plan is the broadest land use planning document that a local government develops, and the environmental assessment that is developed for the General Plan may be utilized for a subsequent project to assess impacts. Development of comprehensive demand projections and supply conditions at this phase of planning can

[13] Although this element is not required, the idea of a stand alone element may be warranted as water resources become more scarce and accurate water planning becomes critical.
[14] Government Code § 65300.5

benefit subsequent phases of planning. In contrast, incomplete or incorrect analysis can cause problems for future supply and demand analysis contained in other planning documents.

Finally, an often forgotten player in the land use and water supply planning framework are the Local Agency Formation Commissions (LAFCOs), which are tasked with considering water service efficiency when evaluating provision of public services as part of annexation and Sphere of Influence (SOI) modification proceedings. This is important at the General Plan stage because General Plan updates often serve as the platform for SOI expansion and territory annexations.

3.1.1 Conservation, Open Space, Public Utilities and Water Elements

3.1.1.1 Purpose

Though the Guidebook discusses elements of General Plans, it is focused on illustrating the issues and necessary interactions between the overall planning process and specific water supply and demand aspects. Typically, General Plans are organized by element, and must contain a specific section with policies regarding natural resources conservation and open space, and also should contain policies regarding water resources. The Conservation Element[15] should contain policies regarding the conservation, utilization and development of natural resources, and also provide a venue for community members to develop land use policies to reconcile conflicting demands for scarce resources, through coordination with local water purveyors and discussion and evaluation of water supply and demand information[16]. The Open Space Element is defined as "any parcel or area of land or water that is essentially unimproved and devoted to an open-space[17]." The Open-Space Element thus seeks to preserve water resources important for habitat, agricultural purposes, and groundwater recharge purposes.

While there are no specific requirements regarding the contents or manner in which a General Plan should consider water resources, the overriding principle of "internal consistency" (between and among the elements) guides the scope and depth of information that should be provided.[18] For purposes of the water analysis, consistency with the land use element in the General Plan is critical. General Plans contain a Land Use Element that designates the proposed general distribution and general location and extent of the uses of the land for all public and private uses.[19] The land use element should also contain standards of population density and building intensity for the land use classifications. These land use

[15] Also known as "Natural Resources" and "Resources Conservation" Element
[16] Government Code § 65302(d)
[17] Government Code § 65560(b)
[18] "Internal Consistency" requires that there be no conflicts between the text or data between and among elements (Government Code § 65300.5)
[19] Government Code § 65302

components are critical to accurate water analyses as previously described in Section 2. The next section considers the specific features of a water supply and demand analysis that may be contained in a General Plan.

3.1.1.2 Timing

State law requires all cities and counties to prepare a General Plan upon incorporation and update a General Plan Housing Element at least every five years. General Plans require CEQA review and the process generally runs concurrently with the development of a General Plan. A Notice of Preparation (NOP) must be circulated for 30 days describing the draft General Plan.[20] A draft Environmental Impact Report (EIR) must be circulated for a 30-60 day comment period.[21] While a public hearing on the draft EIR is not required, many jurisdictions choose to hold such a hearing. The lead agency must issue responses to written comments on the draft EIR to the commenting party at least 10 days prior to certification of the EIR.[22] Before adoption of the final EIR, the local jurisdiction must certify the EIR and make findings as to how significant environmental effects have been mitigated. Certification must take place within one year after deeming the initial project application complete.[23]

3.1.1.3 Contents

Generally, the discussion of water resources in the Conservation Element, the Open Space Element, or a unique Water Resources or Public Utilities Element, entails a set of goals, policies, and implementation strategies. These goals, policies and strategies are typically conservation and preservation oriented, and based upon a broad understanding of a jurisdiction's current and future water resources issues. Examples of such goals, policies and strategies include:

- GOAL: To ensure that water supplies of sufficient quality and quantity will be available to serve the community needs, now and into the future.
    - *Policy:* Protection of water resources and supply systems through sound watershed management.
        - Implementation Measure: Maintenance of local water ordinances to protect the integrity of water supplies.
    - *Policy*: The agency shall work to ensure continued reasonable alternate water supplies.

[20] California Code of Regulations, Title 14, Ch. 3, Art. 7, Section 15082 (b).
[21] California Code of Regulations, Title 14, Ch. 3, Art. 8, Section 15105 (a).
[22] California Code of Regulations, Title 14, Ch. 3, Art. 7, Section 15088 (b).
[23] California Code of Regulations, Title 14, Ch. 3, Art. 8, Section 15108.

- Implementation Measure: The agency shall encourage water supply districts and companies in the county to identify and develop water supply sources, other than groundwater, where feasible.

A land use entity, prior to adoption of or a substantial amendment to a General Plan, is required to distribute the General Plan to "public water systems"[24], serving 3,000 or more connections, for a 45-day review and comment period[25]. This section also requires the public water system to provide the land use entity with the following information: (1) the most current UWMP; (2) a description of its water supply sources in wet, normal and dry years; (3) a description of the demands from all sources in the previous five years; (4) any proposed additional supplies; (5) a description of total current customers by category; (6) quantification of demand reduction associated with water use reduction measures in a water supplier's urban water management plan; and (7) any additional information that would allow for a determination of adequacy of existing and future supplies for the existing and projected demands.[26]

Under the General Plan, the requirement that a public water system with more than 3,000 connections submit this information parallels the requirements contained in an UWMP. As such, this information should be readily available, unless the public water system just reached the connection threshold or needs to update UWMP figures. While a discussion of water resources is valuable for various land use decisions that have an impact on watershed management and water quality, the primary purpose of this information is to consider whether demands are consistent with supplies and to address the potential water resource needs of a given jurisdiction.

While Government Code § 65352.5 applies to those jurisdictions that are or contain public water systems, the requirement to prepare a Conservation Element and an Open Space Element still remains with the land use entity. Moreover, regardless of the number of connections that a local jurisdiction or its water provider has, the requirement of internal consistency compels the land use entity to consider elements similar to those contained in § 65352.5. Specifically, under a General Plan adoption or General Plan amendment, land uses are certain to change and any discussion of water resources needs to accurately reflect the anticipated land use plans in a given jurisdiction.

[24] Health and Safety Code 116275 defines a "public water system" as follows: a system for the provision of water for human consumption through pipes or other constructed conveyances, including collection, treatment, storage, and distribution facilities, either under or not under the control of the operator of the system, which are used primarily in connection with the system. It may also include a system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

[25] Government Code 65352

[26] The information that a public water system is required to submit pursuant to Government Code 65352.5 may also be used to consider hydrologic impacts as part of the environmental assessment discussed in Section 3.1.2.

3.1.1.4 Level of Specificity

The General Plan provides the broadest view of land use planning and water supply planning of all the documents that will be discussed in the Guidebook. As shown, the General Plan elements qualitatively address water resources. Nevertheless, the goals, policies and implementation strategies regarding water resources should be analyzed for internal consistency with the Land Use Element, including both qualitative and quantitative provisions. Because adoption of a substantial amendment to a General Plan requires an environmental assessment pursuant to CEQA, water resources are typically addressed in greater detail in an EIR.

3.1.2 Environmental Assessment of Hydrologic Impacts

3.1.2.1 Purpose

General Plan adoptions and updates are considered "projects" according to the CEQA, and thus require an Initial Study of environmental impacts.[27] If the Initial Study indicates that there are "significant" impacts, then the local entity needs to prepare an EIR.[28] An EIR requires distribution of a Notice of Preparation to responsible agencies, which have 30 days to comment regarding the scope of the potential impacts. Upon receipt of all comments, the lead agency must complete a draft EIR. Generally, the assessment of hydrologic and water quality is part of the Initial Study, and if there are direct, or reasonably foreseeable indirect impacts that are significant, the draft EIR.

Importantly, an EIR must evaluate the effects of a General Plan revision on both the existing environment and the environment envisioned by the General Plan revisions.[29] In *Environmental Planning and Information Council*, the court held that if an EIR compares the potential environmental impacts of a General Plan revision to the potential impacts in the existing General Plan, the results can be misleading because the land uses and population projections in the existing General Plan may have never materialized.[30] In other words, comparing a future condition with another future condition is not sound.

3.1.2.2 Contents

The Project Description drives the scope of the water supply analysis and the associated environmental analysis that need to be considered in an Initial Study and draft EIR. A Project Description should include: (a) the precise location and boundaries of the proposed project, including its location from a regional perspective; (b) a purpose statement and clear set of objectives to help the lead agency develop a reasonable range of alternatives and a statement of overriding considerations; (c) a general description of the project's technical,

[27] CEQA Guidelines § 15206(b)(1)
[28] If there are "no significant impacts" the land use entity may file a "negative declaration." And, even if there are impacts, there may be exemptions. These issues are best addressed through legal counsel.
[29] *Environmental Planning and Information Council v. County of El Dorado* (1982) 131 Cal. App. 3d 354.
[30] *Id.* at 354.

economic, and environmental characteristics.[31] The intended uses of the EIR should also be included. The Project Description should detail the changed conditions that account for the potential environmental impacts associated with the direct physical and "reasonably foreseeable" indirect physical changes in the environment.

The California Supreme Court has emphasized the importance of the principle of "reasonable forseeability" when considering the potential environmental impacts of obtaining a water supply for a project, and encourages presentation of the broadest extent of information *possible* to allow decision makers to understand the environmental benefits, impacts and costs of supplying water to a project. [32] Consistent with the principle of "reasonable forseeability," the *Vineyard* court further recommended that there not be any "ignoring or assuming" a solution of supplying water to a proposed development will manifest itself at a later stage in the development review process. The implication is that "reasonably forseeable" physical changes may be less certain at the General Plan stage than at the Community or Specific Plan stage and therefore the hydrologic analysis of the physical changes in the environment may be more general. Nevertheless, the analysis of reasonably foreseeable physical changes should be commensurate with the specificity of the activities presented in the land use planning document. That being said, to the extent a land use activity is reasonably certain, and its impacts can be contemplated, those impacts need to be evaluated at the earliest applicable stage in the land use planning process.

3.1.2.3 Hydrology Section

The Initial Study and draft EIR are intended to provide disclosure of potential impacts of physical changes in the environment caused by a project. More specifically, the draft EIR provides further detail regarding those impacts deemed significant, and also includes mitigation measures and policy rationale for accepting certain environmental impacts. The CEQA Guidelines provide a list of relevant hydrologic and water quality factors to consider when preparing an Initial Study and draft EIR for a General Plan or other project subject to CEQA.[33] The Guidelines include the following factors:

1. ***Groundwater:*** Will there be a substantial depletion of groundwater supplies or interference with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

[31] CEQA Guidelines § 15124
[32] *Vineyard* at 13 citing *Santiago County Water Dist. v. County of Orange* (1981) 118 Cal.App.3d 818.
[33] CEQA Guidelines, Appendix G

2. ***Supply Expansion:*** Will the project result in the need for new systems or a substantial expansion or alteration to the local or regional water supplies that would result in a physical impact to the environment?

3. ***Insufficient Supplies:*** Will the project result in insufficient water supplies available to serve the project from existing entitlements and resources?

4. ***Drainage:*** Will the project result in a substantial alteration of the existing drainage pattern of the site or area, including alteration of the course of a stream or river?

5. ***Water Quality:*** Will there be a substantial alteration in surface or groundwater quality as a result of an alteration in drainage patterns?

These factors are broad, and leave room for a good faith reasoned analysis of the potential environmental impacts associated with utilizing or acquiring supplies and development of water demands consistent with the General Plan Land Use Element. For example, when considering whether acquisition of sufficient water resources will cause a "substantial depletion such that there would be a "lowering of the groundwater table level" implies that some lowering of the table might *not* be a significant impact over a certain period of time but would be considered a substantial impact if it persists over some longer average period of time. These impacts on the basin should be explained and to the extent they are significant, mitigation measures should be identified that would reduce the impact to "less than significant." Such a measure might include participation in the implementation of a regional groundwater management plan.

Also, determination of whether a "substantial expansion of the local or regional supplies" may be considered a significant impact provides little indication of the "trigger" for such an impact. Most likely, any supply expansion involving infrastructure development will ultimately trigger an environmental assessment, and the question of whether to prepare the assessment at the point the General Plan is prepared will depend whether the direct or reasonably foreseeable indirect impacts of an infrastructure project are certain.

Additionally, analysis of whether a General Plan will result in "insufficient water supplies" presents issues similar to those that must be addressed in Senate Bill 610 Water Supply Assessment (SB 610 WSA) regarding supply sufficiency (see Section 5). The basis for considering this factor could require a thorough analysis of supplies and demands to render a finding on "sufficiency." Furthermore, consideration of those direct and indirect impacts that may result by securing an alternative supply following a finding of "insufficiency," should be evaluated.

Based upon the analysis of impacts, the lead agency must explain how significant environmental effects identified in the EIR will be mitigated or why mitigation measures are

not feasible. The lead agency must certify that there will be no significant effects, or that the effects will be minimized and there is a compelling rationale as to why remaining affects are acceptable.[34]

3.1.2.4 Program & Master EIRs

The CEQA Guidelines provide for "tiering" of environmental analyses for efficiency. Specifically, tiering is defined as "using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project."[35] Tiering is important from a water planning perspective because of the staged nature of development proposals, which typically proceed from broad land use classifications in the General Plan to more detailed proposals in a Community or Specific Plan and are further refined at the tentative map stage. Because water analyses in successively more specific land use planning documents may reference previous land use planning documents and their associated environmental analyses, it is important to be familiar with the scope and depth of the "tiering" requirements.

Tiering may work in a variety of ways. For purposes of a General Plan, a Program or Master EIR may be developed. A Program EIR "if prepared for a General Plan typically considers broad policy alternatives, considers cumulative effects of alternatives where known and also plan-level mitigation."[36] For a Program EIR, "if a development project is consistent with the General Plan of a local agency and an EIR was certified with respect to that General Plan, . . . [the environmental analysis for a subsequent land use planning document] should be directed solely to the impacts which: (1) are peculiar to the parcel or to the project and were not addressed as significant effects in the prior EIR; or (2) which substantial new information shows will be more significant than described in the prior EIR."[37]

A subsequent project may reference a Program EIR if there have not been substantial changes in the General Plan, the environment or the foreseeability of impacts. If a subsequent project references a Program EIR, there must be consistency, and the subsequent project must incorporate mitigation measures contained in the original document. The lead agency should consider whether the subsequent project has environmental effects, and to the extent there may be new impacts, should consider whether they are significant.[38]

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[34] CEQA Guidelines § 15091, which provides that a public agency may cite "specific economic, legal, social, technological, or other considerations, … making mitigation or other alternatives infeasible." [CEQA Guidelines § 15091(a)(3)].
[35] CEQA Guidelines § 15152.
[36] *General Plan Guidelines*, Office of Planning and Research, State of California (2003) p. 138
[37] Public Resources Code § 21083.3(b)
[38] *General Plan Guidelines*, OPR, p. 138 - 139

Functionally, a Master EIR is essentially the same as a Program EIR. A Master EIR is "intended to streamline later environmental review of projects or approvals included within the project, plan or program analyzed in the Master EIR."[39] If a subsequent program is within the scope of the Master/Program EIR, a focused EIR is required if there is substantial evidence that the project may have a significant impact, even if there is contrary evidence.[40] Upon approval of a program EIR, a focused EIR is only required when the significant environmental effects are uncontroverted.[41]

Recognizing the importance of efficiency when considering the hydrologic impacts of a project, *Vineyard* highlights the value of "tiering," as well as the importance of proper reliance upon a subsequent "tiered" environmental assessment if a project is sufficiently well-defined at the time the land use document is adopted.[42] Thus, there are "tiering" considerations that operate both retrospectively and prospectively, in that an environmental assessment may indicate that subsequent phases or components of a project that are complicated or less well defined at the point the General Plan is prepared will be evaluated at a later point in time. This is acceptable so long as the evaluation analyzes each direct and reasonably foreseeable indirect physical change that is sufficiently understood. Tiering also works retrospectively as previously noted in that previous analyses may be utilized for the broader cumulative and growth-inducing impact analysis assuming mitigation measures are adopted for the components of the project that were previously evaluated and have not substantially changed and new analyses are performed for the unique features of the new project.

3.1.3 Water Supply Evaluation

3.1.3.1 Purpose

One method for developing the information necessary to include in a Conservation, Open Space, Public Utilities, Water Resources Element or an environmental assessment of hydrology and water quality impacts is to prepare a Water Supply Evaluation (WSE). A WSE is most applicable to a jurisdiction that is newly incorporated or that has not reached the connection threshold for development of an UWMP. A WSE is not a statutory requirement, and, as such, there are no substantive requirements for a WSE. Nevertheless, given the previous discussion regarding internal consistency, the need to assess whether water resource management measures will have a significant environmental impact, and the implications of EIR tiering, there may be value in developing a formal water supply and demand evaluation.[43] In addition, a WSE can become a platform from which to prepare

[39] CEQA Guidelines § 15175
[40] *General Plan Guidelines*, p. 139
[41] *General Plan Guidelines*, p. 139
[42] *Vineyard* at 16.
[43] Because there is not a statutory requirement for a Water Supply Evaluation, the elements listed are recommended. The recommended contents of the elements are described in greater detail in the sections

future SB 610 WSA compliant assessments or future UWMP updates. The potential components of a WSE are outlined below.

3.1.3.2 Contents

To effectively complete the General Plan itself as well as the necessary environmental documentation, a WSE should contain the following elements:

1. ***Study Area***: The Study Area is the geographic boundary of the political jurisdiction preparing the WSE. Definition of the geographic study area is critical for analytical purposes because the land use based demand projections necessitate use of consistent total acreage figures.

2. ***Land Use Data***: The Study Area sets the boundaries for preparation of the land use data, including the land use classifications and relevant densities for all land area. A description of land use information should consider the development planning horizon of a General Plan and any specifically referenced development proposals contained in a General Plan. While there may be value in considering a 20-year demand projection consistent with requirements of a SB 610 WSA, consistency with the Land Use Element in a General Plan should be maintained.

3. ***Water Demands***: Based upon the land use data, unit water demand factors should be assigned to all land areas based upon the land use classifications. The unit water demands should be presented at the level of detail applicable to the General Plan and should incorporate any ordinances or policies contemplated in the General Plan that may affect unit water demand (i.e. conservation or landscape ordinances). If it is not possible to incorporate actual unit demands for indoor and outdoor uses based upon the nature of the land use at the early stages of the planning process, demands should be presented in aggregate per-acre of land area.[44]

4. ***Water Supplies*:** A WSE should include a description of a jurisdiction's current and future surface water supplies, including source and reliability. If applicable, a WSE should provide: (1) a description of the relevant groundwater subbasin based upon the current DWR Bulletin 118 description; (2) well hydrographs from available wells in an area that greatly exceeds the Study Area boundary; (3) groundwater contours and elevation trends for the same broader geographic area; and (4) supplier historic use, conveyance capacity, and projected use.

5. ***Dry-Year Supply Reliability*:** If dry-year supply reliability projections have not been made in an applicable UWMP, development of reliability projections for a General

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regarding Urban Water Management Plans and Water Supply Assessments. The statutory authority to cross-reference the contents of these documents highlights the value of a high degree of consistency.

[44] See Section 2 for the distinction between these two methodologies.

Plan update are probably not necessary unless there are highly certain development proposals being contemplated, and there is a desire to prepare such analyses in a timely fashion.

6. ***Integration of Supplies and Demands*:** A discussion of the relationship between supplies and demands will provide a basis for assessment of potential environmental impacts that might materialize with the expansion of existing supply infrastructure or acquisition of new supplies.

7. ***Conclusions*:** With mitigation and overriding policy considerations in mind, develop conclusions related to integration results that will be useful in the contemplation of alternative scenarios under the General Plan.

Project Alternatives

CEQA Guidelines § 15126.6 outlines the requirements for evaluating the environmental impacts of project alternatives, including the no-project alternative. A WSE is unique because there is more flexibility in the consideration of project alternatives under CEQA when there is not an overriding statutory requirement to generate specific information (such as the case with the SB 610 WSA). These scenarios might include land use designation changes in the existing jurisdictional boundaries, a proposal for various changes within a SOI, and even consideration of future land use modifications within a proposed SOI. Each of these footprints has an existing water demand and a potential future water demand consistent with the jurisdiction's proposed land use plans. To consider the environmental impacts of the "project," it is necessary to evaluate the existing and future water demands and the associated hydrology and water quality impacts. Such an approach provides the lead agency with the information necessary to consider the environmental impacts of its immediate decision to approve land use changes under the proposed General Plan, and it also serves as a basis for other agencies (e.g., LAFCO) to make decisions regarding the provision of public services in contemplation of an amendment to an existing SOI or expansion of the existing SOI.

3.1.4 Relevance of Local Agency Formation Commissions on General Plan Water Supply Planning

3.1.4.1 Purpose

General Plan updates are often tied to the adoption and/or modification of a SOI. An SOI represents the probable physical boundary and service area of a local agency or municipality as approved by the LAFCO. Within each county, LAFCO is responsible for approving SOI adoptions and modifications for each city and special district. LAFCOs consider amendments based upon the principles of logical and orderly development and coordination of local governmental services.

3.1.4.2 Contents

Among other elements, a LAFCO evaluates water service when considering whether an efficient SOI modification is possible. LAFCOs consider SOI boundaries based upon four factors: (1) present and planned land use; (2) present and probable need for public facilities; (3) present capacity and adequacy of public services (including water); and (4) social or economic communities of interest.

In contemplation of a SOI modification, a LAFCO first considers a local entity's five, ten, and 20-year growth projections and the associated land use changes. There should be a description of the present and probable need for public services concurrent with projected land uses. If the LAFCO processes alter land uses, then the water supply evaluation may need revision to maintain consistency. Generally, the water planning analyses contained in General Plans, General Plan EIRs, UWMPs or SB 610 WSAs will be satisfactory for LAFCO approvals.

3.2 CONCLUSION

The General Plan presents a unique opportunity for interested parties to engage in the planning process. The broad approach used in a General Plan typically allows for identification of policies regarding resource uses and impacts, as well as delineation of various responsibilities for meeting planning objectives. From a water planning perspective, a General Plan plays a significant role because it: (1) serves as an opportunity for public review of the hydrology and water quality impacts associated with a project; (2) may set the foundation for subsequent project-specific reviews that may attempt to utilize the General Plan EIR as the basis for subsequent decisions; (3) provides an opportunity for responsible agencies to participate in the planning process through review of the NOP and comment on the draft EIR once issued, including mitigation measures.

While a General Plan is a critical land use and water resource planning document, it is important to keep its limitations in mind, notably that it is infrequently updated because of the considerable staff time and financial resources involved in such an effort. This has the potential to lead to other problems related to water supply planning. Often, a developer will drive the project planning process and may hire a consultant to prepare an environmental assessment or SB 610 WSA for a project. If the local jurisdiction does not institute quality control of the developer documents, consistency problems among project specific planning documents may emerge. The General Plan thus serves as the foundation for consistency determinations in the project specific documents, and it needs to remain relevant to local jurisdiction staff and decision makers.

SECTION 4 – THE URBAN WATER MANAGEMENT PLAN

4.1 INTRODUCTION

The Urban Water Management Plan (UWMP) is the foundational water supply document for an urban water supplier. While the UWMP has historically been viewed by some suppliers as a "check-the-box" exercise, the quality of analytical detail is becoming more important as water supplies become more scarce and broader analyses are required to understand and disclose the reliability and sufficiency of the water supply. Though there is greater need for scrutiny and analysis, the Urban Water Management Planning Act (Act)[45] recognizes the challenges associated with gathering data and recommends developing conclusions based upon information that is "reasonably available."

The Act is intended to promote efficient use of urban water supplies, ensure water supply reliability in various hydrologic conditions, and provide a mechanism for long-term resource planning through the preparation of a UWMP. The Act is applicable to a publicly or privately owned water supplier serving water to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

Following approval of the UWMP by the public water supplier, it must submit an UWMP to the California Department of Water Resources (DWR) every five years following the first report if the supplier has more than 3,000 connections or serves more than 3,000 acre-feet/year or for the first time one year after exceeding 3,000 connections or 3,000 acre-feet/year threshold. The UWMP is the broadest, most comprehensive water supply and demand document that a public agency prepares, and therefore it can be used as the basis for other analyses, including a supply and demand analysis within a General Plan, for a Senate Bill 610 Water Supply Assessment (SB 610 WSA) or for a SB 221 Water Supply Verifications (SB 221 Verification).

While DWR reviews the UWMP for consistency with the statutory requirements, it does not "reject" an UWMP filed by an urban water supplier. If a plan includes all of the required information, it is "complete." If a plan is not complete, DWR will request that the supplier improve its plan by addressing the provisions identified as "Not Addressed."[46] The contents and analysis in a UWMP are tested when the UWMP is used as a reference in the preparation of a SB 610 WSA or SB 221 Verification because, at that point, projects become most publicly visible and the assumptions may be tested.

[45] California Water Code 10610 et seq.
[46] http://www.owue.water.ca.gov/faq/faq.cfm

Preparation of a UWMP requires a coordinated effort with other water purveyors in the region that may be affected by the planning efforts of the preparing entity. Thus, the preparing entity must notify such entities, make a draft copy of the UWMP available and request comments regarding the content and recommendations prior to its formal adoption after a public hearing.

4.2 ELEMENTS OF AN UWMP

The UWMP requires completion of several elements intended to capture the balance between projected supplies and demands, and also to present both short-term and long-term demand management strategies, and alternative source development methods (including recycled water). While one of the primary objectives of a UWMP is assessment and disclosure of the supply and demand balance of a jurisdiction over a 20-year time horizon, a UWMP does not need to contain conclusions regarding the sufficiency of the water supply relative to projected demands. Nevertheless, the substantive elements of a UWMP do include data beyond that which is required in SB 610 WSAs and SB 221 Verifications, and even though a conclusion regarding sufficiency is not required, the elements of a UWMP should be carefully prepared with the understanding that the data will likely be used for sufficiency analyses at a later date.

The elements discussed below include:

- Study Area
- Water Supplies
- Reliability
- Demands
- Demand Management Measures
- Water Shortage Contingency Plan
- Recycled Water Plan

4.2.1 Study Area

The California Water Code requires preparation of a UWMP based upon the service area of the urban water purveyor. In some cases, the service area may overlap with the political boundary of a local government because the local government is the purveyor. There may be other cases in which the local government does not serve water to all areas within its jurisdiction, in which case it would not be required to include a discussion of the areas served by other purveyors. On the other hand, a local jurisdiction may have an obligation, for health and safety purposes, to ensure availability of adequate supplies for those areas served by other purveyors in the case of a supply shortage or catastrophe.

Definition of the geographic Study Area is critical for analytical purposes because the land use based demand projections necessitate use of consistent total acreage figures. Subdivision of the Study Area may be appropriate for several reasons, including: (1) unique supply and demand considerations, such as provision of water to one area of the larger political jurisdiction by another water purveyor; or (2) wholesale arrangements for certain portions of a jurisdiction that should be considered separately because the unique supply characteristics of the water purveyor may impact supply reliability.

To gain a broader understanding of future demand trends and provide justification for the unit demands developed as part of a UWMP, the UWMP must include a discussion of the population projections for the study area. Population projections also assist in the evaluation of the potential savings that may be realized from implementation of the Demand Management Measures that are also required to be assessed in the UWMP.

4.2.2 Water Supplies

A UWMP requires a description of the supplies available to the urban water supplier over a 20-year planning horizon. The UWMP should describe the legal nature of each water supply, though it is not a requirement to include documentation supporting the supply in the UWMP itself.[47]

Surface Water: Based upon the Study Area delineations, surface water resources should be described consistent with water rights and contract entitlements, including the supply volume, point(s) of delivery and area served. *Vineyard* highlights the importance of a "reasoned analysis of the circumstances affecting the likelihood of the water's availability."[48] In the UWMP, the likelihood of a supply materializing does not have an impact on the conclusions in the document, but if these same supplies are going to be cited as potential sources in subsequent planning documents the disclosure of uncertainties becomes increasingly critical. This should probably compel a "reasoned analysis" in the UWMP because of its foundational nature.

Groundwater: Two of the primary issues related to a discussion of groundwater supplies are: (1) whether there is a reasonable and accurate description of the basin; and (2) whether the requirement to indicate whether the basin is in overdraft impacts future "sufficiency" determinations in subsequent water supply analyses. Generally, a UWMP requires a description of the groundwater basin consistent with the DWR Bulletin 118 summary. Whether the description of the basin is reasonable is in large part an intuitive hydrogeologic consideration. The goal to provide information regarding the basin from the urban water supplier pumps to serve demands in the *Study Area.* Clearly, this can become quite complicated because the aquifer from which the urban water supplier pumps is not uniform

[47] In contrast, a SB 610 WSA does require documentation of the water supply to be included.
[48] *Vineyard* citing *California Oak v. City of Santa Clarita* (2005) 133 Cal.App.4th at 1244.

across its range, and therefore some uncertainty will almost always be present regarding the "basin" from which the urban water supplier pumps unless detailed studies of the basin have been conducted.

An urban water supplier must determine whether DWR has projected the basin is or will become overdrafted if present management conditions continue, in the most current official departmental bulletin (i.e., Bulletin 118) that characterizes the condition of the groundwater basin . . . ."[49] Bulletin 118-03 indicates that the Legislature did not provide direction or funding to undertake an overdraft analysis of the State's groundwater basins. Therefore, except for the 11 basins that Bulletin 118-03 recognizes as being in "critical overdraft," the scope of the analysis required under the statute is unclear. Nevertheless, this omission probably does not relieve a jurisdiction from identifying overdraft conditions based on other available information. To help in this effort, Bulletin 118-03 does provide working definitions of "historical" and "projected" overdraft from which a good faith analysis of overdraft should be considered.

DWR Bulletin 118 defines "overdraft" as "the condition of a groundwater basin or subbasin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years, during which the water supply conditions approximate average conditions."[50] DWR also defines "projected overdraft" as "an estimate of future water shortages based on an assumed management program within the basin, including projected supply and projected demand."[51]

In 1978, DWR was directed by the legislature to develop a definition of "critical overdraft." As a result of public workshops and input from water managers, DWR developed a definition of critical overdraft that was utilized in DWR's Bulletin 118-80 as follows: "A basin is subject to critical conditions of overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." Ultimately, DWR utilized this definition to identify 11 basins in "critical overdraft," and Bulletin 118-03 has retained this list.[52]

The description of the basin, including "overdraft" considerations, is directly related to the methodology that an urban water supplier employs in an SB 610 WSA to determine whether there are "sufficient" groundwater supplies available because sufficiency is directly related to the available supplies and all other demands relying upon the same supply source. Ultimately, the "gold standard" for determining sufficiency of groundwater supplies may be the product of case law resulting from challenges to SB 610 WSAs. While this standard is relevant to SB 610 WSAs, the connection between a Water Supply Assessment and an

[49] Water Code § 10910(f)(2)
[50] Bulletin 118, Ch. 6, p. 98
[51] Bulletin 118, Ch. 6, p. 97
[52] There is not a Sacramento Valley Basin or Sub-Basin on this list.

UWMP may ultimately drive public water systems to prepare the UWMP consistent with this requirement.

4.2.3 Reliability

The Act requires a 20-year projection of water supply availability, as well as the availability of these supplies in normal, single-dry and multiple-dry years. The reliability analysis should be distinguished from the analysis of the nature of the water supplies themselves. Reliability analyses should be performed on those supplies that have been identified as available to serve demands. As explained in Section 2, the interaction of hydrology and the identified water rights and entitlements is critical to assessing the reliability of supplies in different hydrologic year types. A few examples of reliability analyses include:

- *Historic Hydrologic Data*: Reliability is often assessed by analysis of historic supply conditions, with specific emphasis on the driest single and multiple dry-year periods. To perform this analysis, historic hydrologic data needs to be available over a sufficient time period to be able to select representative periods of time. Commonly, a multiple dry-year analysis entails consideration of supply conditions in three successively dry years. Based upon water supply conditions in the representative year(s), the urban water supplier can estimate the quantity of water that might be available in these worst-case scenarios based upon the supplier's existing water rights.
- *Negotiated Agreements*: Reliability may also be assessed according to the details of a negotiated agreement that drive reductions in dry years based upon a unique formula such as reservoir inflow. Specifically, the Water Forum Agreement (WFA) – a negotiated agreement among water purveyors on the American River - uses unimpaired inflow to Folsom Reservoir as the trigger for urban purveyors to reduce their diversions in dry years. The WFA is intended to supersede any diversion reduction requirements directly associated with a given supply. In the case of the WFA, it is possible to assess potential likelihood that staged reductions might take place over a long-term hydrologic record. The dry year patterns identified for purposes of supply analysis will then be considered in light of dry year demands.
- *Groundwater:* Groundwater reliability presents a complicated issue because of the limited information available regarding groundwater supplies. Further detail regarding "sufficiency" of supplies is discussed in the evaluation of the SB 610 WSA in Section 5.

4.2.4 Demands

The Act also requires preparation of the past, current and projected demands by sector. Historic and current demands may be reported based upon available data, including water treatment plant production and end user meter data. A UWMP should also provide a detailed description of projected demands in five year increments for a twenty year period. The methodologies for developing these demand projections are described in detail in Section 2.

As discussed previously, the importance of the demand assessment in light of future use for subsequent SB 610 WSAs and General Plans should be strongly considered to help avoid inconsistencies that could become problematic for subsequent land use planning decision documents.

4.2.5 Demand Management Measures

The Act requires that the urban water supplier describe long-term Demand Management Measures (DMMs). One of the primary objectives of this requirement is to ensure that urban water purveyors make a good-faith effort to use water efficiently prior to initiating water supply projects that may not be as cost-effective per unit of water. While reporting DMMs is a requirement for preparation of a UWMP, there are also incentives for maintaining a robust DMM program through membership in the California Urban Water Conservation Council (CUWCC). Preparation of, and reporting on, DMMs is critical to land use planning efforts because the DMMs are intended to make water "go further" per unit of land or for a population within a given jurisdiction. A detailed listing of required DMMs is available through the California Department of Water Resources.

4.2.6 Water Shortage Contingency Plan

The Act requires a description of a water shortage contingency plan in conjunction with the UWMP. The Act also requires an urban water supplier to identify actions and plans for implementation of measures according to the plan in the case of water shortage. The water shortage contingency plan must consider stages of action up to a 50% reduction in supplies. Also, the urban water supplier must estimate available supplies, assuming a three year dry period, consistent with the driest three-year period on record. The purveyor must consider mandatory prohibitions, penalties, methods for implementation (including resolutions or ordinances) and measurement approaches for determining whether conservation targets are being achieved. Also, the UWMP should contain an analysis of the costs to the agency resulting from shortages.

From the perspective of an UWMP, the biggest issue related to the applicability of a water shortage contingency plan is quantifying the water savings achieved from temporary conservation actions. Because the goal is to achieve water savings sufficient to align demands with supplies, measurement becomes critical. By evaluating demands on an indoor/outdoor basis, it is possible to contemplate potential savings from various rationing activities designed to curtail outdoor uses, which are typically considered "discretionary."

4.2.7 Recycled Water Plan

The Act requires consideration of recycled water opportunities, including capacity of wastewater collection systems, water quality of the wastewater and its suitability for various applications, and the potential demand within the urban water purveyor's jurisdiction for

recycled water. There are a number of issues that emerge as part of this planning exercise, including: (1) the manner in which recycled water is classified in the supply and demand analyses; (2) the costs and benefits of developing recycled water infrastructure; and (3) the ability to ensure that the recycled water meets water quality discharge standards promulgated by the Regional Water Quality Control Board for various suburban and agricultural irrigation applications.

Many water supply and demand analyses classify recycled water as a source of supply, when recycled water opportunities may be better classified as demand reduction opportunities. Recycled water is originally part of an urban water purveyor's supplies, so it is not a new supply, but rather a way of reusing the original supply such that total demands may be reduced. Also, a water supply and demand analysis that projects recycled water will be a source of supply may be oversimplifying a highly complicated process that requires acquisition of a water discharge permit from the Regional Water Quality Control Board, as well as potential agreements to distribute water to willing users.

Recycled water presents unique demand reduction opportunities that can be realized through application of such water for irrigation purposes. To realize these benefits, an urban water purveyor may have to make significant infrastructure investments. Even in California's Central Valley, where water resources are at a premium, retrofitting an existing water system to serve recycled water requires a significant economy of scale before such a venture may be beneficial. New developments present the most promising opportunity to install infrastructure for delivery of recycled water because the pipe can be installed underground alongside other utility infrastructure. In both cases, the economics of utilizing recycled resources for demand reduction is heavily dependent upon the scarcity of water and the cost of infrastructure.

The regulatory challenges associated with securing a permit to apply recycled water in public and semi-public landscaping and for crop irrigation should not be underestimated. The primary concern in the permits is protection of groundwater resources from degradation in water quality resulting from percolation of the applied recycled water. The Central Valley Regional Water Quality Control Board typically requires tertiary treatment of water prior to reuse of such water in landscaping and irrigation applications. There may also be background and ongoing monitoring requirements to characterize the potential impacts that the recycled water operation is having on the groundwater.

4.3 CONCLUSION

UWMPs, though completed every five years, offer an essential opportunity for a water purveyor to provide consistent and comprehensive analysis of water supply and demand conditions that can be used for subsequent land use planning efforts. Failure to pay attention

to the reliance on UWMPs may create constraints for other planning efforts or require additional analysis and documentation to align and explain variances.

SECTION 5 – THE SB 610 WATER SUPPLY ASSESSMENT

5.1 INTRODUCTION

Enacted in 2001 (effective January 1, 2002), Senate Bill 610 Water Supply Assessment (SB 610 WSA) added section 21151.9 to the Public Resources Code requiring that any proposed "project," as defined in section 10912 of the Water Code, comply with Water Code section 10910, et seq.[53] Commonly referred to as a "SB 610 Water Supply Assessment," Water Code section 10910 et seq. outlines the necessary information and analysis that must be included in an environmental impact report (EIR) to ensure that a proposed land development has a sufficient water supply to meet existing and planned water demands over a 20-year projection.

The SB 610 WSA is the first of two development-specific water supply planning documents intended to closely link the demands of a set of proposed land uses contained in a proposed project with the water supplies available for that development. The standard for the certainty and reliability of water supplies sufficient to meet the demands of the proposed development is more exacting then that required for the Urban Water Management Plan (UWMP). Ultimately, because the SB 610 WSA is a source document for an EIR prepared for a proposed project pursuant to California Environmental Quality Act (CEQA), it must provide substantial evidence showing that sufficient water will be available to meet water demands for the water purveyor's existing and planned land uses over a 20-year planning horizon.

The relationship between CEQA and the SB 610 WSA drives the timing associated with preparation of an SB 610 WSA. The SB 610 WSA should be prepared concurrent with the EIR, such that the SB 610 WSA is utilized and referenced in the draft EIR. The SB 610 WSA should then be appended to the EIR that is certified by the local government agency approving the land use project. Thus, the SB 610 WSA is subject to the CEQA deadlines associated with issuance of a Notice of Preparation (NOP), a draft EIR and certification of a final EIR as explained in **Section 3.1.1.2**.

The elements of a Water Supply Assessment are as follows:

- Initial considerations,
- Quantification of the proposed project's water demands,

[53] The term "proposed project" as used in this section is different than the definition of a project used in the context of a General Plan previously discussed in Section 3.

- Description and documentation of water supplies,
- Sufficiency analysis.

5.2 INITIAL CONSIDERATIONS

5.2.1 Is it a Project?

The initial question in conducting an SB 610 WSA is whether there is a "project" that is subject to the SB 610 WSA process. According to the SB 610 WSA requirements, a "project" is defined as any of the following:

- Residential development of more than 500 dwelling units;
- Shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- Commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- Hotel or motel, or both, having more than 500 rooms;
- Industrial, manufacturing, or processing plan, 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;
- Mixed-use project that includes one or more of the projects specified above;
- 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.[54]

Defining the project has important implications to the scope of the WSA analysis as well. For example, if the project will have a non-potable water component – i.e. "purple pipe" – and the source of the non-potable supply from the public water system is a contaminated groundwater basin, then a full analysis of the groundwater basin will be required in the sufficiency analysis. If however, the project identifies a potable supply for the "potential"

[54] This Section is quoted in its entirety from Water Code Section 10912.

non-potable uses, then the sufficiency analysis may be more confined. Accordingly, the definition of the project not only triggers the Water Supply Assessment analysis but it also shapes the scope of the water supply analysis that will be required.

5.2.2 What Documentation Exists?

The SB 610 WSA may be most efficiently completed in cases where an UWMP has been prepared that incorporates the defined project into its analysis. This incorporation means that the level of detail of the demands and the documentation of supplies have been sufficiently detailed in accordance with the requirements of the SB 610 WSA.

In cases where all of the information required for the SB 610 WSA is not contained in the UWMP, then the SB 610 WSA may still reference the UWMP and then develop the necessary level of detail to satisfy the legal requirements. And, even if the UWMP exists and contains very little if any information relevant to the SB 610 WSA analysis, it should still be referenced in the report.

The more critical issue arises where the UWMP exists but the information contained in that document is outdated or contrary to the findings in the SB 610 WSA. In this instance, it is important that the SB 610 WSA explain any discrepancies in the information between the two documents. And, where the UWMP pre-existed the SB 610 WSA, the SB 610 WSA should explain the changed conditions or changes in calculation methodologies that lead to the discrepancies. If a discrepancy is so large as to effectively eviscerate the UWMP, then it may be worthwhile for the water supply provider that developed the UWMP to revise some findings through an amendment process.[55]

5.3 QUANTIFICATION OF THE PROPOSED PROJECT WATER DEMANDS

Water Code section 10910 requires that an SB 610 WSA quantify water demands associated with the proposed project. Water demand projection methodologies were described previously in **Section 2**. These methodologies include both the land use and population-based methods coupled with verification actions. The nature of land uses within the project should be well defined. Such characteristics as the actual number of each type of residential dwelling unit, acreages and square feet of commercial and office land uses, acreages of parks and acreages of roads should be known. Water demand projections for each land use type need to be made over a 20-year period in 5-year increments.

[55] Again, the UWMP is essentially a procedural document and is not subject by "approval" as to substantive content by any reviewing agency. Nevertheless, internal consistency between documents is critical to surviving potential challenges to WSA's and CEQA findings. Furthermore, a water purveyor has the discretion to update an UWMP at times other than the required five-year increments. Thus an update to the UWMP could be made and adopted, then used as a basis for a SB 610 WSA.

Although not specifically required in Section 10910, water demands associated with the proposed project should be estimated for normal, dry and multiple dry-year hydrologic years. Accounting for variations in water demands during dry periods is also discussed in **Section 2**. As described earlier, water demands generally increase in dry periods as outdoor irrigation may start earlier in the year or require more water.

5.4 DESCRIPTION AND DOCUMENTATION OF WATER SUPPLIES

5.4.1 Surface Water Supplies

The surface water analytical requirements for the SB 610 WSA are similar to those for the UWMP, which requires a description of quantities received in prior years, and an analysis of supplies under normal, dry, and multiple-dry year projections. In contrast to an UWMP, the SB 610 WSA also requires inclusion of documentation to establish and support "rights" associated with the stated water supplies. This may include copies of contracts, water right permits, licenses or other recordings that establish proof that the right exists as represented in the sufficiency analysis. Generally, a SB 610 WSA will require the following elements: (1) proof of "right" to a supply; (2) quantification of historic use of the identified supplies over the past five years; and (3) proof or intent to obtain supplies to meet the expected future demand.

5.4.2 Groundwater Supplies

Similar to the requirements of a UWMP, a SB 610 WSA must include, among other things, the following information if groundwater will be a source of supply for a proposed project:

- A description of any groundwater basin or basins from which the proposed basin will be supplied;
- Whether the groundwater basin or basins have been subject to any adjudication proceeding;
- Whether California Department of Water Resources (DWR) has identified the basin or basins as overdrafted in the most current bulletin; and
- Efforts being undertaken to eliminate the long-term overdraft condition.

If groundwater is a source of supply for the proposed project, the analysis must also include "[a]n analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project."

Two important issues have arisen regarding the question of groundwater sufficiency:
(1) Whether a SB 610 WSA must analyze existing and planned water use of all users

overlying the relevant basin or basins; and (2) Whether there can be a finding of sufficient groundwater when the groundwater basin has been identified as overdrafted. Examining all demands within a basin for purposes of determining whether overdraft exists may be one way of satisfying the Water Code requirement to evaluate "sufficiency" in light of basin conditions. Alternatively, a finding of "sufficiency" may not require a quantification of recharge and pumping throughout the entire basin, but rather analysis of historic hydrograph records to determine how the aquifer has behaved over a series of years under various demand scenarios. Again, the SB 610 WSA requirements use "sufficiency" intentionally, because it is a broad term that provides discretion for groundwater pumpers in a region to exercise the basin within an acceptable range, understanding that in some years recharge will exceed pumping and in others pumping will exceed recharge.

The reality is that there is limited information regarding overdraft in the groundwater basins throughout the State of California, as well as information equivalent to a true water budget for groundwater basins. In Bulletin 118-03, DWR ranks the 515 basins/subbasins in the State of California based upon data availability regarding the aquifer. DWR classifies basins in one of the following three categories based upon information readily available regarding pumping and recharge:

> *Type A* indicates: (1) that a groundwater budget exists for the basin or enough components from separate studies could be combined to give a general indication of the basin's groundwater budget; or (2) a groundwater model exists for the basin that can be used to calculate a groundwater budget; or (3) actual groundwater extraction data exist for the basin.
>
> *Type B* indicates that a use-based estimate of groundwater extraction is calculated for the basin. The use-based estimate is determined by calculating the overall use from DWR land use and urban water use surveys. Known surface water supplies are then subtracted from the total demand leaving the rest of the use to be met by groundwater.
>
> *Type C* indicates that there are not enough data to provide either an estimate of the basin's groundwater budget or groundwater extraction from the basin.

Table 5-1 presents the Groundwater Budget Type for each of the seventeen groundwater subbasins in the Sacramento Valley.

Table 5-1 Sacramento Valley Groundwater Subbasins Groundwater Budget Type DWR Bulletin 118-03	
Budget Type	**Subbasin**
Type A	North American
Type B	Red Bluff, Corning, Colusa, Bend, Antelope, Dye Creek, Los Molinos, Vina, West Butte, East Butte, Yolo
Type C	North Yuba, South Yuba, Sutter, South American, Solano, Capay Valley

Clearly, one of the toughest challenges for those public water systems preparing SB 610 WSAs is going to be finding the point at which adequate information has been gathered and analyzed for purposes of making a reasoned conclusion regarding groundwater supply "sufficiency." Because the notion of "sufficiency" as applied to groundwater supplies is relatively untested, and there is probably room for reasoned arguments regarding the scope and depth of information necessary to make a "sufficiency" determination, this element of SB 610 WSAs is likely to be contested. Whether broadly developed pumping data for those using groundwater throughout a basin is necessary to determine whether a basin is in overdraft may be in open question in some circumstances. In many arenas, given the nature of groundwater rights, which are generally highly unregulated, sufficiency may be achieved through analysis of historic groundwater levels and development of basin-wide management measures that reflect the nature of the nature of long-term hydrologic cycles and the opportunities for conjunctive use.

5.5 SUFFICIENCY ANALYSIS

The "sufficiency" determination is really the heart of the SB 610 WSA. Sufficiency is evaluated differently based upon whether the water source is ground water or surface water. Because surface water supplies are generally more easily measured than groundwater, the potential issues associated with a determination of "insufficiency" related to these supplies are likely to be political or legal, though there may well be occasions in which it is technically infeasible to deliver adequate surface water to a proposed project. On the other hand, groundwater sufficiency determinations are more likely to consider primarily technical issues related to availability of water in the aquifer and the ability to measure the reliability of the water source. One clear exception is the case in which the basin being considered in

the SB 610 WSA is an adjudicated basin. An SB 610 WSA must work within the legal confines of an adjudication when evaluating sufficiency of supply. In either case, Water Code section 10910(f)(3)-(4) requires that the analysis be supported by substantial evidence.

5.5.1 Sufficiency Determination

A SB 610 WSA is required to determine whether the water supplier's total projected water supplies will be available during normal, dry and multiple dry water years over a 20-year period to meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses. This analysis is relatively straight forward as long as the water supplier's determination that sufficient water will be available is supported by substantial evidence. Once the water supplier determines whether sufficient water will be available, Water Code section 10911(c) requires that the land use jurisdiction ultimately responsible for the proposed project's approval make an independent determination as to whether sufficient water will still be available to meet demands for the proposed project in addition to demands of existing and planned land uses.

The California Water Code, however, does not define "sufficiency" for purposes of preparing a WSA. Therefore, it is left to the local jurisdiction to develop or ensure that the water purveyor develops substantial evidence such that a conclusion regarding sufficiency can be reasonably drawn. Intuitively, the determination of sufficiency is akin to an accounting process in which supplies are "insufficient" if projections anticipate that there will not be enough supply (down to the acre-foot) to satisfy demands in any of the normal, single-dry or multiple-dry year scenarios.

While Water Code § 10911 implies that projected supplies instantly become insufficient at some point along the spectrum of balancing supplies and demands, there is probably not a bright line for determining "sufficiency" such that a local jurisdiction can point to it and conclude that because supplies are projected to exceed demands by just a few acre feet that supplies are definitely sufficient to meet demands. Given the inherent uncertainty in the projection process, the smaller the projected margin between supplies and exceed demands, the more evidence a local jurisdiction needs to provide that it is capable of developing alternative supplies, including demand management measures, to offset the risk of insufficient supplies.

5.5.2 Finding of Insufficiency

The WSA contemplates that sufficient water supplies may not be developed at the time the WSA is prepared. In this case, the water supplier must include its "plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and

develop those water supplies."[56] The plans for developing water supplies should include information identifying:

- Costs and financing methods associated with developing the water supplies;
- Required permits, approvals and entitlements; and
- Estimated timeframes for developing the water supplies.

Although not expressly stated, the Water Code implies that plans for developing additional water supplies need to be narrowed to a few alternatives if not one identified source. A couple of issues emerge by requiring this approach, notably whether a jurisdiction may essentially accept the conclusion that there will be insufficient supplies for a "project" and yet approve the "project" if the water purveyor is able to develop adequate information regarding the acquisition of additional supplies. This issue highlights the relationship between the SB 610 WSA and the environmental assessment to which the SB 610 WSA is appended.

Vineyard touches on some important themes that could drive the nature and scope of the relationship between the two documents. Specifically, *Vineyard* held that within an EIR, when evaluating the environmental impacts of supplying water to a project there must be certainty that the supplies evaluated will materialize, and are not speculative. Also, to the extent there is some uncertainty, *Vineyard* counsels that there should be discussion of alternatives and the environmental consequences of those alternatives. While *Vineyard* concerned the adequacy of an EIR (as opposed to an SB 610 WSA), these two holdings could have an impact on the scope of information that a land use agency seeks in an SB 610 WSA because of the need to evaluate the impacts of the water resources findings in the SB 610 WSA. Notably, at the SB 610 WSA stage, a public water supplier should be focusing on a few highly likely sources. It is likely that the public water system will find additional pressure to specifically discuss the certainty associated with the "development of water supplies" consistent with the three bullet points above. The public water system will perhaps need to consider alternatives more carefully because of the requirement that the land use agency evaluate the environmental consequences of any identified alternative supplies.

5.6 RELATIONSHIP TO CEQA

Section 10911(b) of the California Water Code provides that the SB 610 WSA "shall" be included in the CEQA document. It is important to note that the requirements set forth for water supply and demand analyses in a SB 610 WSA cover a set of key elements that inform the broader CEQA analysis which should include consideration of hydrologic, water quality and any other impacts associated with the provision of supplying water to the proposed project. The same factors as those described previously may be utilized in this consideration

[56] Water Code § 10911(a)

of impacts including: (1) Substantial depletion of groundwater supplies; (2) Substantial expansion or alteration to the local or regional water supplies that would result in a physical impact to the environment; (3) Insufficient water supplies available to serve the project; (4) Substantial alteration of the existing drainage pattern; and (5) Substantial alteration in surface or groundwater quality as a result of an alteration in drainage patterns.[57]

[57] CEQA Guidelines, Appendix G

SECTION 6 – THE SB 221 WATER SUPPLY VERIFICATION

6.1 INTRODUCTION

The purpose of the Senate Bill 221 Water Supply Verification (SB 221 Verification) is to "include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available" to serve it.[58] The requirement to prepare an SB 221 Verification is triggered upon a local agency receiving a tentative map application for a proposed subdivision.[59] A subdivision is defined as an addition of 500 or more dwelling units, or, if fewer then 5,000 connections exist, upon an increase of 10% or greater in the number of service connections.[60] Upon receipt of a tentative map application, a local agency must send a copy of the application to any public water system that may provide water service to the identified lands.[61] Upon receipt of the request for verification, the public water system must provide the written verification of sufficient water supply to the local agency within 90 days.[62] Also, the requirement that a tentative map comply with the California Environmental Quality Act (CEQA) is likely to be met by reference to earlier environmental analyses prepared as part of an area, specific, or community plan. If a tentative map application is submitted for a development project that does not meet the definition of "subdivision" as contained in Government Code 66455.3 then no SB 221 Verification is necessary.

Similar to a Senate Bill 610 Water Supply Assessment (SB 610 WSA), the heart of an SB 221 Verification is the "sufficiency analysis" by the public water system. The SB 221 Verification defines "sufficient water supply" as the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed subdivision, in addition to planned future uses, including, but not limited to, agricultural and industrial uses.[63] To this end, a public water system is required to consider the following factors when determining whether a "sufficient water supply" exists: (1) the availability of water over a historical record of 20 years; (2) applicability of water shortage contingency plan; (3) sector reductions in water use pursuant to resolution or ordinance; (4) amount supplier could reasonably receive from

[58] Government Code § 66473.7(b)(1)
[59] Government Code § 66455.3
[60] Government Code § 66473.7(1)
[61] "Public water system" is defined in California Water Code § 10912 as a purveyor that serves water to more than 3,000 connections.
[62] The Code does not address the situation in which there is a water purveyor providing water to a "subdivision" that does not fit within the definition of "public water system."
[63] Government Code § 66473.7(a)(2).

another source. If supplies are not currently available, a "sufficiency" determination may rely upon: (a) written contracts; (b) capital outlay projects; (c) construction permits; (d) regulatory approvals.[64]

The information required in the SB 221 Verification may be gained from the SB 610 WSA or other water supply planning documents. Reliance on these documents for the SB 221 Verification, however, requires that these alternative documents meet the verification criteria or a finding that conditions have not changed since the other documents were adopted. Accordingly, preparing documents that are consistent in analyses of water supply and demand conditions may prove helpful in completing the necessary SB 221 Verification analysis.

The written verification of sufficient water supply has some unique requirements beyond those required in an SB 610 WSA. These requirements are:

- The verification shall consider the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial users within the service area of the public water system; and
- If a subdivision will use groundwater, substantial evidence shall be presented regarding the landowner rights to groundwater for the subdivision.
- If the written verification indicates that water supplies will be insufficient, the local agency may make a finding that additional supplies "are, or will be made available prior to completion of the subdivision" that will satisfy the verification requirements.[65]

6.2 "SUFFICIENCY" ANALYSIS

The SB 221 Verification requires a highly refined "sufficiency" analysis. At the tentative map stage, the land use planning entity will be expected to provide specific, parcel by parcel, land use information for a specific development, thus allowing a water analysis of indoor and outdoor uses for land use classifications and corresponding acreages.

If supplies are not currently available for the subdivision, along with agricultural and industrial demands, proof of permitted and/or licensed water rights; proof of contracts for water; as well as any other capital outlay proposals, permits and or regulatory approvals may be used as proof of future supply availability. In the case of a project that is planning to receive surface water supplies through a new diversion, permits and regulatory approvals associated with a project should be highlighted in the supply verification. All prospective approvals and their status should be identified. The federal and state approvals that might be

[64] Government Code § 66473.7(a)(2)(A-D)
[65] Government Code § 66473(b)(3)

required to demonstrate that a water supply will be made available to the subdivision are contained in **Table 6-1**.

Table 6-1
Federal and State Permits for Water Supply Projects

Permit Type	Agency
Clean Water Act, Section 404 (discharge of dredge and fill)	U.S. Army Corps of Engineers
Federal Endangered Species Act	U.S. Fish and Wildlife Service
California Endangered Species Act	CA Dept. of Fish and Game
Streambed Alteration Permit	CA Dept. of Fish and Game
National Pollution Discharge Elimination System, Construction Permit	Regional Water Quality Control Board
Clean Water Act, Section 401 Certification (wetlands water quality protection)	Regional Water Quality Control Board
SWRCB Applications, Permits, Transfers, Assignments	State Water Resources Control Board
Federal, State, Local, Private Encroachment Permits	

In addition to a discussion of specific water supply availability and the status of the procedures necessary to secure additional supplies, the SB 221 Verification, as part of the "sufficiency analysis" must also include an evaluation of the following four elements:

Availability of water over a historical record of 20 years: this requirement is intended to prove that recent demands for water have been met on a consistent basis. Though it will not prove that supplies will be available to meet future demands, it does provide evidence of the District's ability to meet historical demand on its system.

Applicability of water shortage contingency plan: As required by Water Code 10632 (for an UWMP), the agency needs to develop a plan that helps achieve a reduction in demands assuming up to a 50% reduction in supplies. This requirement, as it applies to an SB 221 Verification, seeks assurances that the water shortage contingency plan is applicable to the subdivision contained in the tentative map as well as the other water uses throughout the land use jurisdiction's service area. Because a water shortage contingency plan entails specific voluntary and mandatory actions to be undertaken by specific sectors, including residential and commercial, there needs to be a direct connection between the actions, the sectors, and the ability to measure demand reductions.

Sector reductions in water use pursuant to resolution or ordinance: Commonly, a water shortage contingency plan will establish water service sector priorities to evaluate the impacts of supply shortages and reductions in service to the respective uses within each sector. For example, many jurisdictions will develop a variation on the following three sectors:

1. ***Health and Safety*:** All residential indoor and all non-residential sanitary uses, including the wastewater treatment plant.

2. ***Business*:** All usage related to commercial activity, which may include businesses with major outdoor usage, such as golf courses and agriculture.

3. ***Outdoor Irrigation*:** All residential outdoor uses, and various large landscape customers.

As shown in the hypothetical example in **Table 6-2**, a Water Shortage Contingency Plan could include a reduction matrix that presumes a percentage reduction to the respective classes within a sector based upon the nature of the supply shortfall. The reduction trends are probably most instructive, and as expected, the Outdoor Irrigation sector would take the most severe initial cutback and see reductions up to 100% of supply in the most extreme supply shortage conditions. On the other hand, Health and Safety uses might not see a reduction at all in the mildest shortage conditions, and only a relatively smaller reduction in the most severe conditions. Importantly, developing reduction assumptions such as those in **Table 6-2** is the first step in the process of realizing use reductions.

Table 6-2
Water Shortage Contingency Plan
Hypothetical Sector Reductions

	Usage Priority		
Shortage Condition	**Health and Safety**	**Business**	**Outdoor Irrigation**
10%	0%	10%	40%
25%	10%	25%	75%
50%	25%	50%	100%

Other Sources: Government Code § 66473.7(a)(2)(D) requires an estimate of the amount of water a supplier could *reasonably receive* from other sources, including recycling, conservation and transfers. In most cases, the recycling and conservation data will have been evaluated in either the Urban Water Management Plan or a SB 610 WSA, but to the extent this information needs to be updated, an estimate should be provided.

6.2.1 Agricultural and Industrial Users

The definition of "sufficient water supply" in Government Code § 66473.7(a)(2) provides that supply needs to be available for the subdivision, "… in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses." Furthermore, 66473.7(g) provides that the SB 221 Verification shall include reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial users within the public water system's service area, and currently utilizing the same sources but not receiving water from the city/county. This requirement may be met if the impacts have been previously analyzed as part of an Environmental Impact Report (e.g., as part of a SB 610 WSA).

6.2.2 Proof of Rights to Groundwater

If a subdivision will use groundwater, substantial evidence shall be presented regarding landowner rights to groundwater for the subdivision.[66] The analysis that may be required to demonstrate "rights" to groundwater is far from clear. As mentioned in **Section 2**, groundwater rights are generally categorized as either overlying or appropriative. Generally, water purveyors that provide water to developments hold appropriative rights to groundwater. Appropriative rights to groundwater exist only in the event that there is surplus water in the groundwater basin. Accordingly, a finding of surplus may be required before a water provider can make water available for the development. According to the Department of Water Resource's Bulletin 118 – 2003, there is not currently a groundwater basin in the Sacramento Valley that is overdrafted. While this is a starting point for a domestic water purveyor to prove rights to groundwater, an affirmative finding of a right to groundwater based upon surplus groundwater conditions may be extremely difficult to make in light of the complicated nature of underground water systems and the difficulty in assessing availability of supplies. In this light, proving a right to groundwater as opposed to merely the availability of groundwater, is a nuance that has yet to be fully developed as part of a SB 221 Verification efforts to date.

6.2.3 Future Water Supplies

Government Code 66473.7(b)(3) provides that even in the case the SB 221 Verification indicates that there is an insufficient supply**,** the local agency may make a finding on the record, that additional supplies will materialize that will satisfy requirements. This provision raises an interesting evidentiary issue outside of the SB 221 Verification because the tentative map condition of verifying sufficient water supply need not be based entirely upon the conclusions in the Water Supply SB 221 Verification. In other words, this action may require a water purveyor to commit to a future act or promise a future condition without essentially having the water supply available. Accordingly, if the "finding" of the water

[66] Government Code § 66473.7(h)

purveyor is incorrect and the water supplies cannot be secured, a SB 221 Verification may be made that may not have a verifiable water supply for the development with it.

SECTION 7 – "LOW THRESHOLD" PROJECTS

The requirements of the Senate Bill 610 Water Supply Assessment (SB 610 WSA) and the Senate Bill Water Supply Verification (SB 221 Verification) are intended to ensure that development proposals meeting specific criteria are fully analyzed from a water supply and demand perspective so that a land use entity may make an informed decision regarding the environmental impacts of a project based upon substantial evidence. Assuming a project does not meet the thresholds to trigger an SB 610 WSA or SB 221 Verification, it is nearly certain that a land use entity will need to prepare an environmental assessment and ultimately an Environmental Impact Report (EIR). A "low threshold" project would be one that is not 500 units or greater and does not increase the number of connections of a jurisdiction with fewer than 5,000 connections by 10% or more.

In a "low threshold" project, the water supply analysis will almost exclusively be contained in the environmental assessment required pursuant to California Environmental Quality Act (CEQA). Section 3.1.2 of the Guidebook provides an outline of the general requirements and relevant criteria to be used by a land use entity in preparation of an analysis of water supply impacts of a project. While Section 3.1.2 is written specifically in regards to General Plans, the requirements at more specific planning stages (e.g., specific and community plans) are similar. The primary distinction is that, at successive planning stages, an EIR must contain more detailed analyses of water supplies and the associated uncertainties of the supplies materializing, as well as a detailed analysis of alternatives and their associated environmental impacts.

Also, important to the analysis of "low threshold" projects in a draft EIR are the following four factors: (1) whether known direct impacts to water resources are addressed and whether the conclusions are supported by substantial evidence presented in the draft EIR itself; (2) whether the draft EIR analyzes a range of reasonably foreseeable indirect physical changes that could have an impact on water resources; (3) if applicable, whether the draft EIR appropriately relies upon tiering as outlined in Section 3.1.2.4.; (4) whether the range of alternative supplies seems reasonable, and depending upon the planning stage, whether a refined subset of highly likely supplies are rigorously analyzed for their impacts on hydrology and water quality resources.

In conclusion, even though a land use proposal doesn't trigger the requirement to prepare an SB 610 WSA or SB 221 Verification, the project still must satisfy the CEQA requirements to assess hydrology and water quality impacts.

SECTION 8 – OUTREACH AND COORDINATION

8.1 INTRODUCTION

Section 8 outlines the opportunities for both water purveyors and individuals to coordinate with local government representatives and staff based upon the scope and substance of the information developed in Sections 3-7. The outline clarifies roles and responsibilities of land use agencies and water purveyors and identifies opportunities for individuals and entities with both the expertise and a stake in the resource to coordinate efforts for sound regional water management.

8.2 COORDINATION AND COOPERATION OPPORTUNITIES

8.2.1 The General Plan Process

Development of General Plan elements: Of the five documents discussed in the Guidebook, the General Plan is probably the most open and inclusive in terms of coordination with outside entities during development and review of the General Plan elements. The implementation strategies identified to satisfy the goals and policies often involve outside agencies because those agencies and their members are integral to conservation and protection of water resources. Thus, participation in development of the Conservation, Open Space, Public Utilities and Water Elements (if applicable) is important.

> ***Recommended Actions:*** As outlined in **Section 3**, the General Plan elements identify the goals, policies and implementation measures associated with conservation and protection of various natural resources. Because the implementation measures often involve coordinated efforts with land use entities and special districts in the region, it is important that water districts and companies review drafts of these elements to ensure that the land use entity is appropriately committing the water managers to efforts that are within its jurisdiction and budget.

Provision of Water Supply and Demand Information Pursuant to Government Code 65352.5: While almost all the Northern California Water Association (NCWA) members would *not* fit the definition of "public water system" and therefore not be responsible for providing information pursuant to Government Code § 65352.5, water districts should consider

provision of such information to the extent it would benefit the integration of land use and water supply planning processes.

> ***Recommended Actions:*** Assuming a public water system exists that must provide information pursuant to Government Code § 65352.5, Sacramento Valley water districts should ensure the provision of adequate information consistent with the following elements: (1) the most current Urban Water Management Plan (UWMP) of the public water system; (2) a description of its water supply sources in wet, normal and dry years; (3) a description of the its demands from all sources in the previous five years; (4) any proposed additional supplies; (5) a description of total current customers by category; (6) quantification of demand reduction associated with water use reduction measures in a water supplier's urban water management plan; and (7) any additional information that would allow for a determination of adequacy of existing and future supplies for the existing and projected demands.

Review and Development of CEQA Documentation Regarding Environmental Impacts: The water purveyors, as recognized agencies, and the individual water users are in a unique position to comment on the potential hydrologic and water quality impacts of the General Plan. Two opportunities are available for comment. The initial opportunity exists in responding to the Notice of Preparation (NOP) at the point it is distributed, and providing comments that ensure certain environmental considerations will be made as part of the EIR. An additional opportunity will exist upon release and request for comments on the draft EIR.

> ***Recommended Actions:*** Each Sacramento Valley water district should contact the Planning Department at its respective local land use agency and ensure that it is on the distribution list for the NOP and draft EIR for any General Plan California Environmental Quality Act analysis. Comments on the NOP should focus on the relationship between the proposed land uses in the "project" and the impacts to hydrology and water quality associated with the "project." Importantly, the NOP is an opportunity to identify these potential impacts and request that the scope of the draft EIR encompass an analysis of specific potential environmental impacts upon water resources. The more that water district and water user expertise is brought to bear at this stage in the process, the greater the likelihood that the EIR will proceed efficiently and encompass important issues. Water districts should give specific thought to the five factors identified in **Section 3.1.2.3** when considering the range of potential impacts.
>
> At the point the draft EIR is released for comment, interested parties will be considering the scope and depth of the environmental analysis and the proposed mitigation measures. The draft EIR will present the significant impacts of the project and the associated mitigation measures that reduce the impact to less than significant.

Alternatively, the draft EIR may recognize that even with mitigation there will be significant unavoidable impacts that are acceptable because of overriding considerations. These considerations are generally economic or social in nature and balance the interests of human development of water resources with the environmental impacts associated with water development.

A party reviewing a draft EIR for either a General Plan or a "project" requiring an Senate Bill 610 Water Supply Assessment (SB 610 WSA) (as explained below), should consider the following when assessing the reasonableness of the environmental analysis and the mitigation measures: (1) whether known direct impacts to water resources are addressed and whether the conclusions are supported by substantial evidence presented in the draft EIR itself; (2) whether the draft EIR analyzes a range of reasonably foreseeable indirect physical changes that could have an impact on water resources; (3) if applicable, whether the draft EIR appropriately relies upon tiering as outlined in **Section 3.1.2.4.**; (4) whether the range of alternative supplies seems reasonable, and depending upon the planning stage, whether a refined subset of highly likely supplies are rigorously analyzed for their impacts on hydrology and water quality resources.

It is important to keep in mind that the degree of certainty required for a water supply analysis of associated impacts of any water supply alternatives presented in the General Plan draft EIR is fairly modest. A draft EIR at a highly refined planning stage (e.g., Specific Plan), will need to ultimately consider the impacts of a few, highly likely supply alternatives. This ensures that the land use governing body is making informed decisions with the environmental consequence of those decisions in mind.

Provision of Information as Part of a Water Supply Evaluation: An opportunity exists for those water purveyors providing some water for domestic purposes to ensure that the land use agency has sufficient information to evaluate the balance of supplies and demands as they relate to the broad land use changes in the General Plan. Again, a Water Supply Evaluation (WSE) is not a document required by statute, but rather should be seen as a document that develops supply and demand information somewhat consistent with that which is required in a SB 610 WSA. Therefore, to the extent a purveyor can provide such information in a transparent and thorough fashion, there is an opportunity to ensure sound water supply planning as well as consideration of issues raised by potentially affected water purveyors.

Recommended Actions: As presented in **Section 3.1.3.**, a WSE should include the following elements: (1) study area description; (2) land use data; (3) water demands; (4) water supplies; (5) integration of supplies and demands. Importantly, the land use

data at the General Plan stage may be broad, and thus the demand analysis may be appropriately presented on a per-acre basis as opposed to a *per-dwelling unit* basis. The supply analysis should at least entail discussion of the supply resources currently available and likely to be available throughout the planning horizon of the General Plan. To the extent surface water supplies are a potential resource, there should be a description of the supply at the greatest level of detail possible. If groundwater is identified as a source, there again should be a reasonable discussion of the available resources with an eye towards the subsequent planning stages that require a higher degree of certainty regarding the availability of groundwater supplies. Clearly, at the General Plan stage, the discussion may be broad and might rely on description of water levels in the basin, general contours of the groundwater subbasin and a discussion of participation of the water supplier or the land use entity in any groundwater management efforts.

Because preparation of a WSE is not a statutory requirement, the land use entity does not have to attach it to a General Plan EIR or release the document in any prescribed fashion. Yet, because an EIR must be supported by substantial evidence, to the extent a WSE is prepared, it is probably in the best interest of the land use entity to reference the document as extensively as possible. Thus, a water district evaluating an EIR may consider whether the analysis of impacts to water resources is supported by evidence similar to that which would be prepared in a WSE.

Public Hearings: Beyond the opportunities available on the planning side, individuals have the opportunity to review and comment at all public hearings relating to adoption of the General Plan, as well as during certification of the environmental documentation associated with the project.

8.2.2 The Urban Water Management Plan Process

Description of Supplies: While the responsibility of preparing an UWMP rests with a public water system, and the requirements provide a description of the supplies and demands associated with the public water system's jurisdiction, there are examples in which the entity preparing the UWMP is a local government. Because the governing body adopting the UWMP in these cases represents the entire political jurisdiction, staff will likely feel compelled to describe all water supplies and demands in the jurisdiction. This description of other purveyor supplies and demands might simply present historic conditions and provide some general information regarding future conditions.

Recommended Actions: If a water district lies within a political jurisdiction that is responsible for preparing a UWMP because the political jurisdiction is also an urban water supplier that meets the requirements for preparation of a UWMP, it is important for that water district to ensure that it is noticed when the political jurisdiction is

preparing a UWMP. This will ensure that any supply and demand information pertaining to the water district that is presented in the UWMP is accurate.

Comment on Draft Copy of UWMP: The Urban Water Management Planning Act requires a coordinated effort with other water purveyors in the region that may be affected by the planning efforts of the preparing entity. Thus, the preparing entity must notify such entities, make a draft copy of the UWMP available and request comments regarding the content and recommendations prior to its formal adoption after a public hearing.

Recommended Actions: Each water district can assess which urban water suppliers are adjacent to it, and request that the urban water supplier send it a draft copy of the UWMP. As explained in **Section 4.2**, a UWMP should contain a discussion of the following elements: study area; water supplies; water supply reliability; water demands; demand management measures; a water shortage contingency plan; recycled water plan, water transfers and exchanges.

8.2.3 The SB 610 Water Supply Assessment Process

Project Approval: A local government jurisdiction that makes a discretionary decision to approve a project as defined in Water Code § 10912 will be responsible for meeting the substantive requirements of California Environmental Quality Act (CEQA) and the SB 610 WSA requirements as contained in Water Code § 10910 et seq.. Development of the SB 610 WSA itself may entail the involvement of a water purveyor that is not the political jurisdiction approving the project, and in that case coordination is mandatory consistent with the provisions outlined in **Section 5** of this document. For all other entities and individuals, review and comment on the water supply and demand analysis as prepared in the SB 610 WSA will take place as part of the development of the CEQA document and the project approval itself.

Recommended Actions: Because an SB 610 WSA must be appended to the relevant CEQA document, there is an opportunity for those entities not involved in the preparation of the SB 610 WSA to review both the public water system's findings regarding "sufficiency" as well as the assessment of environmental impacts in the CEQA document. Key components of the CEQA document that should be considered are identified in **Section 8.2.1.** (*Review and Development of CEQA Documentation Regarding Environmental Impacts).*

Because the SB 610 WSA for a "project" as defined in Water Code § 10912 will most likely serve as the primary source of substantial evidence for the environmental analysis in the CEQA document, it should be evaluated to determine whether the required elements are considered and whether there is a reasonable "sufficiency"

analysis. Importantly, the demand and supply analyses should be reviewed in light of the considerations presented in **Section 5.5.**

8.2.4 The SB 221 Water Supply Verification Process

Tentative Map Approval: The tentative map approval is an interim stage in the local government land use planning process in which a Planning Commission (or advisory agency) approves the specific land use plans prior to formal approval of either a Parcel Map or a Final Map. Importantly, a Planning Commission's approval of a tentative map is considered quasi-judicial and therefore the decision is final unless appealed to the primary legislative body of the respective jurisdiction. Because written verification of sufficient water supply is prepared by a public water system at the request of the subdivision applicant pursuant to a condition issued by the land use entity as part of a tentative map approval, it is an "internal" document until released for review and comment prior to consideration of the tentative map at a public hearing. Notably, some jurisdictions use an "advisory agency" to review tentative map applications, and this "advisory agency" may be authorized to issue the approval without a public hearing. Also, while a tentative map approval is subject to CEQA requirements, it likely that such review may be incorporated by reference to earlier environmental analyses prepared as part of an area, specific, or community plan. Thus opportunities to comment or voice concerns may be very limited at this stage of the land use planning process.

Recommended Actions: Because the SB 221 Water Supply Verifications (SB 221 Verification) is the evidence used to support the finding that there is a "sufficient" water supply, and the finding is a necessary condition for tentative map approval, it is not clear whether the SB 221 Verification itself must be released in any specific fashion as part of the land use planning process. For the sake of transparent and reasoned land use planning, it is likely most land use entities approving a tentative map will include the SB 221 Verification as supporting documentation for the tentative map approval and receive comment from interested parties during a hearing. While some jurisdictions have designated staff authorized to approve/deny tentative map applications, it is highly unlikely that any development project that triggers an SB 221 Verification, would review such a project without a public hearing because of the potential impacts.

It is reasonable for an interested party (i.e., a water district) to contact the local land use planning agency and request that notice be provided when a tentative map application hearing is pending. Assuming such applications are not submitted and reviewed on a frequent basis, the burden associated with providing this information seems relatively low, and to the extent it is being requested to ensure good land use and water supply planning, most land use entities would likely welcome the interest.

8.3 CONCLUSION

Collaboration, comment and integration opportunities presented in this section indicate that there are fewer opportunities for coordination in the later stages of the development review process. Thus, early coordination and participation in the broader water supply planning process is important because there is more flexibility to analyze alternatives, incorporate comments and concerns, and find mutually agreeable solutions.

As further indicated by the formalities of coordination in the described planning processes, there is little incentive for a land use entity to reach out to local or regional water purveyors. Complicating this matter is the lack of clarity in the roles and responsibilities of water purveyors and government entities as it relates to surface water and groundwater management. As such, land use planning agencies can easily limit their coordination efforts to those statutorily required under each previously described process.

To improve opportunities for involvement, the NCWA and its members should (1) proactively engage local planning entities, (2) prepare consistent messaging regarding methods to mitigate regional water resource concerns, and (3) expend the energy and resources necessary to review and comment on the water supply analyses included in local land use planning documents.

Overall, elevated and proactive coordination and cooperation between the broad water community and the land use planning authorities is necessary to improve the chance of ensuring regionally acceptable water management strategies and consistency throughout the various levels of water supply evaluations, assessments and verifications.